April 2003

Final Natomas Basin Habitat Conservation Plan

Volume 1

prepared by

City of Sacramento
Sutter County
Natomas Basin Conservancy
in association with
Reclamation District No. 1000
Natomas Central Mutual Water Company

prepared for

United States Fish and Wildlife Service
California Department of Fish and Game

Natomas Basin E042002017SAC cover_9.indd 04.15.03 mdb

FINAL NATOMAS BASIN HABITAT CONSERVATION PLAN

SACRAMENTO AND SUTTER COUNTIES, CALIFORNIA

April 2003

Prepared By:

City of Sacramento
City Hall
915 I Street, Room 100
Sacramento, CA 95814
Tel: 916-808-8368; Fax: 916-566-3968

Sutter County
P.O. Box 1555
Yuba City, CA 95992
Tel: 530-822-7400; Fax 530-822-7109

The Natomas Basin Conservancy
1750 Creekside Oaks Drive, Suite 290
Sacramento, CA 95833
Tel: 916-649-3331; Fax 916-649-3332

In Association With:

Reclamation District No. 1000
1633 Garden Highway
Sacramento, CA 95833
Tel: 916-922-9173; Fax 916-922-2129

Natomas Central Mutual Water Company
2601 West Elkhorn Boulevard
Rio Linda, CA 95673
Tel: 916-419-5936; Fax 916-419-8691

TABLE OF CONTENTS

I. INTRODUCTION . . . . . I - 1
- A. Purpose and Overview of the Plan . . . . . I - 1
- B. Plan Participants . . . . . I - 3
  - 1. Permittors (Wildlife Agencies) . . . . . I - 4
  - 2. Permittees . . . . . I - 4
  - 3. Plan Operator . . . . . I - 10
  - 4. Third Parties . . . . . I - 11
  - 5. Potential Permittees . . . . . I - 11
- C. Biological Goals and Objectives of the NBHCP . . . . . I - 12
  - 1. Overall Goals and Objectives . . . . . I - 14
  - 2. Wetland Species/Habitat Goals and Objectives . . . . . I - 16
  - 3. Upland Species/ Habitat Goals and Objectives . . . . . I - 16
- D. Conservation Strategy of the NBHCP . . . . . I - 16
- E. Overall Benefits of the NBHCP . . . . . I - 18
- F. Regulatory Background . . . . . I - 19
- G. Plan Formulation Process . . . . . I - 20
- H. Legal Challenge in Federal Court . . . . . I - 24
- I. Requirements for the Issuance of the Permits . . . . . I - 27
  - 1. Federal Permit . . . . . I - 27
  - 2. State Permit . . . . . I - 28
- J. Structure of the Plan . . . . . I - 30
- K. Relationship of the Plan to Individual Permittees . . . . . I - 30
- L. Environmental Compliance . . . . . I - 33
- M. Species Covered by the Permit . . . . . I - 33
- N. Covered Activities . . . . . I - 34
  - 1. Land Use Agencies' Covered Activities . . . . . I - 34
  - 2. Water Agencies' Covered Activities . . . . . I - 36
  - 3. TNBC Covered Activities as Permittee and Plan Operator . . . . . I - 37
- O. Activities not Covered by the NBHCP . . . . . I - 37
- P. Adaptive Management Provisions . . . . . I - 38

II. BIOLOGICAL DATA . . . . . II - 1
- A. Environmental Setting . . . . . II - 1
- B. Habitat Distribution . . . . . II - 1
- C. Covered Species . . . . . II - 6
  - 1. Species Potentially Affected by Covered Activities . . . . . II - 8
  - 2. Giant Garter Snake . . . . . II - 11
  - 3. Swainson's Hawk . . . . . II - 17
  - 4. Other Covered Species Which May Occur in the NBHCP Area . . . . . II - 20
- D. Species Which May Occur in the NBHCP Area . . . . . II - 44

III. LAND USE ISSUES . . . . . III - 1
A. Authorized Development by Jurisdiction . . . . . III - 1
B. Existing Land Use . . . . . III - 3
1. Agriculture . . . . . III - 3
2. Waterways . . . . . III - 4
3. Road Network . . . . . III - 5
4. Urban Development . . . . . III - 6
5. Sacramento International Airport . . . . . III - 9
C. Potential Development . . . . . III - 11
1. Foreseeable Urban Development and Status Under the NBHCP . . . . . III - 11
2. Conversion of Agricultural Lands . . . . . III - 17

IV. CONSERVATION PLAN IV-1
A. Plan Purpose IV-1
B. Plan Operator IV-2
C. Conservation Strategies to Mitigate for Urban Development IV-5
1. General Strategies to Mitigate the Impacts of Urban Development IV-5
2. Reserve Acquisition Guidelines and Criteria IV-14
3. Conservation Strategy for Wetland Habitat as Mitigation for Urban Development IV-19
4. Conservation Strategy for Upland Habitat as Mitigation for Urban Development IV-26
5. Conservation Strategies for Vernal Pool Species as Mitigation for Urban Development IV-28
D. Reserve Management/Site Specific Management Plans IV-29
1. Site-Specific Management Plan Policies IV-31
2. Management Activities IV-32
3. Restoration and Enhancement Programs IV-34
4. Reserve Water Management IV-35
5. Avoiding Management Conflicts With the Sacramento Airport IV-38

V. TAKE AVOIDANCE, MINIMIZATION AND MITIGATION V-1
A. Land Use Agencies' Conservation Measures V-1
1. Pre-Construction Surveys V-1
2. Preservation of the Area Adjacent to Fisherman's Lake V-2
3. General Measures to Minimize Take V-2
4. Measures to Minimize Take of Vernal Pool Species V-3
5. Measures to Reduce Take for Individual Species V-6
B. The Natomas Basin Conservancy's (TNBC) Conservation Measures V-17
1. General Conservation Strategies V-17
2. Conservation Strategies for Wetland Species and Reserves V-17
3. Conservation Strategies for Upland Species and Reserves V-17
4. Conservation Strategies for Individual Species V-18
C. Water Agencies' Conservation Measures V-28

1. Water Agencies' Covered Activities V-28
2. Water Agencies' Facilities V-29
3. Water Agencies' Conservation Measures for Giant Garter Snake V-30
4. Reporting Requirements for Covered Activities V-36
5. Covered Activities and Adaptive Management V-36
6. Federal Provision of Construction Incentives for Water Districts and Users V-36

VI. PLAN IMPLEMENTATION VI-1
A. Term of Permit VI-1
B. Funding VI-1
1. The Mitigation Fee VI-1
2. Mitigation Fee Amount/Adjustments VI-2
3. Catch-Up Fee Ordinance VI-6
C. Phasing of Mitigation with Respect to Development VI-7
D. Accounting of Mitigation Land VI-8
E. Monitoring of the NBHCP VI-9
1. Compliance Monitoring VI-10
2. Biological Effectiveness Monitoring VI-14
3. Design of Biological Effectiveness Monitoring Programs VI-17
F. Adaptive Management VI-25
1. General Information VI-25
2. Adaptive Management Revisions to the NBHCP VI-27
3. NBHCP Database and Scientific Authority VI-27
G. Annual Report VI-29
H. Program Adaptation for Recovery Plans VI-29
1. Changes Due to Future Recovery Plans Other than Changes to Managed Marsh Component VI-29
2. Swainson's Hawk Recovery Plan VI-31
I. NBHCP Overall Program Review at 9,000 Acres of Development VI-31
J. Independent Mid-Point Reviews for Land Use Agencies VI-33
K. Unforeseen Circumstances/"No Surprises"/Changed Circumstances VI-34
1. Applicability of the "No Surprises" Protections VI-35
2. Changed Circumstances VI-36
L. Enforcement, Amendments, HCP Requirements VI-43
1. Enforcement of the Section 10(a)(1)(B) and Section 2081 Permits VI-43
2. Severability VI-44
3. Amendments and Revisions VI-44
4. Function of NBHCP under ESA and CESA VI-48

VII. TAKE LEVELS/IMPACTS OF THE PLAN VII-1
A. Effects on Covered Wildlife Species VII-1
B. Effects on Vernal Pool Species VII-2
C. Extent of Incidental Take VII-3

D. Impacts On Individual Species VII-4
1. Giant Garter Snake VII-5
2. Swainson's Hawk VII-12
3. Valley Elderberry Longhorn Beetle (VELB) VII-20
4. Tricolored Blackbird (Agelaius tricolor) VII-23
5. Aleutian Canada Goose (Branta canadensis leucopareia) VII-26
6. White-faced Ibis (Plegadis chihi) VII-28
7. Loggerhead Shrike (Lanius ludovicianus) VII-31
8. Burrowing Owl (Athene cunicularia hypugea) VII-35
9. Bank Swallow (Riparia riparia) VII-37
10. Northwestern Pond Turtle (Clemmys marmorata marmorata) VII-40
11. California Tiger Salamander (Ambystoma californiense) VII-42
12. Western Spadefoot Toad (Scaphiopus *hammondii*) VII-45
13. Vernal Pool Fairy Shrimp (Branchinecta lynchi) VII-47
14. Vernal Pool Tadpole Shrimp (Lepidurus packardi) VII-49
15. Midvalley Fairy Shrimp (Branchinecta n.sp.) VII-51
16. Delta Tule Pea (Lathyrus jepsonii var. jepsonii) VII-54
7. Sanford's Arrowhead (Sagittaria sanfordii) VII-55
18. Boggs Lake Hedge-Hyssop (Gratiaola heterosepala) VII-58
19. Sacramento Orcutt Grass (Orcuttia viscida) VII-60
20. Slender Orcutt Grass (Orcuttia tenuis) VII-61
21. Colusa Grass (Neostapfia colusana) VII-63
22. Legenere (Legenere limosa) VII-65
E. Take as a Result of Indirect Killing or Injury VII-66
F. Effects of the Plan on Long-Term Survival of Wetland-Dependent Species . . . VII-67
G. Species Recovery VII-70
H. Impacts of Reserve Management VII-71
1. Authorizing Management Take/Take for Scientific Purposes VII-71
I. Maximum Extent Practicable VII-72
1. Summary of Findings Under ESA and CESA VII-72
J. Alternatives to the Proposed NBHCP VII-76
1. No Action Alternative VII-76
2. Alternative Reserve Management VII-76
3. Alternate Proportions of Marsh and In-Basin Land VII-77

VIII. REFERENCES VIII-1
A. Bibliography VIII-1
B. Persons and Organizations Consulted VIII-13
C. Report Preparers VIII-15
1. Document Revision and Preparation VIII-15
2. Public Review and Agency Coordination VIII-16
3. Technical Analysis VIII-16
4. Biological Consultant VIII-16
5. Economic Analysis VIII-16

LIST OF TABLES

TABLE I - 1
LISTED, CANDIDATE, AND OTHER SPECIES ADDRESSED IN THE NBHCP AND COVERED BY ITS ASSOCIATED PERMITS . . . . . I - 13
TABLE I - 2
NBHCP REVISIONS . . . . . I - 25
TABLE II - 1
LAND CLASSIFICATIONS IN THE NATOMAS BASIN - 1997 (ACRES) . . . . . II - 2
TABLE II - 2
CANALS AND DRAINS IN THE NATOMAS BASIN - 2001(MILES) . . . . . II - 5
TABLE II - 3
CANALS AND DRAINS IN THE NATOMAS BASIN-2001 (ACRES) . . . . . II - 5
TABLE II - 4
VERTEBRATE WILDLIFE WHICH MAY OCCUR IN THE NATOMAS AREA BY HABITAT TYPE . . . . . II - 45
TABLE III-1
PLANNED DEVELOPMENT BY PERMITTEE . . . . . III - 2
TABLE III-2
CANALS AND DRAINS IN THE NATOMAS BASIN - 2001 (MILES) . . . . . III - 4
TABLE III-3
CANALS AND DRAINS IN THE NATOMAS BASIN - 2001 (ACRES) . . . . . III - 6
TABLE III-4
LAND USES BY JURISDICTION - 2001 (ACRES) . . . . . III - 7
TABLE III-5
POTENTIAL URBAN DEVELOPMENT . . . . . III - 12
TABLE V-1
MITIGATION RATIOS V-6
TABLE VI- 1
COMPONENTS OF CURRENT (2002) MITIGATION FEE PER ACRE DEVELOPED[1] VI-4
TABLE VI-2
HISTORY OF FEE VI-6
TABLE VI-3
SUMMARY OF TNBC MONITORING OBLIGATIONS VI-24
TABLE VI-4
PROPORTION OF MANAGED MARSH HABITAT VI-30
TABLE VII-1
ACREAGE CALCULATIONS VII-4
TABLE VII-2
GIANT GARTER SNAKE CHANGE IN POTENTIAL HABITAT (ACRES) VII-5
TABLE VII-3
SWAINSON'S HAWK CHANGE IN POTENTIAL NESTING HABITAT (ACRES) VII-13

TABLE VII-4
SWAINSON'S HAWK CHANGE IN POTENTIAL FORAGING HABITAT* (ACRES) VII-43
TABLE VII-5
UPLAND FORAGING HABITAT WITHIN TNBC RESERVES VII-15
TABLE VII-6
TRICOLORED BLACKBIRDS CHANGE IN POTENTIAL HABITAT (ACRES) VII-24
TABLE VII-7
ALEUTIAN CANADA GOOSE CHANGE IN POTENTIAL HABITAT (ACRES) VII-27
TABLE VII-8
WHITE-FACED IBIS CHANGE IN POTENTIAL HABITAT (ACRES) VII-29
TABLE VII-9
LOGGERHEAD SHRIKE CHANGE IN POTENTIAL HABITAT (ACRES) VII-32
TABLE VII-10
BURROWING OWL CHANGE IN POTENTIAL HABITAT (ACRES) VII-35
TABLE VII-11
BANK SWALLOW CHANGE IN POTENTIAL HABITAT (ACRES) VII-38
TABLE VII-12
NORTHWESTERN POND TURTLE CHANGE IN POTENTIAL HABITAT (ACRES) VII-40
TABLE VII-13
DELTA TULE PEA CHANGE IN POTENTIAL HABITAT (ACRES) VII-54
TABLE VII-14
SANFORD'S ARROWHEAD CHANGE IN POTENTIAL HABITAT (ACRES) . . VII-56
TABLE VII-15
STATUS OF WETLAND OVER TIME (IN ACRES) VII-70
TABLE VII-16
PROPORTION OF WETLAND BY TYPE OVER TIME (IN ACRES) VII-70

LIST OF FIGURES

Figure 1. Regional Location.
Figure 2. Land Use Agencies "Permit Areas"
Figure 3. Water Delivery and Drainage Systems
Figure 4. Aerial Photograph
Figure 5. 1908 Land Cover
Figure 6. Current Topography
Figure 7. Flood Prone Areas
Figure 8. Current Native Habitats
Figure 9. 1993 Habitat Types Map
Figure 10. 1997 Habitat Types Map
Figure 11. 2001 Habitat Types Map
Figure 12. Giant Garter Snake Records
Figure 13. Active Swainson's Hawk Nests\Swainson's Hawk Zone
Figure 14. Other Species Records
Figure 15. Rice Cultivation (1997)
Figure 16. Historic, Existing and Projected Urban Development Areas
Figure 17. TNBC Reserves and Water Agency Channels
Figure 18. Comparison of a Rice Field to a Managed Marsh
Figure 19. Wetland Plant Depths and Levee Structures (Figures 19.1 through 19.5)
Figure 20. Out-of-Basin Mitigation Areas

ATTACHMENTS

ATTACHMENT A: Proposed Natomas Basin Habitat Conservation Plan Implementation Agreement

LIST OF APPENDICES
(Under Separate Cover)

Appendix A: Economic Analysis of Natomas Basin Habitat Conservation Plan, dated March 2002, by Economic & Planning Systems, Inc.

Appendix B: California Department of Fish and Game Staff Report Regarding Mitigation for Impacts to Swainson's Hawk (*Buteo swainsoni*) in the Central Valley of California, dated November 1, 1994.

Appendix C: U.S. Fish and Wildlife Service (USFWS) Conservation Guidelines for the Valley Elderberry Longhorn Beetle, updated July 9, 1999.

Appendix D: California Department of Fish and Game Staff Report on Burrowing Owl Mitigation, dated October 17, 1995.

Appendix E: Federal Aviation Administration Advisory Circular dated May 1, 1997. Hazardous Wildlife Attractants On or Near Airports.

Appendix F: The Natomas Basin Conservancy By-Laws.

Appendix G: Pacific Region, USFWS and ACOE, Biological Opinion for 404 Permitted Projects with Relatively Small Effects to Vernal Pools, dated February 1996.

Appendix H: Biological Resources Technical Memo, prepared by CH2MHill, dated February 25, 2002.

Appendix I: NBHCP Fee Update - 2002, by Economic & Planning Systems, Inc., dated April 25, 2002.

Appendix J: Documents Regarding Sacramento Area Flood Control Agency Army Corps of Engineers Permit Compliance.

Appendix K: Addendum to the Biological Resources Technical Memo, prepared by CH2M HILL, dated April 2003.

Appendix L: Interim Survey Guidelines for Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for listed Vernal Pool Brachiopods, USFWS, April 19, 1996.

NBHCP Definitions

Terms used in this Plan shall have the same meaning as those same terms have under the ESA and CESA, except as set forth below. Capitalized terms used but not defined herein, but which are defined in the Plan, shall have the meanings specified in the Plan.

1. Adaptive Management. The term "Adaptive Management" means a method for examining alternative strategies for meeting measurable goals and objectives, and then, if necessary adjusting future conservation management actions according to what is learned to achieve those goals and objectives.

2. Amendment. The term "Amendment" shall refer to significant changes to the NBHCP, Implementation Agreement and/or Incidental Take Permit for circumstances as described in Chapter VI, Section 3(b) of the NBHCP. Amendments include activities which are more significant than and different from revisions (see also "Revisions").

3. Area B (Out of Basin Mitigation Area). Area B shall refer to lands identified on Figure 20 of the HCP in which TNBC may pursue acquisition of Mitigation Lands under the specific terms described in Chapter IV, Section 2.b of the HCP, with approval of USFWS and CDFG. TNBC shall account for all acreage acquired in Area B to ensure that the total amount of such lands does not exceed 20 percent of the total Mitigation Lands.

4. Authorized Development. The term "Authorized Development" means that development for which incidental take is authorized for the City of Sacramento and Sutter County under this NBHCP. Authorized Development is limited to a total of 15,517 acres of Planned Development (as further defined below in Section III.A) under the NBHCP. Included within the City's 8,050 acre portion of the Authorized Development are 28 acres of infrastructure development associated with the Metro Air Park (MAP) project in Sacramento County. Included within Sutter County's 7,467 acres of Authorized Development is 16.5 acres of proposed drainage channel improvements located within Sacramento County. Incidental take resulting from the 1,983 acre MAP project, including the 28 acres located in the City of Sacramento, is covered by separate incidental take permits issued by the Wildlife Agencies. The 15,517 acres of Authorized Development related incidental take within the City and Sutter County combined with the 1,983 acres of development related take within Sacramento County for the MAP project represent a total of 17,500 acres of potential urban development in the Natomas Basin which has been analyzed in the NBHCP as Planned Development, as further defined below. Any development within the City of Sacramento beyond the 8,050 acres to be covered under its incidental take permits, within Sutter County, beyond the 7,467 acres to be covered under its incidental take permits, or within Sacramento County beyond the MAP project, will not be covered under the respective incidental take permits and will trigger a reevaluation of impacts to and mitigation for biological and other resources in the Natomas Basin and amendment of the NBHCP and the incidental take permits or development of a new HCP and issuance of new incidental take permits to address such impacts and mitigation as appropriate.

5. Biological Monitoring. The term "Biological Monitoring" means the mandatory element of all HCPs that is designed and implemented to provide the information necessary to assess compliance and project impacts, and verify progress toward the biological goals and objectives for the Plan's Covered Species and habitats.

6. Biological Monitoring Plan. Refers to specific monitoring requirements to be conducted in the Natomas Basin as specified in Chapter VI, Section E, Subsection 2, and includes both the overall NBHCP Biological Effectiveness Monitoring Program and the Site Specific Biological Monitoring Programs.

7. Changed Circumstances. This term "Changed circumstances" is defined in Title 50 of the Code of Federal Regulations, Section 17.3 as changes in circumstances affecting a species or geographic area covered by the NBHCP that can reasonably be anticipated by Plan Participants and the USFWS, and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events.)" Changed circumstances addressed in NBHCP are outlined in Chapter VI, Section K of the HCP.

8. Compliance Monitoring. The term "Compliance Monitoring" means an itemized, task specific method of verifying that the Permittee is carrying out the terms of the NBHCP, Permit and IA.

9. Conservation Measures. The term "Conservation Measures" means that accepting and conveying developer mitigation fees, and possibly land dedications, as required under the NBHCP, the Land Use Agencies shall implement a variety of measures that will avoid, minimize or mitigate the take of Covered Species.

10. Covered Activities. The term "Covered Activities" means the Land Use Agencies Covered Activities and the TNBC Covered Activities.

11. Covered Activities, Land Use Agencies. The term "Land Use Agencies Covered Activities" refers to those specific activities identified at Chapter I, Section N.(1) of the NBHCP for which each Land Use Permittee shall be provided coverage under the federal Section 10(a)(1)(B) permits, and the State Section 2081 Permits. Covered Activities generally means the conversion from vacant land or agricultural uses to residential, commercial, and industrial uses, including related public and private infrastructure development and improvements by the City or Sutter County.

12. Covered Activities, TNBC. The term "TNBC Covered Activities" means those activities conducted by TNBC on behalf of the City, Sutter County and other Permittees who may obtain take authorization pursuant to the NBHCP or an HCP based on the NBHCP, within TNBC's Permit Area. These activities include acquisition, habitat creation, restoration, preservation, enhancement, management and monitoring activities within Conserved Habitat Areas. TNBC's Covered Activities are described at Chapter I, Section N (3) of the NBHCP.

13. Covered Activities, Water Agencies. The term "Water Agencies Covered Activity" refers to those specific activities identified in Chapter I, Section N (2) of the NBHCP for which each Water Agency Permittee shall be provided coverage under the federal Section 10(a)(1)(B) permits, and the State Section 2081 Permits. Such Covered Activities generally include physical maintenance and operation of the Water Agencies' existing facilities located within the Plan Area, including channel maintenance, vegetation control (where no herbicides are utilized), and construction or improvement of facilities where there is no increase to the footprint of the existing facility.

14. Covered Species. The term "Covered Species" means the Federally Protected Species, State Protected Species and the Other Species identified within Table I-1 hereto.

15. ESA and CESA. The term "ESA" means the Federal Endangered Species Act of 1973, as amended. The term "CESA" means the California Endangered Species Act, as amended.

16. Exempt Area. The term refers to areas within the Natomas Basin, within the City of Sacramento which are already approved for development or already developed and as shown on Exhibit B of the Implementation Agreement.

17. Federally Protected Species. The term "Federally Protected Species" means those plants and animals listed by the United States ("U.S.") under the provisions of ESA and shown as Covered Species on Table I-1 hereto that are found, or may be found, in the Permit Areas, as well as those other Covered Species listed on Table I-1 that the USFWS may list in the future.

18. Five Point Policy. The term "Five Point Policy" refers to an addendum to the HCP Handbook published by the Fish and Wildlife Service and the National Marine Service on June 1, 2000. The five point policy addendum provides clarifying guidance for conducting the incidental take permit program and for those applying for an incidental take permit under section 10(a)(1)(B) of the Endangered Species Act (ESA).

19. Habitat Values. The term "Habitat Values" means the capability of a land or water area or associated areas, where indigenous plant(s) or animal(s), individually or collectively, may occur and upon which the Covered Species are dependent, in whole or in part, to provide for some or all of their maintenance, growth and reproduction.

20. Implementation Annual Meeting. The term refers to the annual public meeting held jointly with TNBC, other Permittees, USFWS and CDFG to report on the progress of the HCP Conservation Strategy as described in Chapter VI.3.1 of the NBHCP.

21. Implementation Annual Report. The term refers to the annual report prepared by the TNBC describing the compliance and effectiveness monitoring processes and findings and the status of the progress in implementing the NBHCP in accordance with the requirements of Chapter VI, Section K of the NBHCP.

22. Incidental Take. The term "Incidental Take" means any taking of Covered Species that is incidental to, and not the purpose of, the carrying out of otherwise lawful activity.

23. Incidental Take Permits. The terms "Incidental Take Permits," "ITPs" and "Permits" mean the individual permits issued to each Permittee subject to Section 10(a)(1)(B) of the Endangered Species Act and Section 2081 of the California Endangered Species Act.

24. Independent Mid-Point Review. This term refers to the required review and evaluation of the effectiveness of the HCP by each of the land use agencies at a defined mid-point in the approval of Authorized Development and as more specifically defined in Chapter VI, Section J of the NBHCP.

25. Land Use Agencies. The term "Land Use Agencies"means the City of Sacramento and Sutter County. If and when Sacramento County submits and receives approval of its own ITP, Sacramento County would be considered a Land Use Agency as defined herein.

26. MAP (Metro Air Park) Habitat Conservation Plan (MAP HCP). This term refers to final approved Habitat Conservation Plan for the Metro Air Park Project located in the unincorporated portion of the Natomas Basin within Sacramento County, specifically, "Habitat Conservation Plan for the Metro Air Park Project in the Natomas Basin, Sacramento County, California, Prepared by Metro Air Park Property Owner's Association, Dated 2001."

27. Mitigation Fees. As defined in Chapter VI, the term "Mitigation Fees" means the one time, up-front fees levied upon an Authorized Development site (in gross acres) that is used to pay for the Mitigation Land acquisition, enhancement, management, monitoring, and other activities required under the NBHCP. The Mitigation Fees must be paid prior to the issuance of an Urban Development Permit by the Land Use Permittee. The components of the Mitigation Fee include: Land Acquisition, Restoration/Enhancement/Monitoring, Administration O&M, O&M Endowment Fund, Supplemental Endowment Fund, and Fee Collection Administration as defined in Chapter VI.

28. Mitigation Lands. The term "Mitigation Lands" means the reserve lands acquired through collection and use of Mitigation Fees from Authorized Development, and in some cases land which has been accepted for dedication from Authorized Development, which will be set aside and managed at a ratio of one-half (½) acre of land protected or preserved for every one (1) acre of land converted to Authorized Development. The NBHCP Operating Conservation Program will result in 8,750 acres of Mitigation Lands to be established and managed by TNBC.

29. Mitigation Ratio. The term "Mitigation Ratio" means mitigation for the conversion of land in the respective Permit Areas to Authorized Development at a ratio of one-half (½) acre of land protected or preserved for every one (1) acre of land converted to Authorized Development.

30. Mitigation Requirement. The term "Mitigation Requirement" means the mitigation requirement for each public and private project is determined by applying the Mitigation Ratio to the land area converted to Authorized Development as calculated in accordance with the requirements set forth in Chapter VI, Section 1.

31. Natomas Basin. "Natomas Basin" or "Basin" means that geographical area depicted in Figure 2, Natomas Basin and Affected Jurisdictions.

32. Natomas Basin Habitat Conservation Plan. The terms "Natomas Basin Habitat Conservation Plan," "NBHCP" and "the Plan" mean the year 2002 version of the Natomas Basin Habitat Conservation Plan prepared for the City of Sacramento, Sutter County, The Natomas Basin Conservancy (TNBC), RD 1000 and Natomas Mutual.

33. Natomas Basin Habitat Conservation Plan, 1997. The terms "1997 NBHCP" and "1997 Plan" mean the previously approved City of Sacramento Natomas Basin HCP that was the original basis for this 2002 NBHCP.

34. No Surprises Rule. The term "No Surprises Rule" refers the terms and conditions specified in the February 28, 1998, the U.S. Fish and Wildlife final rule codifying its "No Surprises" policy into federal regulation (63 FR 8859). The "No Surprises" rule states, in part, that: "In negotiating unforeseen circumstances, the [Service] will not require the commitment of additional land, water or financial compensation or other natural resources beyond the level otherwise agreed upon for the species

covered by the conservation plan without the consent of the Permittee. If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the [Service] may require additional measures of the Permittee where the conservation plan is being properly implemented, but only if such measures are limited to modifications within conserved habitat areas, if any, or to the Conservation Plan's Operating Conservation Program for the affected species, and maintain the original terms of the Conservation Plan to the maximum extent possible. Additional conservation and mitigation measures will not involve the commitment of additional land, water or financial compensation or restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the conservation plan, without the consent of the Permittee." (50 C.F.R. Sections 17.22(b)(5)(iii) and 17.32(b)(5)(iii).) The No Surprises Rules is discussed in Chapter VI, Section K of the NBHCP.

35. Operating Conservation Program. The term "Operating Conservation Program" means the totality of the conservation and management measures provided for under the NBHCP to avoid, minimize, mitigate and monitor the impacts of take of the Covered Species as described in Chapters IV through VI of the Plan. The Operating Conservation Program includes totals the Permittees reporting obligations under the Permits and responses to Changed Circumstances described in Chapter VI.

36. Overall Program Review. This term refers to a required program review of the effectiveness of the Operating Conservation Program to be initiated at the point Urban Development Permits covering a total of 9,000 acres of development in the Natomas Basin have been issued by the Land Use Permittees and by Sacramento County for the Metro Air Park. The areas to be covered by the Overall Program Review are specified and described in Chapter VI, Section I of the NBHCP.

37. Permit Area, City of Sacramento. The term "Permit Area" as applied to the City of Sacramento means that area designated on Figure 2 of the NBHCP Implementation Agreement that totals 8,050 acres located within the City of Sacramento city limits and in certain locations (i.e., the Panhandle Annexation Area) within the unincorporated areas of Sacramento County. Incidental take authority for the City of Sacramento is limited to this Permit Area.

38. Permit Area, County of Sutter. The term "Permit Area" as applied to Sutter County means that area designated on Figure 2 of the NBHCP Implementation Agreement that totals 7,467 acres located within the unincorporated areas of Sutter County, and approximately 16.5 acres located within unincorporated Sacramento County. Incidental take authority for Sutter County is limited to this Permit Area.

39. Permit Area, Natomas Mutual. The term "Permit Area" as applied to Natomas Mutual means canals, ditches, waterways, ponds and open water areas, as well as roads, right-of-ways, facilities, maintenance yards, pumps, pipelines, and water detention facilities, under the direct jurisdiction of Natomas Mutual and inside the inner toe of levees surrounding the Natomas Basin, but not including the Sacramento River levees. Incidental take authority for Natomas Mutual is limited to this Permit Area.

40. Permit Area, RD 1000. The term "Permit Area" as applied to RD 1000 means canals, ditches, waterways, ponds and open water areas, as well as roads, right-of-ways, facilities, maintenance yards, pumps, pipelines, and water detention facilities, under the direct jurisdiction of RD 1000 and

inside the inner toe of levees surrounding the Natomas Basin, but not including the Sacramento River levees. Incidental take authority for RD 1000 is limited to this Permit Area.

41. Permit Area, TNBC. The term "Permit Area" as applied to The Natomas Basin Conservancy (TNBC) consists of all lands within the Natomas Basin (the Plan Area), as well as the land bounding the Natomas Basin and extending to the edge of water immediately outside the Natomas Basin levees and Area B as depicted on Figure 20, Out of Basin Mitigation Areas.

42. Permittees. The term "Permittees" means the City of Sacramento, Sutter County, The Natomas Basin Conservancy and RD 1000 and Natomas Mutual to the extent that RD 1000 and Natomas Mutual apply for and obtain incidental take permits from USFWS and CDFG based upon this NBHCP.

43. Plan Area. The term "Plan Area" means the entire 53,537 acres of land within the inside toe of levee of the Natomas Basin levees. The Plan Area refers to the portion of the Natomas Basin that is bounded on the west by the Sacramento River, on the north by the Natomas Cross Canal, on the east by Steelhead Creek (formerly known as Natomas East Main Drain Canal), and on the south by the Garden Highway.

44. Planned Development. The term "Planned Development" means the Authorized Development plus the development of the 1,983 acre Metro Air Park, which is subject to the Metro Air Park Habitat Conservation Plan ("MAP Authorized Development").

45. Plan Operator. The term "Plan Operator" means The Natomas Basin Conservancy, the entity responsible for implementing the NBHCP.

46. Plan Participants. The term "Plan Participants" means parties actively involved in implementing the NBHCP, including the Wildlife Agencies (USFWS and CDFG), the Permittees (City of Sacramento, Sutter County, Natomas Mutual and RD 1000), and the Plan Operator (TNBC).

47. Potential Permittees. The term "Potential Permittees" refers to additional entities within the Natomas Basin that may decide to commit to the terms of the NBHCP and the Implementation Agreement and, through the issuance of Permits by the Wildlife Agencies, join as full Permittees at a future date.

48. Protected Species. The term "Protected Species" means those plants and animals listed under the State CESA and the Federal ESA.

49. Revisions. Refers to minor changes to the NBHCP as specified in Chapter VI, Section 3.a of the NBHCP. Revisions to the NBHCP are changes to the Plan provided for under the Operating Conservation Program, including Adaptive Management changes and Mitigation Fee adjustments. These revisions would not result in operations under the NBHCP that are significantly different from those analyzed in connection with the NBHCP as approved, result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the NBHCP as approved.

50. Section 10(a)(1)(B) Permits. The terms "Section 10(a)(1)(B) Permits" or "Permits" as used in this Plan means the permits issued by the USFWS under Section 10 (a)(1)(B) of the ESA which authorize

the incidental take of a Covered Species which may occur as a result of urban development activities, including public facilities projects, within the City of Sacramento and Sutter County, or as a result of the operation and/or maintenance, including the construction and improvements with no significant increase to the existing footprint, of flood control or water supply activities, water ditches, canals, pumphouses, maintenance facilities, or other ancillary facilities within the Natomas Basin, or as a result of habitat management, enhancement, or restoration activities on reserve lands. "Permit" may also be used in this Plan to collectively refer to the Section 10(a)(1)(B) Permits, and the Section 2081 Permits.

51. Section 2081 Permits. The terms "Section 2081 Permits" or "Permits" means the permits for the incidental take of threatened and endangered species, listed under the CESA, issued by the CDFG under Section 2081(b) and/or 2081.1 of the California Fish and Game Code, or any successor section to authorize the incidental take of a Covered Species which may occur as a result of urban development activities, including public facilities projects, within the City of Sacramento and Sutter County, or as a result of the operation and/or maintenance, including the construction and improvements with no significant increase to the existing footprint, of flood control or water supply activities, water ditches, canals, pumphouses, maintenance facilities, or other ancillary facilities within the Natomas Basin, or as a result of habitat management, enhancement, or restoration activities on reserve lands. "Permits" may also be used in this Agreement to refer collectively to the Section 10(a)(1)(B) Permits and/or the Section 2081(b) or 2081.1 Permits.

52. Site Specific Management Plan. The terms "Site Specific Management Plan" and "SSMP" mean those plans that TNBC is required to complete for each reserve unit that it acquires. SSMP's shall include operations plans that address on-site habitat restoration, enhancement, maintenance and management activities that will be presented to the NBHCP TAC for approval on a three year basis.

53. State Protected Species. The term "State Protected Species" means those plants and animals listed by the State of California ("State") under the provisions of CESA and shown as Covered Species on Table I-1 hereto that are found, or may be found, in the Permit Areas.

54. Swainson's Hawk Zone. This zone is defined as the lands which are not currently developed (excluding the 252 acres of land designated "Urban" on the City of Sacramento General Plan and the North Natomas Community Plan located within the City of Sacramento) and which are located within the Natomas Basin and within one mile east of the Sacramento River and extending from the Natomas Cross Canal on the north and Interstate 80 on the south. See also Figure 13 of the NBHCP.

55. System of Reserves. The term "system of reserves" means Mitigation Lands generally and includes all habitat conserved and managed for the Covered Species, including rice fields by TNBC.

56. Take or Taking. With regard to any activities subject to ESA, the terms "Take" or "Taking" shall have the same meaning as provided in the ESA. With regard to any activities subject to CESA, the terms "Take" or "Taking" shall have the same meaning as provided in CESA.

57. Technical Advisory Committee. The terms "Technical Advisory Committee" and "TAC" mean the advisory group of technical experts selected by the Permittees and the Wildlife Agencies to assist TNBC Board with directing the implementation of the NBHCP.

58. The Natomas Basin Conservancy. The terms "The Natomas Basin Conservancy," "the Conservancy" or "TNBC" shall mean the independent entity established for the purpose of implementing the Natomas Basin Habitat Conservation Plan on behalf of the City, Sutter County and other Potential Permittees. The TNBC is also a Permittee for purposes of implementation of the reserve system.

59. TNBC Mitigation Land or Reserve Area. The term "TNBC Reserve Area" or "TNBC Mitigation Land" shall mean those areas where TNBC is authorized to acquire and manage wildlife reserves subject to the provisions of the NBHCP. Such areas shall include all lands within the Natomas Basin, as well as the land bounding the Natomas Basin and extending to the edge of water immediately outside the Natomas Basin levees and Area B as depicted on Figure 20, Out of Basin Mitigation Areas. The TNBC Reserve Area and the TNBC Permit Area are coterminous.

60. Unforeseen Circumstances. The term "Unforeseen circumstances" is defined at 50 C.F.R. 17.3 as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the USFWS at the time of the NBHCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species. Unforeseen circumstances are discussed in Chapter VI, Section K of the NBHCP.

61. Urban Development Permit and Urban Development Permittee. The term "Urban Development Permit" shall mean the final authorization granted by the Land Use Agencies prior to disturbance of undeveloped land in conjunction with a public or private development project. An Urban Development Permit may also be used to refer to a grading permit or notice to proceed. An "Urban Development Permittee" refers to the individual, agency or company applying for approval, or receiving approval of an Urban Development Permit from the Land Use Agencies.

62. Water Agencies. The term "Water Agencies" means RD 1000 and Natomas Mutual. Natomas Mutual is a private company and not a governmental agency.

63. Wildlife Agencies. The term "Wildlife Agencies" means the U.S. Fish and Wildlife Service and the California Department of Fish and Game.

I. INTRODUCTION

A. PURPOSE AND OVERVIEW OF THE PLAN

This document is the Natomas Basin Habitat Conservation Plan ("NBHCP" or "Plan"). The NBHCP is the conservation plan, which is part of the requirements of the Endangered Species Act, designed to support applications for federal permits under Section 10(a)(1)(B) of the Endangered Species Act. The NBHCP is also intended to serve as an application for incidental take permits under State law pursuant to Section 2081(b) of the California Fish and Game Code. A glossary of definitions for terms used within this document is provided prior to this section.

The purpose of the NBHCP is to promote biological conservation in conjunction with economic and urban development within the Permit Areas. The NBHCP establishes a multi-species conservation program to minimize and mitigate the expected loss of habitat values and incidental take of Covered Species that could result from urban development, operation and maintenance of irrigation and drainage systems, and certain activities associated with the Natomas Basin Conservancy (TNBC) management of its system of reserves established under the NBHCP. The goal of the NBHCP is to minimize incidental take of the Covered Species in the Permit Areas and to provide mitigation for the impacts of Covered Activities on the Covered Species and their habitat.

The NBHCP applies to the 53,537-acre area interior to the toe of levees surrounding the Natomas Basin, located in the northern portion of Sacramento County and the southern portion of Sutter County. The Basin contains incorporated and unincorporated areas within the jurisdictions of the City of Sacramento, Sacramento County, and Sutter County (see Figure 1, Regional Location and Figure 2, Land Use Agency "Permit Area"). The Sacramento International Airport is located in the Basin. The southern portion of the Basin is urbanized, but most of the Basin is used for agriculture.

The entities that may rely upon the NBHCP in their individual applications for federal incidental take permits under Section 10(a)(1)(B) of the Endangered Species Act and state incidental take permits under Section 2081 of the California Fish and Game Code are: (1) the City of Sacramento (City); (2) Sutter County (Sutter); (3) Reclamation District No. 1000 (RD 1000); (4) Natomas Central Mutual Water Company (Natomas Mutual) and (5) the Natomas Basin Conservancy (TNBC). The City, Sutter, RD 1000, and Natomas Mutual will obtain individual Section 10(a)(1)(B) permits from the U.S. Fish and Wildlife Service for Covered Activities conducted within each local agency's respective jurisdiction within the Natomas Basin. TNBC will obtain a Section 10(a)(1)(B) permit and a Section 2081 permit for reserve management and habitat establishment activities conducted by TNBC on behalf of the City, Sutter County and other Potential Permittees, within the Natomas Basin and Area B. Similarly, the City, Sutter, RD 1000, and Natomas Mutual will also each obtain individual Section 2081 permits, or amendments to existing 2081 permits, from the Department of Fish and Game for Covered Activities conducted within each local agency's respective jurisdiction within the Natomas Basin and TNBC will obtain a Section 2081 permit for reserve management and habitat establishment activities it conducts on behalf of the City, Sutter County

and other Potential Permittees, within the entire Natomas Basin and Area B. The City, Sutter County, RD 1000, Natomas Mutual and other potential Permittees will each be required to mitigate the impacts of their Covered Activities independently. Thus, if any one of the permits, other than the Permits issued to TNBC, is revoked, the other permits would remain in effect. This is in keeping with the design of the NBHCP as a mitigation tool which can be used by the various Permittees to obtain the necessary incidental take permits needed to conduct otherwise lawful activities within each entity's respective jurisdictional boundaries. Although the mitigation strategy provided for under the NBHCP would mitigate for effects resulting from the Land Use Agencies' Covered Activities, because the percentage of uplands to wetlands differs between their respective Permit Areas, the NBHCP allows for the mitigation strategy provided for under the NBHCP to be reevaluated in the event either the City's or Sutter County's permits are terminated or revoked, or a Permittee (other than TNBC) chooses not to participate in the NBHCP. The mitigation strategy would be reevaluated to ensure that the configuration of TNBC Mitigation Lands provided for under the NBHCP continues to adequately mitigate for the impacts of Authorized Development in the jurisdiction(s) participating in the NBHCP. Because TNBC in carrying out its reserve acquisition and management activities, is acting on behalf of and is controlled by the City, Sutter County and other Potential Permittees noncompliance by TNBC with the terms and conditions of its Permits, the NBHCP or Implementation Agreement, shall be considered a failure of the City and Sutter and other Potential Permittees to comply with their obligations under the NBHCP and may result in suspension and or revocation of their respective Permits.

The effectiveness of the NBHCP's Operating Conservation Program (OCP) to adequately minimize and mitigate the effects of take of the Covered Species due to Authorized Development depends on the City and Sutter County limiting total development within their respective Permit Areas to a combined total of 15,517 acres. In addition, the OCP and the NBHCP's effects analysis account for a combined total of 17,500 acres of Planned Development occurring in the Natomas Basin (i.e., 15,517 acres within the City and Sutter County's Permit Areas and 1,983 acres of Metro Air Park [MAP] development in Sacramento County).

Because the NBHCP's OCP is based upon the City and Sutter County limiting development limiting total development to 8,050 acres within the City's Permit Area, approval by the City of future urban development beyond the 8,050 acres or outside of its Permit Area would constitute a significant departure from the Plan's OCP and would trigger a reevaluation of the Plan, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional urban development, and/or possible suspension or revocation of the City's Permits in the event the City were to violate such limitations without having completed the required reevaluation, amendments or revisions. Similarly, approval by Sutter County of development within the Natomas Basin beyond the authorized 7,467 acres or outside of the Sutter County Permit Area would constitute a significant departure from the Plan's OCP and would trigger a reevaluation of the Plan, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional urban development, and/or possible suspension or revocation of the County's Permits in the event the

County were to violate such limitations without having completed the required reevaluation, amendments or revisions.

Any additional urban development within the Natomas Basin that occurs outside of the City's and Sutter's Permit Areas, with the exception of the MAP development, including any development with Sacramento County or within the jurisdiction of another Potential Permittee, also would constitute a significant departure from the Plan's OCP and would trigger a new effects analysis, a new conservation strategy, and issuance of Incidental Take Permits to the Potential Permittee for that additional urban development. Notwithstanding the foregoing, so long as the City and Sutter County limit urban development to their respective Permit Areas and the City and Sutter County continue to meet their obligations under this NBHCP, the OCP and associated Permits remain valid for each Permittee's Covered Activities.

This NBHCP is based upon the 1997 NBHCP that was the basis for issuance of permits to the City of Sacramento. The 1997 NBHCP has been updated and modified as a result of litigation involving a challenge to issuance of take permits to the City of Sacramento. This NBHCP has also been modified to include participation by the Permittees of the City, Sutter, TNBC, Natomas Mutual and RD 1000.

B. PLAN PARTICIPANTS

Implementation of the NBHCP will involve a variety of agencies and entities. Described below are the primary three categories of NBHCP participants:

(1) The Wildlife Agencies (USFWS and CDFG), which have incidental take permitting authority over federally and state listed species under the ESA and CESA, are the *Permittors*;

(2) City of Sacramento, Sutter County, the Natomas Basin Conservancy (TNBC), RD 1000 and Natomas Mutual are the *Permittees*;

(3) The Natomas Basin Conservancy (TNBC), which will carry out the mitigation requirements of the NBHCP on behalf of the other Permittees, is the *Plan Operator*. TNBC Board will be composed of representatives from, among other interested groups, the City of Sacramento, Sutter County, RD 1000 and Natomas Mutual.

In addition to the Plan Participants identified above, there is the potential for other parties to seek coverage under the NBHCP or a similar habitat conservation program. These entities and individuals are considered *Potential Permittees* and are discussed following the Plan Participants below.

1. Permittors (Wildlife Agencies)

a. U.S. Fish and Wildlife Service (USFWS)

The USFWS has the authority for issuing Section 10(a)(1)(B) incidental take permits under the ESA and will be responsible for enforcing the provisions of the federal incidental take permits, reviewing annual status reports and responding to requests for amendments, and providing technical assistance with regard to the acquisition and management of reserve lands and the implementation of avoidance and minimization measures. The USFWS will be an advisor to TNBC and to the Permittees.

b. California Department of Fish and Game (CDFG)

The CDFG is authorized pursuant to California Fish and Game Code Section 2081, subdivision (b), to issue incidental take permits under CESA. In that capacity as it relates to the NBHCP, the CDFG will be responsible for enforcing the provisions of the NBHCP implementation agreement, reviewing annual status reports, responding to requests by the Permittees for amendments, and providing technical assistance for acquisition and management of reserve lands. The CDFG will be an advisor to TNBC and the other Permittees in implementing the NBHCP. The CDFG will also assist, as appropriate, in reserve establishment and management and may serve as a successor to TNBC (see Section 3.4.7 of the Implementation Agreement).

2. Permittees

Each of the Permittees is expected to apply for and obtain separate Section 10(a)(1)(B) and Section 2081 permits for activities occurring under each Permittees' respective authorities. The Permittees shall utilize a single NBHCP and Implementation Agreement(s) will be executed as each participant becomes signatory to the HCP. Entities undertaking urban development or other Covered Activities under the direct control of the Permittees and in compliance with the NBHCP will be covered under the Permittee's Incidental Take Permits. Specific Covered Activities for each of the Permittees are identified under Section I.N. of this chapter.

As a Permittee, each of the Land Use Agencies will require all new development in the Natomas Basin to participate in the NBHCP and to provide for the establishment of a system of reserves in order to mitigate the individual and cumulative impacts of Authorized Development on Covered Species and their habitats. Urban Development must be in compliance with the NBHCP and state and federal law. Compliance with the Conservation Plan will typically be accomplished through payment of a mitigation fee, (or in lieu dedication of mitigation land as well as payment of the non-land acquisition portion of the fee), and compliance with all applicable avoidance, minimization, and mitigation measures required under the Plan. The Land Use Agencies will keep track of all Authorized Development to ensure that mitigation fees have been paid and required take avoidance, minimization and mitigation measures have been met. For

Authorized Development consisting of construction of public works or other public facilities, each of the Land Use Agencies, as a Permittee, shall ensure compliance with the NBHCP similar to private projects.

In addition to the Land Use Agency Permittees, the Water Agency Permittees will ensure that all Water Agencies' Covered Activities are conducted in accordance with the practices described in Chapter V.C.1. The Water Agencies shall annually report on their Covered Activities and document their compliance with the provisions of the NBHCP and the associated permits. These reports, along with those of the Land Use Agencies, shall be compiled annually by TNBC to form a Basin-wide record of Permittees' activities.

Finally, the TNBC as a Permittee, will comply with the habitat reserve acquisition and management measures included in Chapter IV as well as specific species conservation measures included in Chapter V.

a. City of Sacramento

The City of Sacramento will require the proponents of all new development in the Natomas Basin within the City's Permit Area to demonstrate suitable mitigation for project impacts in accordance with the NBHCP and in compliance with state and federal law. Such compliance shall include the requirements for land and/or fee dedication as described within this document as well as the application of all measures listed in Chapter V of this document to avoid, minimize and mitigate the take of Covered Species. This requirement will apply to all new development described in the North Natomas Community Plan and South Natomas Community Plan (see the associated Natomas Basin HCP Environmental Impact Statement/Environmental Impact Report which includes all adopted mitigation measures). All proponents of new development in the City shall comply with the applicable mitigation measures identified in the Mitigation Monitoring Plans approved with each community plan, as well as the measures of this NBHCP. The City of Sacramento is seeking coverage for a total of 8,050 acres of Authorized Development under the NBHCP.

In addition to review and approval of private urban development proposals, the City of Sacramento will construct public projects and infrastructure that shall also be covered by the NBHCP. The Public projects are included in the 8,050 acres of Authorized Development allocated to the City of Sacramento.

The effectiveness of the NBHCP's Operating Conservation Program (OCP) to adequately minimize and mitigate the effects of take of the Covered Species due to Authorized Development depends on the City and Sutter County limiting total development within their respective Permit Areas to a combined total of 15,517 acres. In addition, the OCP and the NBHCP's effects analysis account for a combined total of 17,500 acres of Planned Development occurring in the Natomas Basin (i.e., 15,517 acres within the City and Sutter County's Permit Areas and 1,983 acres of MAP development in Sacramento County). Because the NBHCP's OCP is based upon the City limiting total development to 8,050 acres within the City's identified Permit Area, approval by the City of future urban development beyond the 8,050 acres or outside of its Permit Area would constitute a significant departure from the Plan's OCP and would trigger a

reevaluation of the Plan, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional urban development, and/or possible suspension or revocation of the City's Permits in the event the City were to violate such limitations without completing such reevaluation, amendment or revision. Any additional urban development within the Natomas Basin that occurs outside of the City's and Sutter's Permit Areas, with the exception of the MAP development, including any development with Sacramento County or within the jurisdiction of another Potential Permittee, also would constitute a significant departure from the Plan's OCP and would trigger a reevaluation of the Plan, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy, and issuance of Incidental Take Permits to the Potential Permittee for that additional urban development and/or possible suspension or revocation of the City's Permits in the event the City were to violate such limitations. Notwithstanding the foregoing, so long as the City and Sutter County limit urban development to their respective Permit Areas and the City and Sutter County continue to meet their obligations under this NBHCP, the OCP and associated Permits remain valid for each Permittee's Covered Activities.

If the City of Sacramento annexes additional lands into the City (with the exception of the panhandle annexation area - see Section III.C) within the Plan Area but outside the City's Permit Area as shown on Figure 2, the City would be required to comply with state and federal law, to address the impacts of take resulting from future development of the annexed lands. As noted in Section VI.L of this NBHCP, inclusion of additional lands under the NBHCP for purposes of seeking incidental take coverage would require either an amendment of the Plan and the City's Incidental Take Permits or preparation of a new HCP for that additional area. Such an amendment would require the City to address various impacts, including impacts to the NBHCP Covered Species and the effects of urban development on lands proposed for annexation on the biological viability of such species and would be subject to all applicable state and federal statutes and regulations, including the provisions of the CESA, ESA, CEQA and NEPA.

For purposes of the NBHCP, although the West Lakeside Annexation area is proposed by the landowners to be annexed to the City of Sacramento, this area currently is located within Sacramento County and is not outside of the County's Urban Services Boundary and the City's Sphere of Influence, and it is not included in the 8,050 acres of Authorized Development or within the City's Permit Area. Thus, this annexation would trigger a reevaluation of the Plan, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the City for that additional urban development and possible suspension or revocation of the City's Permits in the event the City were to violate such limitations without completing such reevaluation, amendment or revision.

Any amendments proposed but not yet processed and approved will not affect the validity of this HCP.

b. Sutter County

Sutter County will require the proponents of all new development in the Sutter County portion of the Natomas Basin to demonstrate suitable mitigation for project impacts in accordance with the NBHCP and in compliance with state and federal law. This includes compliance with appropriate mitigation measures which might be identified and adopted pursuant to the California Environmental Quality Act (CEQA). HCP compliance shall include the requirements for land and/or fee dedication as described within this document as well as the application of all measures listed in Chapter V of this document to avoid, minimize and mitigate the take of Covered Species. Sutter County development under the NBHCP will include up to 7,467 acres of land located within the County's Industrial/Commercial Reserve area located in the southeast portion of Sutter County within the Natomas Basin.

Although the SYSCO project was approved prior to adoption of the NBHCP and issuance of Incidental Take Permits, the SYSCO project is located within the Sutter County Industrial/Commercial Reserve and was required to comply with the provisions of the NBHCP. Sutter County collected funds from SYSCO in the amount of the NBHCP fee in place at the time of project approval. These funds will be utilized to purchase 25 acres of TNBC reserve land. The 50 acre SYSCO project, located within the Sutter County Permit Area, is considered part of Sutter County's 7,467 acres of Authorized Development.

In addition to review and approval of private urban development proposals, Sutter County will construct public projects and infrastructure that shall also be covered by the NBHCP. These Public projects are included in the 7,467 acres of Authorized Development allocated to Sutter County.

At this time, there is one proposed Sutter County public facility project, drainage channel improvements to support the South Sutter County Specific Plan area, located on land in Sacramento County outside the Sutter County Industrial/Commercial Reserve. This project involves expanding two existing RD 1000 drainage channels to accommodate additional storm water flows. These channels, referred to as the East Drainage Canal and the Montna Drain, are located within Sacramento County immediately south of the Sutter-Sacramento County boundary. To the extent that these channels and their associated levees and access roads are expanded beyond the footprint of the existing facilities, Sutter County will consider the expansion of these facilities as urban development subject to the provisions of the NBHCP. Such increases in the footprint of the drainage channels are considered part of Sutter County's 7,467 acres of Authorized Development.

The effectiveness of the NBHCP's Operating Conservation Program (OCP) to adequately minimize and mitigate the effects of take of the Covered Species due to Authorized Development depends on the City and Sutter County limiting total development within their respective Permit Areas to a combined total of 15,517 acres. In addition, the OCP and the NBHCP's effects analysis accounts for a combined total of 17,500 acres of Planned Development occurring in the Natomas Basin (i.e., 15,517 acres within the City and Sutter County's Permit Areas and 1,983 acres of MAP development in Sacramento County). Because the NBHCP's OCP is based upon Sutter County limiting total development to 7,467 acres within

Sutter County's identified Permit Area, approval by Sutter County of future urban development beyond the 7,467 acres or outside of its Permit Area would constitute a significant departure from the Plan's OCP and would trigger a reevaluation of the Plan, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional urban development, and/or possible suspension or revocation of Sutter County's Permits in the event Sutter County were to violate such limitations without completing such reevaluation, amendment or revision. Any additional urban development within the Natomas Basin that occurs outside of the City's and Sutter's Permit Areas, with the exception of the MAP development, including any development with Sacramento County or within the jurisdiction of another Potential Permittee, also would constitute a significant departure from the Plan's OCP and would trigger a reevaluation of the Plan, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy, and issuance of Incidental Take Permits to the Potential Permittee for that additional urban development, and/or possible suspension or revocation of the County's Permits in the event Sutter County were to violate such limitations. Notwithstanding the foregoing, so long as the City and Sutter County limit urban development to their respective Permit Areas and the City and Sutter County continue to meet their obligations under the NBHCP, the OCP and associated Permits remain valid for each Permittee's Covered Activities.

For purposes of obtaining coverage under the NBHCP, expansion of the County's Permit Area or an increase in the County's Authorized Development could only be accomplished through approval of a major amendment of the NBHCP and the associated permits. Such an amendment of the NBHCP and associated permits would be subject to all applicable state and federal statutes and regulations, including the provisions of the CESA, ESA, CEQA and NEPA.

c. Reclamation District Number 1000 (RD 1000)

RD 1000 was created April 8, 1911, by a Special Act of the California State Legislature to provide agricultural drainage, flood control and levee maintenance. The entire Natomas Basin is included within its jurisdiction. RD 1000 has participated in the development of the NBHCP. However, RD 1000 has elected not to apply for an Incidental Take Permit at the time of publication of this draft NBHCP. RD 1000 may elect at a future date to apply for an Incidental Take Permit and would be required at that time to execute an Implementation Agreement with USFWS evidencing implementation and compliance with this HCP.

During the HCP preparation process, both RD 1000 and Natomas Mutual Water District expressed interest in pursuing take coverage for pesticides and rodenticides. However, such coverage is prohibited or limited by the regional USFWS guidance policy (USFWS, *Inclusion of Pesticide and Herbicide Applications as a Covered Activity in and Endangered Species Act Section 10(a)(1)(B) Permit*, July 1998). Any exceptions to this policy would require a considerable length of time to prepare and process adequate scientific information necessary for the USFWS to analyze the biological effects of each chemical on the Covered Species. Because of the length of time and uncertainty surrounding approval

of pesticides and rodenticides, this HCP does not include coverage for pesticides, herbicides or rodenticides. Rather, this HCP limits the Covered Activities for the Water Agencies to mechanical activities such as mowing and non-chemical channel maintenance activities. In March 2002, the Boards of Directors of both Water Agencies elected not to continue participation in the joint HCP because coverage for pesticide use would not be granted by the USFWS. The Water Agencies continue to be represented in the HCP as a Permittee in the event they should choose at a future date to apply for Incidental Take Permits for the activities (excluding pesticides) authorized in the HCP and evaluated in this EIR/EIS.

RD 1000 is bounded on the west by the Sacramento River, on the north by the Natomas Cross Canal, on the east by the Pleasant Grove Creek Canal and Steelhead Creek (formerly known as Natomas East Main Drainage Canal (NEMDC)) and on the south by the American River. RD 1000 does not maintain Steelhead Creek, but does maintain the approximately 43 miles of levees that surround it. In addition, RD 1000 maintains approximately 10 miles of non-project interceptor levees in the Pleasant Grove area. Generally, levees operated or maintained by RD 1000 are on easements of record, except for the Cross Canal and its south levee and some sections of Steelhead Creek and its west levee, which are on parcels owned in fee by the District.

When originally designed, the interior canal system brought all agricultural drain water to the pumping plant at Second Bannon and Pritchard Lake for discharge into the Sacramento River. The system today consists of approximately 30 miles of main canals that RD 1000 owns in fee. These parcels are delineated on the subdivision plat maps, including acreage. RD 1000 also operates and maintains approximately 150 miles of drainage ditches, which are on recorded "ditch and roadway" rights-of-way. They drain specific parcels and connect to the main canals (see Figure 3, Water Delivery and Drainage Systems).

At present RD 1000 operates eight pumping plants that pump agricultural irrigation tailwater and urban storm water into the Sacramento River, Natomas Cross Canal, and Steelhead Creek (formerly NEMDC). These pump stations and the drainage system are shown on Figure 3, Water Delivery and Drainage Systems. RD 1000 drainage channels and Natomas Mutual irrigation channels overlap in some instances, with a combined total of approximately 247 miles of channels occupying an estimated 1,769 acres of the Natomas Basin.

Giant garter snakes live in the canals and ditches maintained by RD 1000 and canal and ditch operation and maintenance activities may result in take of the Covered Species. RD 1000 is committed to reducing impacts of its operations and maintenance practices on Covered Species, particularly the giant garter snake. This NBHCP includes appropriate measures to avoid, minimize and mitigate the impacts of RD 1000 Covered Activities.

RD 1000 is not provided take authorization under this NBHCP for projects that would increase the footprint of any RD 1000 facilities within the Natomas Basin. If such projects are proposed, the potential impacts on state and federal listed species would be reviewed subject to the provisions of CESA

and ESA and permits, as determined appropriate, would be required. This NBHCP does not provide take authorization or specify mitigation for such projects.

d. Natomas Central Mutual Water Company ("Natomas Mutual")

Natomas Mutual was incorporated in 1921. It is a private, non-profit water company with a service area of approximately 47,000 acres within the Natomas Basin. Natomas Mutual is managed for the mutual benefit of its shareholders, who are owners of land within the service area.

Natomas Mutual has participated in the development of the NBHCP. However, Natomas Mutual has elected not to apply for an Incidental Take Permit at the time of publication of this draft NBHCP. The decision of Natomas Mutual to not participate within this NBHCP was made in response to the lack of coverage for pesticide and herbicide use under this NBHCP. Such coverage has not been included due to the lack of knowledge of impacts associated with pesticides and herbicides typically used by Natomas Mutual and the inability to predict the damage such chemicals might have on Covered Species. Natomas Mutual may elect at a future date to apply for an Incidental Take Permit and would be required at that time to execute an Implementation Agreement with USFWS evidencing implementation and compliance with this HCP. (See also RD 1000 discussion Section C above.)

About 30,000 acres of land within the Natomas Mutual service area are irrigated each year, with rights to some 130,200 acre feet of water diverted from the Sacramento River. Natomas Mutual maintains a "closed water delivery system," which holds all agricultural water within the service area from April 1st through October 15th of any year. Natomas Mutual maintains an extensive system of water delivery facilities that recapture water from fields and use it over again. Five main pumping stations along the Sacramento River divert water into main canals and then into ditches throughout the service area (see Figure 3, Water Delivery and Drainage Systems).

Giant garter snakes live in the canals and ditches maintained by Natomas Mutual and canal and ditch operation and maintenance activities may result in take of the Covered Species. Natomas Mutual is committed to reducing impacts of its operations and maintenance practices on Covered Species, particularly the giant garter snake. This NBHCP includes appropriate measures to avoid, minimize and mitigate the impacts of Natomas Mutual Covered Activities.

As noted in I.N.2, Natomas Mutual is not provided take authorization under this NBHCP for projects such as the construction, maintenance, operation, or closure of river diversion facilities and accompanying fish screens owned or operated by Natomas Mutual in the Natomas Basin. Nor does this NBHCP provide take authorization for projects involving the expansion of existing Natomas Mutual facilities beyond the footprint of the existing facility. If such projects are proposed, the potential impacts on state and federal listed species would be reviewed subject to the provisions of CESA and ESA and permits, as determined appropriate, would be required. This NBHCP does not provide take authorization or specify appropriate mitigation for such projects.

e. The Natomas Basin Conservancy (TNBC) (as a Permittee).

TNBC serves as the plan operator established by the City and controlled by the City, Sutter County and other potential Permittees to acquire and manage the system of habitat reserves to be created under the NBHCP. TNBC is also a Permittee. TNBC will seek separate Incidental Take Permits to cover activities related to the acquisition, establishment and management of the system of habitat reserves to be created throughout the Natomas Basin and in Area B (see Figure 20). The NBHCP includes a number of measures to avoid and minimize the impact of TNBC Covered Activities to Covered Species in Chapter IV, and in addition includes measures to enhance the survival of Covered Species through habitat enhancements and adaptive management provisions.

3. Plan Operator

a. Natomas Basin Conservancy

The NBHCP's reserve acquisition and management activities will be implemented by The Natomas Basin Conservancy (TNBC), serving as the "Plan Operator", on behalf of the City, Sutter County, the Metro Air Park Property Owners' Association under the Metro Air Park HCP (MAP) and other potential Permittees. TNBC is an independent non-profit corporation. The habitat mitigation fees and mitigation lands will be transferred to TNBC under the Plan. TNBC's efforts are guided by a Board of Directors, with members of the Board appointed by agencies receiving permits under the NBHCP. The Board is assisted in its efforts by the NBHCP Technical Advisory Committee (TAC), a group of experts with members including representatives of the Wildlife Agencies (U.S. Fish and Wildlife Service and California Department of Fish and Game) and the Permittees.

TNBC, as the Plan Operator, will conduct a variety of actions to acquire, establish and enhance, monitor and manage lands in perpetuity to ensure the continued success within the Natomas Basin of all Covered Species listed within the NBHCP. TNBC will serve, on behalf of the Permittees and the Wildlife Agencies, as the Plan implementation and effectiveness monitor. As development within the Natomas Basin occurs, and as TNBC acquires reserve lands, site specific management plans will be prepared for and adopted by TNBC. Additionally, TNBC may implement adaptive management plans and to the extent provided for under by the NBHCP, management measures proposed in species recovery plans for the Covered Species. Additional responsibilities of TNBC are further detailed in Chapters IV, V and VI.

4. Third Parties

"Third Parties" refers to persons receiving incidental take coverage under the incidental take permits held by a Permittee. An example of a "third party" is a private landowner in the Natomas Basin who seeks an urban development permit from the City or Sutter County. (Development proposals on private land within the City's and Sutter's Permit Areas shall comply with the requirements of the NBHCP,

including payment of mitigation fees and compliance with applicable avoidance, minimization, and mitigation measures.)

5. Potential Permittees

In addition to the plan participants described above, there are two additional groups that could obtain coverage under the NBHCP or under a similar habitat conservation plan: the County of Sacramento and Natomas Basin Farmers. Inclusion of either of these Potential Permittees within the NBHCP would require an amendment (see Section VI.L.3.), of the Plan and issuance of separate incidental take permits. If the County of Sacramento considers new projects within the unincorporated area of the Natomas Basin in Sacramento County, the County may seek to address mitigation for biological impacts via amendments to this NBHCP or through a habitat conservation plan similar to the NBHCP. Similarly, farmers within the Natomas Basin may choose to participate in the same or similar habitat conservation plans that would specifically address ongoing agricultural operations.

In the future, if the County, Natomas Basin farmers or other Potential Permittees within the Natomas Basin seek to become Permittees by participating in the NBHCP, such parties will be required to comply with Federal and State law governing issuance of incidental take permits under ESA and CESA. They may rely on this version of the NBHCP, with modifications appropriate to each additional Permittee, or prepare and process a separate HCP application specific to each new Permittee's activities. Should any additional entity within the Natomas Basin prepare and process a separate HCP that is also intended to serve as an application for incidental take permits under Federal and State law, such plan must be consistent with the biological goals and objectives and the conservation strategy of this NBHCP.

a. Sacramento County

The County of Sacramento is not a participant in this NBHCP nor is it proposing to obtain incidental take permits based on this NBHCP. If the County considers new projects within the unincorporated area of the Natomas Basin within Sacramento County, the County would review the biological impacts of these new projects and require these projects to demonstrate that adequate mitigation would compensate for biological impacts in accordance with state and federal law. The County may seek to address mitigation for biological impacts via amendments to this NBHCP or through a habitat conservation plan designed to achieve the biological goals and objectives for the Natomas Basin outlined in the NBHCP in a manner compatible with the conservation strategy of the NBHCP. In particular, such mitigation would be required to address the effect of reduced agricultural lands on the biological viability of the NBHCP.

b. Farmers

While farming is not provided coverage under the NBHCP Incidental Take Permits, it is recognized that continued agricultural activities within the Basin are beneficial to the long-term viability of certain

Covered Species in the region. Farmers who own, operate, and maintain land in the Basin may choose to participate in the NBHCP in the future or adopt their own habitat conservation plan with mitigation measures similar to those applied to agricultural lands managed by TNBC under this NBHCP.

6. Additional NBHCP Permittee - Metro Air Park

The USFWS and CDFG, in February of 2002, issued ITPs for the Metro Air Park (MAP) project to the MAP Property Owners Association (MAP POA). MAP will be an urban development project adjacent to the Sacramento International Airport in Sacramento County. The 2,011 acres of urban development associated with the MAP are part of the total 17,500 acres of future Planned Development considered by the NBHCP in the Natomas Basin. However, a portion of the MAP project, approximately 28 acres, is located within the City of Sacramento's NBHCP Permit Area. These 28 acres are included in the 8,050 acres of disturbance attributed to the City. Therefore, this NBHCP anticipates that the MAP project will result in 1,983 acres of the 17,500 acres of disturbance addressed by this NBHCP. MAP has obtained separate incidental take permits based on an HCP that incorporates the conservation strategy of the 1997 regional NBHCP as modified to address the specific circumstances of Metro Air Park and in response to the District Court's ruling in *NWF v. Babbitt*. As stated above, the Metro Air Park HCP and its IA provide for automatic revision of the MAP HCP to incorporate applicable provisions of the revised NBHCP upon approval of the latter by Wildlife Agencies. Extension of applicable NBHCP provisions to MAP will be treated as a revision of the Plan and will not require a permit amendment.

C. Biological Goals and Objectives of the NBHCP

The NBHCP biological goals are the broad guiding principles for the operating conservation program and provide the rationale behind the minimization and mitigation strategies. The specific biological objectives are the measurable targets for achieving the biological goals. The goals and objectives together provide a framework for developing a monitoring program that measures progress towards meeting those goals and objectives. In addition, the biological goals and objectives must be linked to the adaptive management process in order to ensure that necessary management decisions are based on these guiding principles of the Plan.

Described in this section are the biological goals and objectives for the overall NBHCP and for specific species known to utilize the Natomas Basin. The primary biological goal of the NBHCP is to create a system of reserves, with both wetland and upland components, that would support viable populations of the giant garter snake, Swainson's hawk and other Covered Species. The NBHCP primarily focuses preservation efforts on the giant garter snake and Swainson's hawk. The habitat needs of the other Covered Species overlap significantly with the giant garter snake and the Swainson's hawk such that specific habitat requirements of the other Covered Species can be incorporated and met within the upland and wetland components of the reserves focused on providing Swainson's hawk and giant garter snake habitats. Specific consideration of the needs of the other Covered Species must be incorporated into the restoration, enhancement, and management plans as they are developed for each reserve site according

TABLE I - 1
LISTED, CANDIDATE, AND OTHER SPECIES ADDRESSED IN THE NBHCP AND COVERED BY ITS ASSOCIATED PERMITS

#	Species	Federal Status	State Status	Habitat Notes
1	Aleutian Canada goose *Branta canadensis leucopareia*	SC		Grazes in marshes and stubble fields, roosts on the water
2	bank swallow *Riparia riparia*		T	Nests in river banks, forages for insects over open water, croplands, and grasslands
3	burrowing owl *Athene cunicularia*		SSC	Prefers open, dry grassland and desert habitats
4	loggerhead shrike *Lanius ludovicianus*	SC	SSC	Prefers open habitats with scattered shrubs, trees, fences, and posts. Will use cropland.
5	Swainson's hawk *Buteo swainsoni*		T	Breeds in riparian forest; known nesting sites in trees along Sacramento River in Natomas Basin. Forages for small mammals in grasslands and croplands.
6	tricolored blackbird *Agelaius tricolor*	SC	SSC	Nests in marshes with bulrush, blackberry or cattails; three known occurrences in Natomas Basin. Forages on the ground in grasslands and croplands.
7	white-faced ibis *Plegadis chihi*	SC	SSC	Forages in flooded rice fields
8	giant garter snake *Thamnophis gigas*	T	T	Forages in marshes, low gradient open waterways and flooded rice fields, hibernates in canal berms and other uplands; several known occurrences in Natomas Basin
9	northwestern pond turtle *Clemmys marmorata marmorata*	SC	SSC	Lives in permanent bodies of water; requires floating vegetation, logs, rocks or banks for basking. Hibernates and lays eggs is uplands.
10	California tiger salamander *Ambystoma californiense*	C	SSC	Winters in ground squirrel burrows or other holes; breeds in vernal pools, stockponds , and other seasonal wetlands.
11	western spadefoot toad *Scaphiopus hammondii*	SC	SSC	Primary habitat is grasslands; breeds in shallow temporary pools
12	valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T		Lives and reproduces on elderberry shrubs found along rivers and canals.
13	midvalley fairy shrimp *Branchinecta mesovallensis n. sp.*			Vernal pool obligate often found in small pools; likely to occur in Plan Area
14	vernal pool fairy shrimp *Branchinecta lynchi*	T		Vernal pool obligate; widely distributed in Sacramento County
15	vernal pool tadpole shrimp *Lepidurus packardi*	E		Vernal pool obligate; widely distributed in Sacramento County
16	Boggs Lake hedge-hyssop *Gratiaola heterosepala*		E	Low-terrace species found in shallow water margins of vernal pools
17	Colusa Grass *Neostapfia colusana*	T		Occurs in large deep pools with substrates of adobe mud but also in smaller pools; known in Yolo County

#	Species	Federal Status	State Status	Habitat Notes
18	delta tule pea *Lathyrus jepsonii* ssp.*jepsonii*	SC		Perennial twining vine occurs in both riparian and marsh habitats
19	legenere *Legenere limosa*	SC		Found in wet places or vernal pools below 400 feet in elevation
20	Sacramento Orcutt grass Orcuttia viscida	E	E	Found in relatively large, deep vernal pools in eastern Sacramento County
21	Sanford's arrowhead Sagittaria sanfordii	SC		Tuberose perennial likely to occur in drainage or irrigation ditches
22	slender Orcutt grass *Orcuttia tenuis*	T	E	Found in relatively large, deep vernal pools in eastern Sacramento County

Key to Abbreviations

Federal	E	=	Listed as endangered	C	=	Candidate for federal listing, data sufficient
	T	=	Listed as threatened	SC	=	Species of Concern--informal category, formerly called candidate 2 species (data for listing insufficient)
State	E	=	Listed as Endangered	R	=	Listed as Rare
	T	=	Listed as Threatened	SSC	=	Species of Special Concern

to criteria provided in Chapter IV.D Reserves will be planned to provide diverse habitat elements within the broader categories of upland and wetland habitats in order to meet the needs of a broad range of species. Table I-1 below identifies the 22 species covered by the Plan.

The NBHCP covers seven (7) plant species. The Federal ESA (Sections 7(o)(2) and 7(o)(4) which refers to terms, conditions and exceptions of taking of listed fish and wildlife species do not apply to plant species. The above listed plants are included as a Covered Species under the NBHCP in recognition of the conservation measures provided for them under the HCP, and to extend assurances to them under the federal "No Surprises" rule. The NBHCP also covers the seven plant species for CESA purposes.

1. Overall Goals and Objectives

The NBHCP applies a range of conservation strategies intended to mitigate for the impacts arising from Covered Activities in the Permit Areas. The goals and objectives in this plan contain habitat and species information related to the Covered Species.

Overall biological goals and objectives of the NBHCP include:

Overall Goals:

(1) Establish and manage in perpetuity a biologically sound and interconnected habitat reserve system that mitigates impacts on Covered Species resulting from Covered Activities and provides habitat for existing, and new viable populations of Covered Species.

(2) Implement an adaptive management program that responds to changing circumstances affecting Covered Species and their habitats.

(3) Preserve open space and habitat that may also benefit local, non-listed and transitory wildlife species not identified within the NBHCP.

(4) Ensure that direct impacts of Authorized Development upon Covered Species are avoided or minimized to the maximum extent practicable.

Overall Objectives:

(1) Minimize conflicts between wildlife and human activities, including conflicts resulting from airplane traffic, roads and automobile traffic, predation by domestic animals, and harassment by people.

(2) Maintain and operate flood control, irrigation and drainage facilities in a manner that minimizes take of Covered Species and promotes vegetative cover that enhances habitat values for Covered Species, consistent with the Water Agencies' legal obligations.

(3) Ensure connectivity between TNBC reserves to minimize habitat fragmentation and species isolation. Connections between reserves will generally take the form of common property boundaries between reserves, waterways (primarily irrigation and drainage channels) passing between reserves and/or an interlinking network of water supply channels or canals.

(4) Within individual TNBC reserves, provide a mosaic of habitats that support both wetland and upland species, and that are configured to support species that utilize both types of habitat.

(5) Implement monitoring programs with qualitative and/or quantitative monitoring methods to evaluate management objectives and strategies for the reserve system. TNBC shall develop each monitoring plan and shall submit the plan for review by NBHCP TAC and approval by the Wildlife Agencies prior to implementation.

(6) Increase the diversity and abundance of Covered Species on reserve lands.

(7) Revise the reserve design and management based on the most current biological data.

2. Wetland Species/Habitat Goals and Objectives

The following biological goals and objectives for the wetland habitat established by the NBHCP are specific to the following Covered Species: giant garter snake; tricolored blackbird; Aleutian Canada goose; white-faced ibis; Northwestern pond turtle; California tiger salamander; western spadefoot toad; midvalley fairy shrimp; vernal pool fairy shrimp; vernal pool tadpole shrimp; delta tule pea; Sanford's arrowhead; Bogg's Lake hedge-hyssop; Colusa grass; legenere; Sacramento orcutt grass; slender orcutt grass; and delta tule pea.

(1) Acquire, enhance and create a mosaic of wetland habitats with adjacent uplands and connecting corridors to provide breeding, wintering, foraging, and cover areas for wetland species in the Plan Area.

(2) Provide habitat to maintain, attract and sustain viable populations of the Covered Species. The habitat areas should be configured to encompass natural species migration areas, minimize species isolation, and prevent future habitat fragmentation.

(3) Document population trends of Covered Species through monitoring.

3. Upland Species/ Habitat Goals and Objectives

The following are biological goals and objectives for the upland habitat established by the NBHCP for the following Covered Species: Swainson's hawk; loggerhead shrike; burrowing owl; tricolored blackbird; bank swallow; California tiger salamander; and valley elderberry longhorn beetle.

(1) Acquire, enhance and create a mosaic of upland habitat types for breeding, foraging, and cover for species dependent on upland habitats.

(2) Ensure reserve land connectivity with travel corridors for upland-dependent species. The habitat areas should encompass grasslands, agricultural croplands, riparian habitats, and shelter and nesting habitat areas (fence rows, clusters of shrubs and small trees), as well as wetland areas to provide a year-round source of water for upland species. The upland areas should be configured to enhance natural species migration, minimize species isolation, and prevent future habitat fragmentation.

D. CONSERVATION STRATEGY OF THE NBHCP

The NBHCP seeks to ensure the long term conservation and to aid in the recovery of numerous wildlife species that have been granted varying degrees of protection under state and Federal law. The NBHCP Plan Area includes approximately 53,537 acres of land that have historically been utilized for

agriculture, with rice being the predominant crop in the Basin. The combination of rice, other agricultural crops, drainage and irrigation channels, and ruderal lands has allowed remnant wildlife populations to persist within the Basin, most notable among these being the giant garter snake and the Swainson's hawk.

Conservation of Covered Species under this Plan will be achieved through acquisition (conservation easement or fee title), protection, and enhancement of existing habitats in the Natomas Basin, minimizing the impacts of the Covered Activities, including development activities, water facility maintenance, and reserve management activities, and by focusing upon the preservation of the overall habitat values in the Basin. Habitat values are defined as the capability of a land, water, or associated area, where indigenous plants or animals may occur and upon which the Covered Species are dependent, in whole or in part, to provide for some or all of their maintenance, growth and reproduction. Preservation of habitat values within the Natomas Basin will protect and conserve both listed and non-listed species.

The NBHCP has been established to allow some development to occur within the Natomas Basin, while ensuring that habitat values are maintained and, to the maximum extent practicable, increased within the Natomas Basin.

The NBHCP conservation strategy has been prepared to accommodate 17,500 acres of Planned Development. Of this 17,5000 acres, 15,517 acres will be developed by the City of Sacramento and Sutter County and is considered the Authorized Development of this NBHCP for the City and Sutter County. An additional 1,983 acres is to be developed by Metro Air Park (MAP). While MAP is not a Permittee under this NBHCP, the impact of MAP development has been considered and MAP development will be required to comply with the conservation strategies of this NBHCP.

As established in this Plan, developers which request Urban Development Permits of the Land Use Agency Permittees would be required to: (1) provide land and/or fees to establish one-half acre of reserve land for each acre of development (0.5 to 1 ratio); (2) provide funding for the enhancement of habitat on the reserve land during the 50 year term of the permits so as to result in habitat types currently anticipated to be comprised of the following percentages (25% in managed marsh, 50% in rice production, and 25% in upland habitats); (3) contribute to an endowment fund to provide for habitat management and monitoring the Mitigation Land habitat reserves in perpetuity; (4) provide funding for ongoing management of Mitigation Lands, administration of the Plan and TNBC operations over the permit term; and (5) contribute to a supplemental endowment fund to be used to respond to changed circumstances that could arise in the future.

In addition to the Mitigation Fee required under the NBHCP, Authorized Development within the Permit Areas will also be required to adhere to guidelines to avoid, minimize and mitigate take of Covered Species during development. These additional guidelines are discussed within Chapter V. These guidelines to avoid, minimize and mitigate take of species have been based upon: (1) adopted land use documents (specific plans and general plans of the City of Sacramento and Sutter County) and associated environmental documents; (2) mitigation measures applied to recent development projects within the City

of Sacramento; and (3) USFWS and CDFG adopted guidelines for avoidance, minimization, and mitigation for take of species covered by the NBHCP.

During the 50 year life of the permits, development activities covered by the NBHCP could result in approximately 23,105 acres of urban development in the Natomas Basin (5,605 acres of existing development and 17,500 acres of additional Planned Development). It is assumed that the remaining land within the Basin will ultimately be a combination of urban and agricultural uses. Of the up to 8,750 acres of Mitigation Lands that the NBHCP contemplates being under TNBC control for mitigation of the Land Use Agencies' Authorized Development, it is anticipated that approximately 50% (4,375 acres) would be in rice production cultivated consistent with the NBHCP Conservation Plan (Chapter IV) that promotes increased habitat values, approximately 25% (2,187 acres) would be enhanced as managed marsh, and approximately 25% (2,187 acres) would function as upland habitat. Should a giant garter snake recovery plan be adopted in the future, or as indicated from the results of monitoring in the Plan Area, or from new scientific information, reserve lands anticipated to be in rice production that are under the control of TNBC, acquired after recovery plan adoption or the availability of such information or monitoring results could be converted to managed marsh in accordance with the provisions of NBHCP Section V1.H.1.

The NBHCP contains significant Adaptive Management provisions. Adaptive Management is a process that allows the NBHCP's Operating Conservation Program to be adjusted during the life of the permits to ensure that the most up-to-date peer-reviewed scientific information is being utilized, and that the Plan's biological goals and objectives are being achieved as described in Section VI.F of the NBHCP. Under its Adaptive Management provisions, the NBHCP can be modified if necessary to ensure that the most up-to-date information is being used under the OCP. However, adaptive management to benefit one species will not occur at the biological expense of another listed/Covered Species.

E. OVERALL BENEFITS OF THE NBHCP

The NBHCP will avoid, minimize and mitigate the impacts of any incidental take authorized by the Permits and is designed to assure that issuance of the Permits will not appreciably reduce the likelihood of the survival and recovery of the Covered Species. Overall, the NBHCP maintains wildlife values within the Natomas Basin and will produce a net positive effect for the Covered Species for the following reasons:

(1) Permanent preservation. The 8,750 acres of land to be acquired over the 50 year life of the permits and maintained as wildlife reserves will enjoy permanent preservation status. The agricultural land within the reserves is guaranteed to be preserved in the future, and, as a result, is inherently more valuable to wildlife than agricultural land that is subject to future development.

(2) Improved management of rice farming on TNBC's Mitigation Lands. The 4,375 acres of rice land to remain in cultivation under TNBC management as wildlife preserves will be managed to enhance wildlife values and to minimize incidental take of species during

farming activities. Land management practices of TNBC will generally increase the habitat values of the agricultural land through modification of practices such as crop selection, minor adjustments to irrigation regimes, fallowing of crop lands and education of farm workers on the avoidance of incidental take of Covered Species.

(3) 25% restored wetland managed for wildlife. Under the NBHCP, by the end of 50 years at least 25% of TNBC Mitigation Lands will be improved and restored as marsh habitat. If, however, USFWS provides written notification supported by documented evidence in the form of a written report and technical analysis regarding the adoption of a Giant Garter Snake Recovery Plan, the availability of monitoring results from the Plan Area or new scientific information indicating and adjustment in the enhancement and management activities for managed marsh is warranted, then the proportion of marsh habitat may be increased by the Permittees to as much as 75% of the Mitigation Lands acquired after the date of notification. This land will be managed to promote long term viability of wildlife populations. The enhanced marsh reserves will be of substantially greater habitat value than the current combination of fields and canals that are not managed to promote wildlife or avoid incidental take of species.

(4) Enhanced Reserve Habitats. Enhanced habitat values and avoidance/minimization of incidental take allow more giant garter snakes and other Covered Species to inhabit a given amount of reserve land as compared to existing agricultural land.

(5) Take Avoidance and Minimization. In addition to the permanent set aside and improvement of habitat values on TNBC lands, Authorized Development and Water Agencies' Covered Activities will adhere to guidelines to avoid, minimize and mitigate take. Mitigation measures that have been previously adopted for individual projects within the Basin would be applied more widely through the Basin in a consistent manner, thus maximizing application of take avoidance measures.

(6) Expansion of Species Range. Reserve lands provide the opportunity to establish habitat for the Covered Species in areas which will improve the viability of the species and in some cases, expand their range.

F. REGULATORY BACKGROUND

The federal Endangered Species Act (ESA) is administered by the U.S. Department of the Interior, Fish and Wildlife Service (USFWS or Service). The California Department of Fish and Game (CDFG), as trustee for the State's fish and wildlife resources, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat for biologically sustainable populations of such species. In that capacity, CDFG administers the California Endangered Species Act (CESA), the Native Plant Protection Act (NPPA), and other provisions of the California Fish and Game Code that afford

protection to the State's fish and wildlife trust resources. CDFG also fulfills its charge as a trustee agency through implementation of and adherence to the California Environmental Quality Act (CEQA), a statute designed to facilitate disclosure and mitigation of project-related adverse environmental impacts, as well as informed public decision making.

Both the federal and state Endangered Species Acts provide protection for listed species. In particular, Section 9 of the federal ESA prohibits "take" of listed animal species. "Take" is defined by the ESA as: "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" with respect to any federally listed endangered animal species. Threatened animal species are protected against take under Federal regulation (50 CFR 17.31). Take not specifically allowed by federal permit under Section 10(a)(1)(B) of the ESA is subject to enforcement through civil or criminal proceedings under Section 11 of the ESA.

California law prohibits take of plant and animal species protected under CESA and NPPA, as well as take of species designated as "fully protected." The California Fish and Game Code defines take to mean "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Under case law, the prohibition against take extends to the killing of endangered, threatened or candidate species in the course of otherwise lawful activity. Thus, except as authorized under CESA, NPPA, and the Natural Communities Conservation Planning Act (NCCP), the unlawful take of plant and animal species listed as endangered or threatened under CESA, or the take of species that are candidates for listing under CESA, is prohibited by state law. Unlawful take of species protected by CESA and NPPA, and take of species designated as fully protected, is subject to fine and criminal prosecution under the California Fish and Game Code.

While take is typically understood in the sense of deliberately capturing or killing individual animals, the ESA also defines take to include "incidental take," which means take that is incidental to, but not the purpose of, the carrying out of an otherwise lawful activity. Under 50 CFR § 17.3, the definition of "harm" in the take definition includes "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." Unlike ESA and its implementing regulations, the definition of take under CESA does not include the terms harm or incidental take. Any action, however, direct or otherwise, that results in the death or capture of a plant or animal species protected under CESA could constitute an unlawful take of such species as defined by state law.

Development of open lands in the Natomas Basin would likely result in take and, in the absence of appropriate permits, would therefore potentially be subject to federal and state enforcement. Operation and maintenance of water supply and drainage facilities and agricultural operations conducted on reserve lands managed by TNBC may also result in take of listed species. Implementation of and compliance with this Plan is intended to satisfy the incidental take permitting provisions of the ESA and CESA.

Additional Regulations. In addition to the Section 10(a)(1)(b) and Section 2081 Permits the NBHCP Permittees shall also comply with all other applicable local, state and federal regulations, laws or ordinances. This includes, but is not limited to, the following: U.S. Army Corps of Engineers Clean Water Act 404 permits; State Water Quality Control Board discharge notification requirements; CDFG 1600 Streambed Alteration Agreements; State and Federal Departments of Transportation laws and regulations; and USEPA and Department of Pesticide Regulation laws and regulations.

G. PLAN FORMULATION PROCESS

The formulation of the NBHCP has occurred over fifteen years and has involved many iterations, of which one version, the 1997 NBHCP, provided the basis for the Wildlife Agencies to authorize incidental take by the City of Sacramento within a portion of Natomas Basin. This process has also involved legal challenges and led to various combinations of Permittees seeking incidental take permits within the Natomas Basin. Provided below is a summary of major milestones in the formulation process of the NBHCP.

1986 - With record flood flows in the American River Basin and significant flood damage in the Sacramento area, the U.S. Army Corps of Engineers (Corps) undertook a study of flood control proposals.

1991 - The Corps produced the American River Watershed Investigation, along with an Environmental Impact Report/Environmental Impact Statement (EIR/EIS), which included the proposed Auburn Dam and flood control features for the Natomas Basin. USFWS recommended mitigation through creation of a wetland/ upland complex. Congress did not act on this flood control project, but did authorize federal reimbursement for a smaller flood control project proposed by Sacramento Area Flood Control Agency (SAFCA).

December 27, 1991 - The proposed listing of the giant garter snake was published in the Federal Register and public comment solicited.

February 1992 - SAFCA prepared a draft Swainson's hawk and giant garter snake HCP.

July 1992 - SAFCA began issuing for public comment a series of draft EIRs that examined the impacts of the local flood control project.

March 1993 - SAFCA applied to the Corps for a permit under 404 of the Clean Water Act for a local project designed to bring 100-year protection to the Natomas Area.

October 1993 - The Service elevated the project under 404 of the Clean Water Act because the Corps would not address the indirect impacts of the flood control project. The Service recommended that

a comprehensive basin-wide management plan be prepared to mitigate the loss of wildlife habitat associated with the indirect effects of the project.

October 20, 1993 - The Service published in the Federal Register its listing of the giant garter snake as a threatened species under the ESA.

November 1993 - The Corps agreed to address indirect effects through development of a habitat mitigation plan to be developed by SAFCA as a condition of their 404 Clean Water Act permit.

January 1994 - USFWS and CDFG began participating in the Natomas Basin Habitat Conservation Plan Working Group (the group included SAFCA, the wildlife agencies, Corps of Engineers, local Land Use Agencies, the Water Agencies, and landowners).

March 1994 - The Service issued a biological opinion that SAFCA's flood control project would not likely jeopardize the continued existence of the giant garter snake, based on the Corps 404 permit condition of completion of a habitat mitigation plan prior to the flood control work. (See also Appendix J.)

March 1994- June 1996 - SAFCA was the lead agency in developing the HCP and prepared and circulated for public comment three drafts, but later discontinued its efforts because it had no land use authority. (The three drafts were released March 1995, October 1995, June 1996). During this time period, public workshops were held to address concerns raised by the public. Each Workshop had a focus group including developers, the environmental community, and the rice industry.

November 1996 - The City of Sacramento took the lead for the HCP effort and published and submitted to the Service a fourth version, along with an application for an incidental take permit.

January 15, 1997 - The November 1996 version of the NBHCP was announced in the Federal Register and released for public comment. A draft Environmental Assessment (EA) was prepared and released with the draft NBHCP.

June 18, 1997 - The City's June 1997 draft NBHCP, draft Finding of No Significant Effect (FONSI) and draft IA were noticed in the Federal Register and released for public comment.

August 1997 - At public hearings, the City Council adopted a negative declaration under CEQA and approved the NBHCP and directed the City Manager to obtain ITPs.

November 1997 - The City revised and published the 1997 NBHCP.

December 1997 - The City, Service, CDFG, and TNBC executed an Implementation Agreement. The Service issued its final Biological Opinion, prepared a Finding of No Significant Impact (FONSI under NEPA), completed its Findings and Recommendations, and issued an Incidental Take Permit to the City.

At the same time, CDFG, in reliance on the City's negative declaration as a responsible agency under CEQA, adopted findings pursuant to CESA, and issued a management agreement authorizing incidental take by the City consistent with the NBHCP pursuant to former Section 2081 of the US Fish and Game Code.

December 1997 - Water Agencies submit their separate Habitat Conservation Plan, Implementation Agreement, Incidental Take Permit Application, and 2081 application to the Service and to the CDFG.

January 1998 - The Mountain Lion Foundation and other environmental organizations filed suit against CDFG, alleging that CDFG's decision to authorize take by the City consistent with the NBHCP violated CESA and CEQA.

April 1998 - The City began collecting habitat mitigation fees and issuing urban development permits under the 1997 NBHCP.

December 1998 - The City appointed a board of directors for TNBC. TNBC began holding publicly noticed meetings and began its acquisition and management of habitat mitigation lands.

February 12, 1999 - The National Wildlife Federation *et al.* filed suit against the U.S. Fish and Wildlife Service, alleging that the Service's decision to issue Incidental Take Permit (ITPs) to the City violated the Endangered Species Act, NEPA, and the Administrative Procedures Act.

January 19, 2000 - Following a prior stipulated dismissal of petitioners' CEQA claim, the Sacramento County Superior Court ruled in favor of CDFG and upheld the City's incidental take authorization under CESA.

August 15, 2000 - In the lawsuit brought by the National Wildlife Federation *et al.* against the U.S. Department of Interior and the Service, Judge Levi held that the record did not support the Service's findings in issuing an ITP to the City.

November 2000 - Water Agencies submit revised Habitat Conservation Plan, along with its Implementation Agreement, to the Service and to the CDFG.

December 18, 2000 - The Service published in the Federal Register a Notice of Intent to prepare a joint EIR/EIS on the proposed issuance of new ITPs to the City and Sutter County. The City and Sutter County published a Notice of Preparation for a Joint EIR/EIS for the state permits on the same day.

December 21, 2000 - Judge Levi signed a stipulation agreed to by all parties to the federal lawsuit that any judgement entered would not be effective with respect to the Natomas Basin Conservancy and

that the incidental take permit will continue and remain in effect with respect to the Natomas Basin Conservancy and their land acquisition and management activities.

January 3 & 4, 2001 - Public workshops were held by the Service, Sutter County, and City of Sacramento. Mailings and newspaper notices were distributed prior to the workshops.

January 16, 2001 - The formal scoping period for the EIR/EIS ended. The Service, City and Sutter are using the scoping comments to assist in revising and preparing the NBHCP and EIR/EIS.

January 26, 2001 - The court entered judgment declaring that the incidental take permit (ITP) issued by the Service to the City for the NBHCP is no longer valid.

March 2001 - The Water Agencies join the City and Sutter revised NBHCP process. A Revised NOP/ NOI was prepared to indicate the Water Agencies participation in the NBHCP process.

April 18, 2001 - The revised NOP/NOI noticing the involvement of the Water Agencies in the HCP process was published in local newspapers and in the *Federal Register* on August 18, 2001.

May 15, 2001 - Judge Levi signed a Modified Order incorporating the agreement to settle litigation allowing limited development to proceed in exchange for acquisition of mitigation land in prioritized areas, and to reinstate the ITP issued on December 31, 1997 by the Service to the City for the sole purpose of effectuating the terms of the Settlement Agreement. Later the same month, the Court of Appeal for the Third Appellate District dismissed the appeal in the State litigation challenging CDFG's management authorization to the City.

January 2002 - The Water Agencies submit in writing their Best Management Practices and statement of Covered Activities which include a request for Take coverage for pesticide use. USFWS responds that Take coverage for pesticide use is in conflict with regional USFWS guidance policy (USFWS, *Inclusion of Pesticide and Herbicide Applications as a Covered Activity in an Endangered Species Act Section 10(a)(1)(B) Permit*, July 1998) limiting Take authorization for such chemicals.

January 2002 - March 2002 - Consultations between the USFWS, City, Sutter and the Water Agencies continue regarding the Water Agencies' request to seek Take coverage for pesticide and rodenticides. In March 2002, the City and Sutter decide to proceed with the HCP including coverage for all requested Water Agency Covered Activities with the exception of pesticides and herbicides. Also ink March, the Board of Directors of the respective Water Agencies decide not to continue participation in the HCP. The Water Agencies continue to be represented in the HCP as a Permittee in the event they should choose at a future date to apply for Incidental Take Permits for the activities (excluding pesticides) authorized in the HCP and evaluated in the EIR/EIS.

March 2002 - Metro Air Park Property Owners Association (MAP POA) received incidental take permits for 2,011 acres of urban development. This area of disturbance is included within the 17,500 acres of Natomas Basin development described in this NBHCP.

H. LEGAL CHALLENGE IN FEDERAL COURT

On February 12, 1999, the National Wildlife Federation *et. al.* filed suit in federal court to challenge the Secretary of the Interior's decision to issue an incidental take permit to the City of Sacramento. On August 15, 2000, Judge David F. Levi issued a Memorandum of Opinion and Order. The Court held that the NBHCP in most respects satisfied the substantive requirements of the ESA as set forth in Section 10(a)(2)(a). The Court also held that, with one exception, relative to whether the Plan "minimizes and mitigates" expected impacts to the maximum extent, the Findings and the Biological Opinion were adequate with respect to the NBHCP as a whole. The Court also rejected the plaintiff's claims that biological uncertainties associated with, among other things, the NBHCP's adaptive management provisions undermined the legal adequacy of the Plan as a whole and found that the Service's decisions were based upon the best available scientific and commercial evidence.

The Judge's Order found four deficiencies with respect to issuance of the City's Section 10(a)(1)(B) Incidental Take Permit:

(1) The record did not support the Service's findings in support of the NBHCP and the Section 10(a)(1)(B) ITP that the NBHCP would minimize and mitigate impacts on Covered Species to the "maximum extent practicable." This finding is referred to as the "Maximum Extent Practicable Finding" in Table I-2.

(2) The record did not support the "No Jeopardy" findings contained in the Biological Opinion as it applied to issuance of the Section 10(a)(1)(B) ITP to the City of Sacramento. The Judge's Order concluded there was insufficient evidence to demonstrate that the NBHCP was economically and biologically sufficient to protect the listed species if the City was the only participant in the NBHCP which was designed as a regional plan. This finding is referred to as the "No Jeopardy Finding" in Table I-2.

(3) The record did not support the Service's finding that the City would ensure adequate funding for the NBHCP as it applied to issuance of the Section 10(a)(1)(B) ITP. Judge Levi concluded that the City declined to ensure funding for the NBHCP in the event of a shortfall in mitigation fees collected from developers. This finding is referred to as the "Assured Funding Finding" in Table I-2.

(4) The Service's decision to not prepare an Environmental Impact Statement for the NBHCP and Section 10(a)(1)(B) ITP was arbitrary and capricious.

The NBHCP has been revised to address Judge Levi's decision, address concerns identified during implementation of the NBHCP, reflect regulations of the wildlife agencies established subsequent to the 1997 NBHCP, and in response to public review and comment. Table I-2 identifies where in the NBHCP these revisions have been made:

TABLE I - 2
NBHCP REVISIONS

Maximum Extent Practicable Finding (ESA Section 10(a)(2)(B)(ii))	
1. No development in Swainson's Hawk Zone (HCP wide)	Section V.A.5
2. Require Preservation of Swainson's Hawk Nesting Trees (HCP wide)	SectionV.A.5
3. Remove 50% cap on funding for adaptive management / recovery plans (HCP wide)	Removed from NBHCP
4. Remove Area C as Mitigation Option (HCP wide)	Removed from NBHCP
5. Explicit Cap on Basin Development of 17,500 acres (HCP wide w/ specific acres for each Permittee - any new Permittee or increase over 17,500 invokes new analysis)	Sections III.A
6. Require assurance of 2,500 acre preserve and at least three 400 acre preserves (HCP wide)	Section IV.C.1.e
7. Mitigation measures related to drainage canals	Section V.B
8. Incorporate Mitigation Monitoring Plans	Section I.B.2
Analysis	
9. Comparison Study of Mitigation Fees in Surrounding Jurisdictions (HCP wide)	Appendix A
10. Quality of Habitat Analysis (lands of varying habitat value uniformly mitigated w/ high quality reserve habitat) (HCP wide)	Section VII. Impacts Analysis
11. Cost Benefit Analysis	Appendix A
12. FWS Analysis of Benefits of Plan for each Covered Species	Biological Opinion
13. Alternative Analysis - Explain why Higher Ratio is not Feasible (HCP wide)	Section VII and Appendix A

Assured Funding Finding (ESA Section 10(a)(2)(B)(iii))	
14. Establish Separate Funding Mechanism Prior to Plan Approval that Provides City/ County w/ Authority to Raise $ if TNBC/ FWS/ DFG Determine Additional $ is Needed for Acquisition / Monitoring / Management /Etc. (Mechanism must remain in place for permit term even if permit is terminated) (City / County)	Section VI.B.2
15. Require Land Acquisition to be 200 Acres Ahead of Development (City - County)	Section VI.C.1
No Jeopardy Finding (ESA Sections 10(a)(2)(B)(iv) and 7(a)(2))	
16. Require Independent Mid-Point Review of Development for Each Permittee (City - 4,500 to 5,500 acres / Sutter - 4,000 acres)	Section VI.J
17. Require remaining Land Use Permittee to Independently Meet 2,500 Acre Preserve + 400 Acre Preserves with Additional Funding Mechanism if other Land Use Permittees Fail to Join or Drop-out	Section I.K
18. Biological Analysis Specific to each Permittee (City/ County) (see 12 above)	Section VII.D.
Other HCP/ IA Modifications	
19. No Surprises Rule	Section VI.K
20. Changed Circumstances	Section VI.K
21. Five Point Policy	Throughout NBHCP
22. Single HCP with Individual Permittees' Obligations Identified	Section V
23. Single IA with Individual Permittees' Obligations Identified and a Severability Clause	Implementation Agreement
24. Annexation Analysis for 50 acre South Natomas Community Plan annexation and panhandle annexation (City)	Included in Section III under City Development
25. Annexation Procedure for Future Annexations (City)	Section 1.A, 1.B.2

I. REQUIREMENTS FOR THE ISSUANCE OF THE PERMITS

The NBHCP is intended to meet the requirements of the state and federal Endangered Species Acts. In addition to the Permittees' satisfaction of the application requirements for state and federal Incidental Take Permits through submittal of the NBHCP, the Permittees and the Wildlife Agencies must comply with state and federal environmental regulations set forth in the California Environmental Quality

Act (CEQA) through preparation of an environmental impact report and the National Environmental Policy Act (NEPA) through preparation of an environmental impact statement.

1. Federal Permit

Section 10 of the ESA states:

"The Secretary [of the Interior] may permit...any act otherwise prohibited by Section 9 for scientific purposes or to enhance the propagation or survival of affected species...; or any taking [of fish and wildlife] otherwise prohibited by Section 9(a)(1)(B) if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity."

Under Section 10(a)(2)(A) of the ESA, an incidental take permit application must be supported by a conservation plan that specifies the following (see Section VI. for an explanation of how the Plan meets these requirements):

(1) the impacts likely to result from the taking of the species for which permit coverage is requested;

(2) measures to monitor, minimize, and mitigate such impacts;

(3) funding available to implement such measures;

(4) alternative actions that would not result in taking;

(5) reasons for not utilizing such alternatives;

(6) responses to changed circumstances; and

(7) any additional measures, the USFWS may require as necessary or appropriate for purposes of the plan.

Section 10(a)(2)(B) of the ESA specifies the issuance criteria which must be satisfied before the USFWS can issue an incidental take permit. These criteria include a requirement that the taking authorized by the permit "will not appreciably reduce the likelihood of the survival and recovery of the species in the wild."

Although not specifically required by the ESA, it is appropriate for the conservation actions taken under a Section 10(a)(1)(B) permit to assist in carrying out species recovery plans and to improve the status of listed species affected by the permit. The USFWS has prepared a Draft Giant Garter Snake Recovery Plan, and the NBHCP provides for modification of the NBHCP's operating conservation

program for the snake at the time such a Final Recovery Plan is approved, to incorporate, as appropriate, measures recommended in the recovery plan. Similarly, the NBHCP provides for inclusion, as appropriate and within the limitations set forth in Chapter VI, of measures recommended in future recovery plans for other Covered Species following adoption of such recovery plans.

2. State Permit

For purposes of the NBHCP, take authorization by CDFG under CESA is governed by Section 2081 of the Fish and Game Code, as well as regulations set forth in Title 14 of the California Code of Regulations, commencing with Section 783.0. According to Fish and Game Code Section 2081, Subdivision (b), and Section 783.4, Subdivision (a), of Title 14, the Director of CDFG may authorize the take of endangered species, threatened species, and candidate species only where certain conditions are met. CDFG's implementing regulations provide, in pertinent part, that a permit may only be issued if the Director finds that:

(1) The take authorized by the permit is incidental to an otherwise lawful activity.

(2) The applicant will minimize and fully mitigate the impacts of the take authorized under the permit, including all impacts on the species protected under CESA that result from any act that would cause the proposed taking.

(3) The proposed permit is consistent with any regulations adopted under Fish and Game Code Sections 2112 and 2114, of which both pertain to the development and adoption of recovery plans for certain specific species.

(4) The applicant has ensured adequate funding to implement the measures required under the permit to minimize and fully mitigate the impacts of the taking, and to monitor compliance with, and the effectiveness of, the measures.

Section 2081 and its implementing regulations also provide that no incidental take permit shall be issued by CDFG if issuance of the permit would jeopardize the continued existence of the species. In making its determination regarding jeopardy, CDFG must base its decision on the best scientific and other information reasonably available, and shall consider the species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of known population trends, known threats to the species, and reasonably foreseeable impacts on the species from other related projects and activities.

See Sections IV.A through IV.D, for an explanation of how the Plan meets the specific requirements set forth in the two preceding paragraphs.

Take authorization by CDFG is also governed by a number of statutory directives. The California Fish and Game Code provides, for example, that state agencies, including CDFG, should not approve

projects as proposed which would jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent further jeopardy (See generally Fish & Game Code, § 2081, subds. (B)(1)-(4),(c); Cal. Code Regs., Tit. 14, §§ 783.2, 783.4). Likewise, CESA directs CDFG, together with the project proponent and the state lead agency, to develop reasonable and prudent alternatives to the proposed activity that are consistent with the statutory charge to conserve protected species, as well as the charge to maintain the project purpose to the greatest extent possible.

Consistent with these obligations, the California Fish and Game Code provides that, where a person is required to provide mitigation or alternatives to address a particular impact on a species protected under CESA, the measures or alternatives shall be roughly proportional to the extent of any such impact caused by that person. Moreover, where various measures or alternatives are available to meet this obligation, those ultimately required must maintain the applicant's objectives to the greatest extent possible. State law also prescribes that any such measures or alternatives must be capable of successful implementation.

Finally, under CESA, all state agencies, including CDFG, shall seek to conserve endangered species and threatened species, and such agencies are directed to use their authority in furtherance of the purposes of the statute (See generally Fish & Game Code, § 2081, subds. (B)(1)-(4),(c); Cal. Code Regs., Tit. 14, §§ 783.2, 783.4). In this regard, conservation means to use, and the use of, all methods and procedures which are necessary to bring an endangered or threatened species to the point at which the measures provided by CESA are no longer necessary.

In addition to CESA, CDFG must comply with CEQA prior to take authorization based on the Plan. CDFG's principle obligation is to comply with CEQA's "substantive mandate." That is to say, regardless of whether CDFG serves as a lead or responsible agency under CEQA, CDFG must consider mitigation measures and alternatives that might avoid or substantially lessen the potentially significant impacts of the proposed taking, and adopt such measures or alternatives where feasible. Other specific obligations required of CDFG under CEQA are set forth in Title 14, Section 783.5, of the California Code of Regulations.

J. STRUCTURE OF THE PLAN

The NBHCP is a supporting document for Federal Section 10(a)(1)(B) and state Section 2081 permit applications. It describes the Biological Data (Chapter II) and the Land Use Issues (Chapter III) that are relevant to the formulation of the Plan. The Conservation Plan is described in Chapter IV. The avoidance, minimization and mitigation measures required by Permittees are defined in Chapter V. The overall Plan Implementation is described in Chapter VI. A description of the impacts to Covered Species of activities addressed by the Plan and expected take levels are included as Chapter VII, Impacts of the Plan. References are provided in Chapter VIII.

All Figures referenced throughout the NBHCP are bound together at the end of the document.

Several key documents which provide a greater level of detail on certain issues than the NBHCP are attached as Appendices (e.g., Appendix A, Economic Analysis of the NBHCP). The specific terms of the NBHCP that affect the rights and obligations of the permit recipients are specified in the Implementation Agreement. The NBHCP Implementation Agreement for the City and Sutter is published under separate cover, but is also attached to the NBHCP as Attachment A.

K. RELATIONSHIP OF THE PLAN TO INDIVIDUAL PERMITTEES

The Plan is intended to support ESA Section 10(a)(1)(B) and CESA Section 2081 permit applications from the City, Sutter, TNBC, RD1000, and Natomas Mutual. An Implementation Agreement will describe the obligations of each of the Permittees.

In addition to the five Permittees noted above, a separate HCP has been approved by USFWS and CDFG for Metro Air Park (MAP). The NBHCP, in making its estimate of the total additional urban development which would take place within the Plan Area during the next 50 years, took into account the land disturbance that will occur within the MAP project area (1,983 acres of disturbance including required off-site improvements and excluding off-site impacts already counted in the City's allowed development). The Permittee for the MAP HCP is the Metro Air Park Property Owners Association (MAP POA) and the fees for development occurring in association with the MAP project will be collected by the County of Sacramento and transferred to TNBC to fund habitat preservation, enhancement and restoration on TNBC reserves. The MAP HCP follows the NBHCP conservation strategy and also provides for incorporation of all applicable future revisions or amendments to the NBHCP. Under the MAP HCP, the reserve acquisition and management will be carried out by TNBC in a manner consistent with the NBHCP. Apart from its obligations with respect to the Metro Air Park HCP, no further participation of the County of Sacramento in the NBHCP has been proposed.

The Permit Area for each of the Permittees (e.g., City of Sacramento, Sutter County, RD1000, Natomas Mutual and TNBC) comprises each jurisdiction's respective geographic portion of the NBHCP Plan Area, and those activities, for which each of the Permittees is seeking coverage. In the case of the Land Use Agencies, the Permit Areas are those areas designated for urban development for each jurisdiction as identified on Figure 16. The NBHCP does not provide coverage for take of Covered Species associated with development outside of Areas identified on Figure 2. Coverage for any development outside of those areas will require a major amendment to the NBHCP and a permit amendment or a separate HCP and permit as described under Sections I.B.2.a and b.

It is anticipated, but not essential to the successful implementation of the Plan, that the City, Sutter County, TNBC, RD 1000 and Natomas Mutual will each adopt the NBHCP. Based upon the NBHCP, each Permittee will apply separately for, and obtain Section 10(a)(1)(B) and Section 2081 permits applicable to activities within each Permittee's respective Permit Area. The NBHCP is designed to assure

that each individual Permittee will minimize and mitigate take-related impacts under the NBHCP that are incidental to otherwise lawful, Covered Activities carried out by the Permittee or third parties under the direct control of the Permittee. The obligations of each Permittee under the NBHCP are independent and do not depend on the participation of any other Permittee. Similarly, the failure of one Permittee to fulfill its obligations under the plan, or the failure of one of the Land Use Permittees to obtain incidental take permits in reliance on the plan will not effect the viability of the plan or affect the permits of the remaining Permittees. For example, each Land Use Agency, (i.e., the City of Sacramento and Sutter County) is responsible under the Plan for minimizing and mitigating the effects of Authorized Development occurring within its individual Permit Area. Additionally, while the City of Sacramento and Sutter County are jointly responsible for establishing a 2,500-acre preserve by the end of the 50 years, if either the City or Sutter County were to drop out of the plan, the remaining land jurisdiction would remain independently responsible for establishing the reserve.

An additional concern related to implementation of the NBHCP by a single Land Use Permittee is the type of habitat within the participating jurisdiction. Specifically, the currently existing habitat within the City of Sacramento tends toward upland habitat, while habitat within Sutter County is more typically wetland (rice production). In fact, the variation between habitat within the two jurisdictions has increased in recent years as development within the City has proceeded. This is a result of both a natural rotation of crop cultivation in response to market conditions and soil capabilities, as well as the tendency for landowners to cease rice cultivation prior to undertaking development. For example, agricultural lands formerly in rice cultivation within the MAP HCP were removed from agricultural production in 1997.

Aside from the transition of agricultural practices noted above, there remains some variation in the habitat types within the City's and the County's Permit Areas. If one of the Land Use Permittees does not implement the NBHCP, then the conservation plan will be reviewed and adjusted as determined appropriate to ensure a balance between types of habitat impacted by Authorized Development and types of habitat preserved by TNBC. This adjustment will be informed by the biological monitoring requirements of the NBHCP and implemented through the Plan's adaptive management provisions. Thus, although the mitigation strategy provided for under the NBHCP would mitigate for effects resulting from the Land Use Agencies' Covered Activities, because the percentage of uplands to wetlands differs between their respective Permit Areas, the NBHCP allows for the mitigation strategy provided for under the NBHCP to be reevaluated in the event either the City's or Sutter County's permits are terminated or revoked, or a Permittee (other than TNBC or the Water Agencies) chooses not to participate in the NBHCP. The mitigation strategy would be reevaluated to ensure that the configuration of TNBC Reserve lands provided for under the NBHCP continues to adequately mitigate for the impacts of Authorized Development in the remaining jurisdiction.

Finally, TNBC will implement management practices defined by the NBHCP and modify such practices through the adaptive management provisions regardless of whether one or both of the Land Use Agencies or other Permittees participates in the NBHCP. Thus, even if one of the Land Use Agencies does

not participate in the Plan, the impacts of development in the participating Land Use Agency will be adequately mitigated under the Plan.

Similarly, if either or both of the Water Agencies participates in the NBHCP, each participating Water Agency will be obligated to mitigate the effects of its operations and maintenance activities regardless of the participation of the other Water Agency. Moreover, as Permittees under the NBHCP, the operations and maintenance activities of RD 1000 and of Natomas Mutual would enhance the quality of waterway habitats within the Natomas Basin regardless of whether the Land Use Agencies participate in the NBHCP. Conversely, avoidance, minimization and mitigation measures applied to the Land Use Agencies' Permit Areas under the NBHCP's Operating Conservation Program that will mitigate the impacts of Authorized Development of the Land Use Agencies and will ensure the viability of Covered Species is not appreciably reduced by Authorized Development. Thus, the impacts of each of the Permittees' Covered Activities will be mitigated under the Plan regardless of whether the other Permittees continue their participation in the Plan.

Further assurance of NBHCP implementation is provided through the Independent Mid-Point Reviews required of both Land Use Agencies. During these reviews, the City and Sutter must demonstrate substantial progress toward establishing the 2,500-acre preserve and ensuring that the remaining preserves will ultimately meet the minimum 400-acre size at the end of 50 years. The Independent Mid-Point Reviews provide a comprehensive review of the status of NBHCP implementation and the success of mitigation measures, in addition to ensuring progress toward the establishment of a 2,500-acre reserve and an overall minimum 400-acre reserve size at the end of 50 years.

If either of the Land Use Agencies decided not to allow urban development within its jurisdiction within the Natomas Basin, then there would be no need to mitigate for that agency's development impacts through the NBHCP, since there would not be any impacts if development did not take place. If a Land Use Agency decided to pursue another HCP instead of the NBHCP in order to obtain its incidental take permit, then such other HCP would have to be complimentary with the NBHCP. In either event, the applicable provisions of the NBHCP could still be implemented to mitigate for the impacts of a participating agency's activities within the Natomas Basin.

L. ENVIRONMENTAL COMPLIANCE

In 1994 and 1988, the City of Sacramento prepared environmental impact reports (EIR) for the adoption of the North Natomas and South Natomas Community Plans respectively, and other land use approvals authorizing urban development within the Natomas Basin. Sutter County currently is undertaking the preparation of an EIR for adoption of a specific plan and related land use approvals for development within the Sutter County portion of the Natomas Basin.

The City of Sacramento, Sutter County, and the USFWS jointly will prepare a combined environmental impact report (EIR) and environmental impact statement (EIS) prior to approval of the

NBHCP and ITPs. The City of Sacramento and Sutter County will serve as co-lead agencies under the California Environmental Quality Act (CEQA) with respect to the preparation of the EIR prior to taking any action to adopt the NBHCP. The Department of Fish and Game, as a responsible agency under CEQA, will rely on this EIR, prior to taking its action to approve 2081 permits, Streambed Alteration Agreements, and any modifications to previously issued permits. The EIR/EIS may also be used to satisfy the requirements of CEQA and NEPA, to the extent allowed under state and federal law, should RD 1000 choose to participate in the NBHCP and apply for an incidental take permit in the future.

The USFWS will serve as the Federal lead agency for the preparation of the environmental impact statement (EIS) under the National Environmental Policy Act, prior to taking any action adopting the NBHCP and approving issuance of ITPs to the Permittees.

M. SPECIES COVERED BY THE PERMIT

Based on coordination with the USFWS and CDFG and the results of field surveys, the 22 species listed in Table I-1 have been identified as potentially subject to take or loss as a result of activities described in the NBHCP and are "Covered Species" under the NBHCP and its associated state and federal permits. "Covered Species" under this Plan means those species that are conserved by NBHCP and will be listed on the Section 10(a)(1)(B) and Section 2081 permits.

Some species shown in Table I-1 are listed under the state or federal ESAs while others are currently unlisted. All species addressed in the NBHCP as Covered Species will be included in the state and federal permits issued in accordance with the Plan. If a Covered Species addressed by the NBHCP is elevated from non-listed to protected status under ESA (threatened or endangered) after the issuance of an incidental take permit to an individual Permittee, then permit coverage for the newly listed Covered Species would become effective upon the final listing of the species. Under CESA, the Section 2081 Permit shall become effective to permit the Incidental Take of such species in connection with Authorized Development within each Permittee's Permit Area as of the date the species is accepted and designated as a candidate species pursuant to California Fish and Game Code section 2074.2, upon confirmation by CDFG that substantial evidence demonstrates that the Section 2081 Permit will continue to meet the standards in California Fish and Game Code Section 2081 (b) and Title 14 of the California Code of Regulations, Section 783.4 for the Additional State Protected Species and in accordance with the standards set forth in Section 6.2.4 of the NBHCP Implementation Agreement.

Two listed wildlife species are known to be widely distributed in the Natomas Basin and would be affected by anticipated urban development. The federally and state listed giant garter snake (GGS) inhabits rice fields, drainage canals, remnant sloughs and marsh, and adjacent open areas in the Basin. The state listed Swainson's hawk generally nests along the Sacramento River on the western edge of the Basin and in isolated trees and groves throughout the Basin and may forage within the Basin. Other species are more localized in their distribution or may be present in association with particular habitats such as vernal pools or elderberry bushes. Many migratory bird species occur in the Basin occasionally during the winter and

utilize the Basin for foraging and resting areas during migration and wintering. Several species occur only occasionally or have very localized distributions within the Natomas Basin but may become breeding or resident or expand their distributions in response to habitat restoration and enhancement proposed under this Plan. One tricolored blackbird colony is known to exist in the Basin and is located on existing TNBC reserve lands. Additionally, burrowing owls are known to occur within the Natomas Basin and appropriate measures have been included in the NBHCP to minimize and mitigate take of burrowing owls. Burrowing owl nesting sites are located on TNBC reserve lands.

The NBHCP covers seven (7) plant species. Take of listed plants is not prohibited under the ESA and therefore will not be authorized under the federal incidental take permits. Plants are included as a Covered Species under the NBHCP and will be listed on the federal permits in recognition of the conservation measures provided for them under the NBHCP. Plant species covered under the NBHCP will also be provided assurances under the federal "No Surprises" rule. The NBHCP also covers the seven plant species for CESA purposes.

N. COVERED ACTIVITIES

Described herein are the specific activities for which the Permittees will be provided incidental take coverage under the NBHCP Permits. Due to the similarities and differences of the Covered Activities of the Permittees and TNBC, this section is divided into Land Use Agencies (City of Sacramento and Sutter County), the Water Agencies (RD 1000 and Natomas Mutual) and the Plan Operator (TNBC).

1. Land Use Agencies' Covered Activities

For purposes of the Plan, and the Land Use Agencies' respective Section 10(a)(I)(B) and Section 2081 permits, the Land Use Agencies' Covered Activities are the following:

a. Authorized Development projects sponsored by either private developers or public entities that occur within the respective Permit Area of the Permittee, residential, commercial, industrial and similar urban development projects, including infrastructure improvements within the respective Permit Areas, required to support Authorized Development.

b. Total Authorized Development not to exceed 15,517 acres (the City-8,050 acres and Sutter-7,467 acres). This total does not include 1,983 acres of urban development associated with the Metro Air Park (MAP) project for which incidental take has been authorized by separate permits. However, the 1,983 acres of development in the MAP project are included in the 17,500 acres of total development in the Natomas Basin for purposes of analyzing the overall impacts of urban development in the Basin and evaluating the viability of the conservation strategy provided under the NBHCP. The Authorized Development covered by the incidental take permits sought by the City of Sacramento and Sutter County represent the 15,517 acre balance of Natomas Basin development after subtracting the 1,983 acres of development within the MAP project.

c. Authorized Development that affects vernal pool and aquatic species which are covered by the NBHCP, whether or not such development also requires a permit under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act or other federal regulations that would trigger an ESA consultation. As of April 2002, there were no known vernal pools located within the City's or Sutter County's Permit Areas. However, pre-construction surveys for past City projects have identified small, isolated vernal pools. It is anticipated additional small pools, that are as yet unidentified, will be found during future pre-construction surveys.

d. The following public facility projects proposed by the Land Use Agencies outside of their respective jurisdictions:

(1) Sutter County drainage improvements associated with the proposed South Sutter County Specific Plan that include expanding two existing drainage channels; the Montna Drain (approximately 80 feet by 8,000 feet upon completion) and the Natomas East Drain (approximately 90 feet by 8,000 feet upon completion). It is anticipated that the proposed Sutter County drainage improvements will convert approximately 16.5 acres of existing agricultural land to drainage channel. This land is subject to payment of NBHCP fees is part of Sutter County's total 7,467 acres of Authorized Development and is covered by Sutter County's permit.

(2) City of Sacramento public improvements occurring outside of the City limits include 10.4 acres of drainage improvements to widen the West Drain in Sacramento County, along the western City limits. Area of disturbance for this drainage improvement is included within the City's total 8,050 acres of Authorized Development. The area has already been disturbed in compliance with the 1997 HCP.

(3) Metro Air Park off-site improvements fall partially within the City of Sacramento Permit Area and partially within Sacramento County. MAP's off-site improvements located in Sacramento County include drainage, sewer, and roadway improvements. MAP off-site improvements occurring in Sacramento County have been included within MAP's 1,983 acres of disturbance. The MAP off-site improvements occurring in the City of Sacramento (approximately 28 acres) while authorized under MAP's incidental take permits are included within the City's 8,050 acres of Authorized Development.

2. Water Agencies' Covered Activities

For purposes of the Plan, and the Water Agencies' respective Section 10(a)(I)(B) and Section 2081 permits, the Water Agencies' Covered Activities consist of activities undertaken by the Water Agencies and their authorized agents as follows:

(1) De-silting
(2) Excavation and re-sloping of ditches and channels
(3) Deposition of ditch and canal spoils materials on adjacent property
(4) Placement of fill material
(5) Control of vegetation in and around canals, ditches, and drains by mowing and other measures to provide necessary operation and maintenance of canals as needed. Vegetation management plans would be presented to the NBHCP TAC for review and to the Wildlife Agencies for approval on a three year basis.
(6) Construction and improvement with no increase to the existing footprint, of flood control and water conveyance facilities, water ditches, canals, pumphouses or maintenance facilities, and other ancillary facilities that are owned or operated by RD 1000 or Natomas Mutual.

The Water Agencies' Covered Activities do not include the construction, maintenance, operation, or closure of river diversion facilities and accompanying fish screens owned or operated by Natomas Mutual in the Natomas Basin.

3. TNBC Covered Activities as Permittee and Plan Operator

As the Plan Operator, TNBC, its authorized agents, and other third parties under its direct control are granted coverage under TNBC's Incidental Take Permits for its Permit Area. TNBC's Permit Area includes the entire Plan Area, as well as, the levees bounding the Natomas Basin and extending to the edge of water immediately outside the Natomas Basin levees, and Area B, as depicted on Figure 20, Out of Basin Mitigation Areas.

Within the TNBC Permit Area, TNBC is provided incidental take coverage for managing reserves, preservation activities, creation and restoration activities, enhancing reserves, and monitoring Mitigation Lands.

O. ACTIVITIES NOT COVERED BY THE NBHCP

Specific activities not covered by the NBHCP and its associated Permits include the following:

1. Agricultural Activities. Except as provided for TNBC management of reserve lands, agricultural activities are not Covered Activities under the NBHCP and the NBHCP Permits.

2. Dredging. Except as provided for the Water Agencies' channel maintenance, dredging is not a Covered Activity under the NBHCP and the NBHCP Permits.

3. Additional Regulations. In addition to the Section 10(a)(1)(b) and Section 2081 Permits the NBHCP Permittees shall also comply with all other applicable local, state and federal, regulations,

laws or ordinances. This includes, but is not limited to, the following: U.S. Army Corps of Engineers Clean Water Act Section 404 permits; State Water Quality Control Board/Regional Water Quality Control Board Section 401 water quality certification and/or waste discharge requirements; CDFG Streambed Alteration Agreements pursuant to Fish and Game Code Division 2, Chapter 6, Section 1600 *et. seq.*; State and Federal Departments of Transportation; and USEPA and Department of Pesticide Regulation.

4. Relationship of Plan to Section 7 Consultations. Private or public actions that are Covered Activities under the NBHCP may also be subject to separate Section 7 review if those actions are authorized, carried out, or funded by Federal agencies. Incidental take for Covered Activities carried out by the Permittees or third party developers acting under the authority of an urban development permit issued by either the City or Sutter County will be granted under the permits and will be subject to the take mitigation, minimization and avoidance measures provided for under the NBHCP. Incidental take coverage for the federal action agency will be granted through the incidental take statement issued with the USFWS' Section 7 biological opinion.

P. ADAPTIVE MANAGEMENT PROVISIONS

Adaptive management is a method for examining alternative strategies for meeting measurable goals and objectives, and then, if necessary, adjusting future conservation and management actions according to what is learned. The adaptive management strategy includes milestones (specific periodic evaluations) that are reviewed at scheduled intervals during the lifetime of the incidental take permits and Covered Activities. The frequency interval of these evaluations will be based on the relative degree of risk to the Covered Species and habitats.

Adaptive management uses new information derived from monitoring, scientific research, and Plan implementation to revise conservation plans as part of a continual feed-back loop. Plan implementation information includes, but is not be limited to, the effectiveness of incidental take avoidance and minimization measures, reserve management techniques, and Plan funding adequacy. The adaptive management strategy must define the feedback process and incorporate feedback loops that link implementation and monitoring to a decision-making process. Incorporating new monitoring information is necessary to effect changes in management to achieve the Plan's biological goals and objectives.

Adaptive management requires a commitment of science to the conservation process in perpetuity. Rigorous scientific standards need to be applied both to research and monitoring, and research and monitoring are inextricably linked. Information from on-site monitoring (e.g., population trends of target species, responses of a community to prescribed burning, species diversity of actively restored and managed reserves) is combined with data from research (e.g., population genetics or dispersal behavior of target species) to inform and revise site-specific and regional management plans.

Adaptive management can assist the Wildlife Agencies and Permittees in improving the effectiveness of the Operating Conservation Program. The NBHCP Adaptive Management strategy will:

(1) Identify the uncertainty and questions that need to be addressed to resolve the uncertainty;
(2) Develop alternative strategies and determine which experimental strategies to implement;
(3) Integrate the monitoring program that is able to detect the necessary information for strategy evaluation; and
(4) Incorporate feedback loops that link implementation and monitoring to the decision-making process that will result in appropriate changes in management to achieve biological goals and objectives of the Plan.

II. BIOLOGICAL DATA

A. ENVIRONMENTAL SETTING

The Natomas Basin is a low lying area in the Sacramento Valley, California, located east of the Sacramento River and north of its confluence with the American River, (see Figure 4, Aerial Photograph). The Plan Area encompasses 53,537 acres within the Natomas Basin, of which 16,881 acres lie in Sutter County and 36,656 acres lie in Sacramento County (see Figure 2, Land Use Agencies "Permit Areas" and Affected Jurisdictions). Of the 36,656 acres within the Natomas Basin, 23,820 acres lie within the jurisdiction of unincorporated Sacramento County and 12,836 acres lie within the City of Sacramento. The Natomas Basin is defined as the area, inside the peripheral levees, and extends to the toe of the levee on the Basin side of boundary levees.

Prior to modern reclamation efforts, drainage off the western slopes of the Sierra Nevada produced regular flooding and created the Natomas Basin as an area of highly fertile, alluvial soils. This early condition is reflected in Figure 5, 1908 Land Cover, which shows the large American Lakes, a large extent of riparian scrub-shrub (e.g., willows), and a large expanse of dry farmed open plain. Since 1914, land reclamation and reclamation facilities, canals, levees and pumping stations have allowed over 80% of the Basin to be converted to agricultural production. A high proportion of the soils in the Natomas Basin are underlain by impervious clay, which creates the poor drainage conditions favoring irrigated rice farming, which became prevalent in the 1940's.

Today, the predominant crops produced in the Natomas Basin are rice, corn, grain, tomatoes and pasture lands. The overall topography of the Basin remains a shallow bowl, but the irregular small-scale topographic features of the original landscape have largely been eliminated by agriculture. See Figure 6, Current Topography. The drainage pattern of the Basin has been altered so that runoff is pumped into the surrounding canals and the Sacramento River at several places. Even with pumping, portions of the area are subject to shallow flooding from rain falling in the Basin that cannot be conveyed quickly enough to external drainage systems. See Figure 7, Flood Prone Areas.

Natural and uncultivated vegetation types are interspersed throughout the agricultural areas of Natomas Basin. See Figures 9 - 11, Habitat Types Maps (1993 - 2001). Natural vegetation is found primarily along irrigation canals, drainage ditches, pastures, and uncultivated fields. Borders of canals and ditches often have narrow strips of emergent vegetation (cattails and bulrushes) or wooded riparian areas. The presence of these water conveyance systems, operated by Natomas Mutual and RD 1000 among the mosaic of agricultural fields and riparian areas, provide important nesting, feeding, and migration corridor habitat for a variety of wildlife species inhabiting the Basin.

B. HABITAT DISTRIBUTION

B. HABITAT DISTRIBUTION

To assist in the analysis of expected habitat changes, standard categories of existing land uses and a GIS database were developed to provide a framework for predicting future land area assigned to each of these categories. The year 1997 is the initial year in which land use characteristics are considered because the previous take permits were approved in 1997. Additional information available since 1997 and field data gathered in 2001 were used to supplement and update the 1997 data. This updated information is referred to in this report as the "HCP baseline" and is referred to as the 2001 Land Use or Habitat Acreage Inventory. The primary steps in developing the land use database are presented below.

(1) Digital aerial photos were obtained from the U.S. Geological Survey and assembled into a mosaic containing surrounding levees, providing a total area of 53,537 acres.

(2) A land use classification system was developed, focusing on the habitat information necessary for this specific analysis. Eighteen land use categories were developed, which are described in Table II-1.

(3) Land use data from the Department of Water Resources (DWR) was added to the GIS database, and the DWR categories were translated to match the eighteen land use categories developed for the project.

(4) The resulting land use map was modified to a limited extent based on field data collected by May & Associates. This resulted in a greater level of detail (a one-acre minimum polygon) and a more accurate map. Jurisdictional boundaries were added to the GIS database. Because lands in agricultural production and, in particular, rice cultivation, is in flux within developing areas in the City of Sacramento and within the MAP HCP area, the acreages shown for agricultural and rice production do not reflect all lands removed from agricultural production since 1997. In particular, the acreage depicting rice production within the MAP HCP area reflects rice lands as of the 1997 baseline. Since 1997, no lands within the MAP HCP have been in rice production.

Following the completion of the baseline scenario described above, the last step in the development of the database was to develop a future land use scenario corresponding to buildout conditions in the Natomas Basin. This buildout condition includes the planned land development activities of the City and Sutter County, and also includes the development of the Metro Air Park project in unincorporated Sacramento County. Although Sacramento County is not a participant, the NBHCP includes the 1,983 acres comprising the MAP area within the 17,500 acres of Planned Development addressed under the NBHCP.

This analysis has divided land within the Natomas Basin into eighteen land use classifications. Acreage for each land use class were calculated in 1997 and are presented in Table II-1 below. There are

a total of 53,537 acres in the Basin with over 65% of the acreage in rice or non-rice crops. A small portion, less than 4%, of the acreage is within the Metro Air Park area.

TABLE II - 1
LAND CLASSIFICATIONS IN THE NATOMAS BASIN - 1997 (ACRES)

Land Use Class[a]	City of Sacramento	Metro Air Park	Other Sacramento County	Sutter County	TOTAL
Airport	18	0	1,512	21	1,551
Alfalfa	0	0	137	234	371
Canals	129	0	308	66	503
Grassland	454	0	293	138	886
Highways	450	0	414	571	1,435
Idle	838	50	480	94	1,464
Non-rice Crops	4,905	325	8,591	2,866	16,686
Oak groves	15	2	70	11	98
Orchard	13	0	169	0	182
Other	148	0	305	15	468
Pasture	35	22	261	355	674
Ponds and seasonally wet areas	7	4	75	10	96
Rice	987	1,541	8,427	11,737	22,693
Riparian	24	0	93	6	124
Ruderal	1,429	6	261	274	1,970
Rural residential	49	10	170	148	377
Tree groves	36	23	39	8	106
Urban	3,298	0	229	327	3,854
TOTAL	**12,836**	**1,983**	**21,836**	**16,881**	**53,537**

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2001)

a See definitions of Land Use Classes below.

b. The Canal land use category includes only Class I canals and drains, the largest canals and drains that are digitized as area features in the GIS database. Class II, III, and IV canals and drains are not included in this table because they are linear features in the GIS database. For a detailed description of canals and drains, both as area and linear features, see Tables II-2 and II-3.

Note: Urban uses noted herein reflect 2001 conditions. Agricultural cover types reflect 1997 uses. Since 1997, all rice production within Metro Air Park has been discontinued.

Definitions of Land Use Classes

Airport	Lands within the ownership boundary for the Sacramento International Airport, including all land use types (e.g., facilities, runways, open lands and farmlands adjacent to runways) within boundary. Does not include airport buffer lands (e.g., south of I-5). Also includes the former Natomas Air Park and several small rural airstrips (one in Sacramento County and two in Sutter County).
Alfalfa	Based on a subset of the DWR "Pasture" land use category that includes alfalfa production, as estimated for the 1997 baseline. Includes known alfalfa fields along Garden Highway in Sutter County.
Canals	The largest (Class I) canals and drains (including adjacent maintenance roads) in the Natomas Basin, primarily the ones already digitized for the DWR land use maps. Includes the East Drain, West Drain, Main Drain, North Drain, and the Central Main Canal. Does not include smaller canals and drains, which are recorded in the project database as linear features.
Grassland	Based on DWR "Native Vegetation" land use category with additional information provided by May & Associates field data and aerial photo interpretation, as estimated for the 1997 baseline. Includes known uncultivated grasslands, primarily along the eastern border of the Natomas Basin.
Highways	Includes Interstates 5 and 80, S.R. 99/70, and interchanges, including all areas within medians.
Idle	Based on DWR "Idle" land use category - agricultural lands temporarily out of production.
Non-Rice Crops	Based on the DWR land use categories of "Grain and Hay Crops", "Field Crops," and "Tilled Lands." In the Natomas Basin, this category includes primarily wheat, corn, safflower, and tomatoes.
Oak Groves	Includes several isolated pockets of mature oak trees east of Garden Highway.
Orchard	Based on the DWR land use categories of "Deciduous Fruits/Nuts" and "Citrus and Subtropical". In the Natomas Basin, this includes primarily pear, peach, and walnut orchards adjacent to Garden Highway.

Other	Miscellaneous land uses not captured by other land use categories. Includes Teal Bend Golf Course, the wastewater plant at Sacramento International Airport, and several utility substations.
Pasture	Based on DWR "Pasture" land use category, including primarily irrigated pasture in the Natomas Basin.
Ponds/Wet Areas	Wetland/marsh areas including the area around the North Drain (near RD 1000 Pumping Plant #2) and several isolated locations throughout the Natomas Basin. Based on DWR's "Water Surface" land use category and some "Riparian Vegetation" categories, with additional information provided by May & Associates data and aerial photo interpretation.
Rice	Based on DWR's "Rice" land use category.
Riparian	Based on DWR's primary "Riparian" category, with additional information provided by May & Associates data. Includes cottonwood/willow areas along primary canals and drains, including the Fisherman's Lake area.
Ruderal	Includes former agricultural lands that are no longer in production, primarily due to proximity to urbanized areas (e.g., surrounding Arco Arena). Includes DWR's "Barren" and "Vacant" land use categories. Ruderal lands typically consist of non-native grasses, and most are occasionally tilled for fire control.
Rural Residential	Includes farmhouses and farm equipment yards. Includes DWR's "Semi-Agricultural" land use category, with additional information provided by aerial photo interpretation.
Tree Groves	Includes non-riparian stands of trees other than mature oaks. Based on DWR's "Native Vegetation" land use category, with additional information by May & Associates data and aerial photo interpretation.
Urban	Urbanized areas. Primarily in the City of Sacramento, but also including unincorporated areas along El Centro Road in Sacramento County and Pacific Avenue in Sutter County.

The system of canals and drains owned and maintained by RD 1000 and Natomas Mutual has been analyzed based on data obtained from RD 1000 and Natomas Mutual and field data collected by May & Associates. The canals and drains were divided into four categories: Class I (the Canal land use category including the primary drainage system), Class II (large), Class III (medium), and Class IV (small). The following Tables II-2 and II-3 show the number of miles and acres of canals and drains in the Natomas Basin by jurisdiction for the year 1997, as updated by CH2MHill in 2001.

TABLE II - 2
CANALS AND DRAINS IN THE NATOMAS BASIN - 2001(MILES)

Canal Type	City of Sacramento	Metro Air Park	Other Sacramento County	Sutter County	Total
Class I	13.9	1.4	13.6	7.1	36.0
Class II	4.0	4.0	18.0	24.5	50.5
Class III	15.1	3.5	50.5	28.5	97.6
Class IV	5.1	4.1	31.4	22.3	62.9
TOTAL	**38.1**	**11.6**	**114.9**	**82.4**	**246.9**

Source:CH2M Hill, September 2001.

TABLE II - 3
CANALS AND DRAINS IN THE NATOMAS BASIN-2001 (ACRES)

Canal Type	City of Sacramento	Metro Air Park	Other Sacramento County	Sutter County	Total
Class I	129	0	308	66	503
Class II[a]	32	32	144	196	404
Class III[a]	90	21	301	170	582
Class IV[a]	23	19	145	103	289
TOTAL	**275**	**72**	**898**	**534**	**1,779**

Source:CH2M Hill, September 2001.

a Class II, III, and IV canals and drains are linear features in the GIS database. Conversion to area features required using a standard width for each canal type, which was determined to be 65.9, 49.2, and 38.0 feet for Class II, III, and IV canals, respectively, based on information from Natomas Mutual. These standard widths include adjacent upland areas (e.g., maintenance roads) in addition to channel width.

b Class 1 canals acreage located within Metro Air Park is shown under Other Sacramento County.

C. COVERED SPECIES

The NBHCP provides for the conservation of 22 wildlife and plant species that either exist or may exist within the Natomas Basin. Two of the Covered Species, Swainson's hawk and giant garter snake have influenced the structure of the NBHCP for the following reasons: (1) both species are prominent within and surrounding the Natomas Basin; (2) both are listed as state threatened species and the giant garter snake is also a federal listed threatened species; and (3) as a wetland species (giant garter snake) and upland foraging species (Swainson's hawk), the habitat necessary to support the two species provides

to varying extent the habitat types utilized during some or all of the life cycles of the remaining Covered Species.

While giant garter snake (GGS) and the Swainson's hawk are known to occur widely throughout the Natomas Basin, at least 10 of the remaining Covered Species are also known to or likely to occur within the Basin in limited areas or during certain periods of the year. Take of Covered Species other than the hawk and snake may occur as a result of Authorized Development by the Land Use Permittees or the Water Agencies Covered Activities, or as a result of management activities carried out by TNBC. Some species either do not occur widely in the Natomas Basin, or may become established more widely in the future. If Covered Species that are currently infrequent visitors should increase usage of the Natomas Basin, then TNBC in consultation with the NBHCP TAC, would consider modifying reserve management strategies to better accommodate and support the increasing populations of such Covered Species.

Six of the seven covered birds species are migratory (Aleutian Canada goose, bank swallow, burrowing owl, Swainson's hawk, tricolored blackbird, white-faced ibis), and one is resident (loggerhead shrike). Four of the covered bird species are currently known to breed in the Basin (Swainson's hawk, burrowing owl, tricolored blackbird, loggerhead shrike). Two species, white-faced ibis and bank swallow, could potentially nest in the Basin if suitable nesting habitat becomes available. The remaining animal and plant species are year-round residents of their habitats.

Generally, species using the Natomas Basin occur in three general habitat associations. Wetland associated species, upland associated species and vernal pool associated species.

Wetland Associated Species. Several species use marsh and wet areas as well as vernal pool areas. These species may also require upland areas that are associated with wet areas. These associated wetland species covered by the NBHCP include:

Giant garter snake
Aleutian Canada goose
Tricolored blackbird
White faced ibis
Northwestern pond turtle
California tiger salamander
Western spadefoot toad
Delta tule pea
Sanford's arrowhead

Giant garter snake prefers marshlands which are extremely limited in the Natomas Basin. As a result this species has adapted to use rice fields and canals. The NBHCP through development of managed marsh reserves and preservation of rice reserves will provide managed habitat to support the needs of this species and associated upland species.

Aleutian Canada goose is a winter visitor to the Natomas Basin and forages and rests in the area, but is not known to breed in the basin. Although, there are no known occurrences of the Aleutian Canada goose in the NBHCP Plan area, the NBHCP includes policies to support resting and foraging for this species in the reserve system areas. Thus, preservation of the rice landscape included in the mitigation plan will also support winter foraging and resting areas for the Aleutian Canada goose.

White faced ibis uses rice fields, ditches and other wet areas for foraging and prefers extensive marsh areas for nesting. Because there is so little native marsh in the Natomas Basin, there are no known nesting sites of the white faced ibis in the plan area. Creation of new managed marsh mitigation lands and the wetland reserve management policies have been designed to all support species such as the white faced ibis.

Tricolored blackbird uses marshes, rice fields and meadows for foraging and nesting. Again because of the limited amount of native marsh remaining in the Plan Area, breeding populations of this species have declined over the last several decades. The managed marsh reserves which include both marshes and upland areas (for foraging) will also benefit this species.

Northwestern pond turtle, California tiger salamander and western spadefoot toad are all species that use wetland areas with associated uplands as habitat. The pond turtle prefers marshlands and other slow moving waters, but also uses upland areas for basking, egg laying and overwintering. This habitat is similar to the requirements for the giant garter snake and the reserve management requirements for managed marsh. Similarly, western spadefoot toad requires shallow seasonal wetlands for breeding. Finally, the California tiger salamander is an aquatic breeder and therefore requires ponds, marsh or other shallow or slow moving waters for breeding. The juvenile and adult salamanders utilize upland grass areas for habitat once metamorphosis has occurred. Thus, all three of these species require marsh or wetland areas with associated uplands. These species will benefit by the substantial increase in managed marsh habitat under the 0.5 to 1 mitigation ratio. Vernal pool avoidance policies included in the NBHCP will further protect habitat for these species.

Delta tule pea and Sanford's arrowhead, two plant species, are associated with wetland and marsh areas. Neither species have known occurrences in the NBHCP Plan Area largely because of the lack of marsh and wetlands remaining in the area. Thus, under the NBHCP managed marsh management strategies, these species will also benefit from the increase in marsh reserves provided by the NBHCP.

Vernal Pool Associated Species. Related to marsh habitat enhancement strategies are avoidance and minimization strategies to protect vernal pool associated species. Vernal pool species are the most difficult to develop mitigation for since none of the vernal pool covered species are known to be present in the Natomas Basin. There are however, limited vernal pools on the eastern edge of the Natomas Basin which may support these species. The NBHCP includes USFWS survey protocols and mitigation through 1) avoidance and on-site preservation or 2) payment into a USFWS Mitigation Bank. Covered species which may use vernal pool habitat include: Midvalley fairy shrimp, vernal pool fairy shrimp, vernal pool

tadpole shrimp, Boggs Lake hedge-hyssop, Colusa grass, legenere, Sacramento orcutt grass, and slender orcutt grass.

Upland Associated Species. Nearly all covered bird and animal species (with the exception of certain VP species) need some upland areas for basking, hibernaculae, cover or foraging. Upland areas of the reserve system will be designed to support foraging and/or perching habitats for the Swainson's hawk, loggerhead shrike, tricolored blackbird and bank swallow. Burrowing owl may also use upland areas, as well as the upland portions of marsh and rice levees for burrows. As noted above, although the *California Tiger Salamander* is an aquatic breeder, this species also uses upland areas utilizes upland areas during advanced juvenile and adult stages. Thus, the reserve management strategies seek to provide a upland habitats to support a variety of upland associated species. Each Site Specific Management Plan prepared for reserves, will consider the potential for the reserve to optimally support multiple upland species. Additionally each upland reserve Site Specific Management Plan will also address vegetation needs such as nesting trees for upland covered species.

1. Species Potentially Affected by Covered Activities

a. General Distribution/NDDB Records

Early in the NBHCP process, the USFWS provided a list of species with the potential to occur in the Natomas Basin. This list was eventually modified to develop the Covered Species list shown in Table I-1. To offset the potential impacts of habitat loss on these species, the goal of the NBHCP is to mitigate on a habitat protection basis. The NBHCP specifically focuses on impacts and mitigation requirements for two listed species known to occur extensively in the NBHCP area -- the federally and state listed giant garter snake (GGS), associated primarily with wetland habitats, and the state listed Swainson's hawk, associated primarily with upland habitat. Although the federally listed vernal pool species shown in Table I-1 are addressed in this Plan and are included under the incidental take permits under defined circumstances, take of these species is expected to be limited because the Natomas Basin no longer contains large intact vernal pool grassland complexes and isolated vernal pool habitats may occur within areas that are to be developed but is expected to be relatively small in extent and amount (see Section IV.C.54.). Thus, protection of wetland and upland habitats described under the NBHCP for the giant garter snake, Swainson's hawk, and listed vernal pool species is expected to provide significant levels of protection for each of the other species associated with these habitats, as shown in Table I-1.

The NBHCP emphasizes conservation of the overall ecosystem of the Natomas Basin by maintaining and enhancing a combination of wetland and upland habitat values, and by ensuring that all the species shown in Table I-1 are protected by the provisions of the Plan. It is expected that the measures described in the Plan will provide benefits for both those species that are listed under the ESA and CESA and for other unlisted species, some of which may become listed in the future. As explained in Chapter I, the Section 10(a)(1)(B) and Section 2081 permits issued in association with the NBHCP will apply to all species listed in Table I-1.

A search of the California Natural Diversity Data Base (NDDB) was conducted August 3, 2000 to determine known occurrences of listed or candidate species within the Natomas Basin. Although the NDDB may not contain all records of sightings within an area, it is the most consistent published source of information available. NDDB records are not localized as to parcel; rather, sightings in a fairly large radius are shown as one record. Thus, the NDDB shows the general distribution of species. NDDB occurrence records were used to determine which listed, candidate, or other species were likely to occur in the Basin and to estimate their distribution. The giant garter snake and Swainson's hawk are discussed in Section II.C.2 and II.C.3 below, respectively. Other Covered Species that are currently known within the Plan Area or have the potential to occur there are discussed below in Section C.4.

Species occurrences in the Plan Area known from Giant Garter Snake and Swainson's Hawk reports and other species' records are shown in Figure 12, Giant Garter Snake Records; Figure 13, Swainson's Hawk Records; and Figure 14, Other Species Records. Figure 12 reflects published information and illustrates the occurrence of giant garter snakes throughout the Basin. Unpublished records (George Hansen, pers. comm.) also confirm the widespread distribution of the giant garter snake in the Natomas Basin. Figure 13 reflects published information from the 2001 Annual Report prepared by the Swainson's Hawk Technical Advisory Council. However, the vast majority of the Basin is private land and has not been systematically surveyed for all Covered Species. The species with the most documented occurrences in the Basin are the giant garter snake and Swainson's hawk. As stated above, these species are the main focus of mitigation efforts under the Plan.

b. Fish Species Not Covered by the Plan

The following listed fish species -- Spring and Winter run chinook salmon, steelhead, delta smelt, and Sacramento splittail -- will not be covered by the Plan and its associated Section 10(a)(1)(B) and Section 2081 permits. Those fish species will not be covered by the Plan because the effects of water intake entrainment from the Sacramento River will be addressed and analyzed through a separate Section 7 consultation with NMFS. In anticipation of that separate permit, Natomas Mutual is working with federal and state agencies to design fish screens to minimize the take of riverine species. The fish screens are expected to be completed in 2003 or later.

The utilization of distinct permits processes is indicative of the fact that those fish species and terrestrial species (e.g., the giant garter snake) depend upon different, and sometimes conflicting, habitat resources. For example, existing diversions from the Sacramento River create Spring, Summer, and early Fall water on which existing giant garter snake populations depend. At the same time, existing diversions create a risk for those fish species. However, the principal conservation methods to be used by the Plan for wetland habitats do not require more water than is currently used to grow rice on the same land area. Therefore, establishment of the Plan will not increase the dependence on external water supplies or increase the amount of future water diversions, which would affect these fish species.

2. **Giant Garter Snake** (*Thamnophis gigas*)

a. Species Description and Taxonomy

The giant garter snake is one of the largest garter snakes of the genus *Thamnophis*, with a total length up to 4.5 feet or greater. The garter snake in the Sacramento Valley and Delta regions has a dorsal ground color often dark brown to olive or nearly black, a complete dorsal strip varying in color from dull yellow to bright orange, and sometimes orange on the ventral surfaces as well (Hansen 1992). The giant garter snake was formerly listed as a sub-species of *Thamnophis elegans* but was elevated to a full species status as *T. gigas*. Since *T. gigas* is adapted to a different ecological habitat than other subspecies of either *T. elegans* or *T. couchii*, *T. gigas* is largely isolated from its related species and sub-species. The following description of the life history of the giant garter snake is taken from reports written by John Brode and George Hansen (see References section, Chapter VIII, and other personal communications).

The giant garter snake is listed as a threatened species under the Federal Endangered Species Act and the California Endangered Species Act. The giant garter snake is an endemic species of wetlands in the Central Valley of California. Historically, giant garter snakes were found from the vicinity of Butte County southward to Bakersfield in Kern County. Today, populations of the giant garter snake are found in the Sacramento Valley and in isolated pockets of the San Joaquin Valley.

b. Activity Cycle/Behavior

In the Basin, the GGS annual cycle and habitat utilization generally occur in the following pattern. By the end of October, GGS begin entering their winter retreats in rodent burrows excavated in channel and canal banks, rubble piles, and other upland sites. After emergence from winter retreats, which occurs by late March or early April, GGS utilize canals with water that persists through the summer months. Many of the canals contain adequate emergent aquatic vegetation and steep, vegetated banks that provide cover and an abundant food supply of small fish, tadpoles and frogs. However, current canal maintenance practices have rendered many of the major canals in the basin unusable. Rice fields are also utilized by GGS, with this seasonal use beginning after rice growth is sufficiently high to provide cover. Following pre-harvest rice field draining, GGS move out of rice fields and re-enter canals where they often find prey stranded in pools of water left behind from the flooding of the rice fields. After the fields have been drained, the GGS returns to its winter retreat.

Seasonal

Adult and juvenile giant garter snakes emerge from their winter retreats in late March or early April and bask on elevated ground at overwintering sites. They are active from the time of emergence to the end of October, with surface activity concentrated from April to October.

Daily

Hansen and Brode (1992b) describe the daily activity of the GGS to generally include "emergence from burrows in the bank after sunrise; basking to warm its body to activity temperatures during cool weather or cool early mornings; and foraging or courting activity throughout the remainder of the day. GGS were observed several times after sunset during hot weather, usually lying motionless on warm pavement or dirt roads." Giant garter snakes will move distances of five miles over the course of a few days, and have been documented to move as much as one mile in a single day. Typically, the GGS moves between zero and thirty meters in a day. They may use stretches of unvegetated canals as dispersal corridors; however, they typically do not remain in such canals long because without cover they are vulnerable to predation.

Reproduction

Giant garter snakes have been observed mating on vegetated canal banks or on stands of emergent vegetation from April to May. After breeding, the males and females separate and continue feeding. Gravid females continue to feed through the summer. Females give birth about 120 days after breeding (e.g. breeding in April and bearing young in August). Females three years of age and older can begin to reproduce. Clutch size for young snakes is usually small, however, with 8 to 10 young. Clutch size increases with age of female, reaching as high as 50 young for a 10 to 12 year old female (4 to 5 feet in length). Females can probably clutch each year, but reproductive success may depend on whether they recover their body weight after they bear.

c. Habitat Components/Requirements

The giant garter snake inhabits agricultural wetlands and other waterways, such as irrigation and drainage canals, rice lands, marshes, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley. This species prefers freshwater marshes and low gradient streams, and has adapted to drainage canals and irrigation ditches for habitat. This species is the most aquatic of the garter snakes in California. Habitats currently known to support giant garter snakes include Gilsizer Slough, Badger Creek, and Colusa National Wildlife Refuge, Sacramento National Wildlife Refuge, Delevan National Wildlife Refuge, Sutter National Wildlife Refuge, and Gray Lodge Wildlife Area.

The agricultural and flood control activities of the 20th century have greatly reduced the habitat for the giant garter snake. Uncontrolled seasonal flooding of the Sacramento Valley historically provided expansive areas of giant garter snake habitat. As a result of habitat loss and fragmentation, declining populations and continuing threats to the remaining populations, the giant garter snake was listed as a threatened species by the State of California in 1971 and a federally threatened species in 1993.

Components

Generally, the habitat components most important to giant garter snake survival are: (1) water, including permanent water that persists through the summer months; (2) emergent aquatic vegetation and steep, vegetated banks for cover; and (3) an abundant food supply (Glenn Wylie, BRD, pers. comm.). Other important components are adjacent upland areas with small mammal burrows or other suitable winter retreats, upland habitat with grassy banks for refuge from flood and openings in the vegetation for basking, and habitat diversity. The giant garter snake occurs in a combination of permanent and seasonal freshwater habitats and conducts most of its activities within the immediate vicinity of water. Giant garter snakes usually occur within a few feet of water (i.e., within escape distance) and are often found between the water level and the top of adjacent banks or embankments.

Seasonal and Permanent Marsh

As the name implies, a seasonal marsh is flooded seasonally to accomplish a variety of purposes, including benefits to wildlife and vegetation management. The time of year when a seasonal marsh is flooded depends on the wildlife species being targeted (e.g., winter for waterfowl). Permanent marshes retain water year round. Giant garter snakes are known to use a variety of seasonal and permanent marsh habitats. Recent telemetry studies have shown the GGS prefer permanent marshes or canals with permanent marsh-like conditions. Native marsh habitats are nearly non-existent in the Natomas Basin and constitute less than 0.2% of the Natomas Basin. As such, the giant garter snake populations have overtime, adapted to the inundated (flooded) rice fields and related irrigation ditches in the Natomas Basin.

Rice Fields

Giant garter snakes are known to utilize rice fields for some of their habitat needs (Brode and Hansen 1992), along with associated features of the Natomas Basin rice growing landscape, including the canals, ditches, and drains of the Basin's water conveyance systems, the higher ground of levees and railroad embankments, and sloughs and marshes. Gravid female garter snakes, for example, have been observed to utilize maturing rice fields and to remain in the rice fields to feed after parturition; neonate garter snakes have also been observed feeding in rice fields (Hansen, pers. comm.). In studies conducted by the U.S.G.S. Biological Resources Division (BRD), 50% of radio-telemetered giant garter snakes have been observed in rice fields, especially along the edges of the fields, and when the rice plants are high enough to provide sufficient cover (Glenn Wylie, pers. comm.).

Giant garter snake seasonal activity associated with rice cultivation typically occurs as follows:

Spring: Rice is planted and the fields are flooded with several inches of water. Prey species (e.g., small fish and frogs) migrate into rice fields from ditches and drains that retain water year round and where they overwinter, eventually attracting giant garter snakes into the fields.

Summer: Once the rice plants are high enough to provide cover, giant garter snakes use the rice fields to feed and bear their young (see above). They will use the fields so long as there is sufficient water and quantities of prey.

Late Summer/Fall: The water is drained from the rice fields and garter snakes move off the fields to other adjacent habitats. The rice is harvested. At this time female garter snakes have just borne young and need food to regain their body weight. Prey species that were in the rice fields now concentrate in the ditches and drains, where the snakes can find a ready food source.

Winter: Giant garter snakes enter a dormant period inside winter retreats (e.g., small mammal burrows). While the rice fields lie fallow, many are intentionally flooded in Winter to be used by migrating waterfowl.

Irrigation Canals/Drainage Ditches

Giant garter snakes adapt well to man-made waterways as represented by the Natomas Basin's water conveyance system. In fact, the Basin's irrigation canals and drainage ditches, together with their associated levees and adjacent embankments, are probably an essential component of giant garter snake habitat in the Basin. Irrigation canals provide not only an essential habitat area potentially containing all the habitat components described above, but also create dispersal corridors allowing garter snakes to move from one area to another in search of mates, new territories, summer habitat, etc. Irrigation ditches and canals constituted 50% of all habitat use by giant garter snakes radio-telemetered by the BRD at Gilsizer Slough, which is outside of the Natomas Basin (Glenn Wylie, pers. comm.). Hansen and Brode (1992b) also provide data illustrating extensive use of water conveyance structures by giant garter snakes.

The relationships of rice fields, irrigation ditches, and canals to each other, as well as their relative importance as habitat for the giant garter snake, are not fully understood. Giant garter snakes have been found in some areas where rice is not grown and the number of irrigation structures is low (e.g., Badger Creek in southern Sacramento County). However, it appears that giant garter snakes are usually not found in agricultural areas where rice is not the predominant crop (Brode and Hansen 1992). Irrigation ditches and drains appear to provide valuable giant garter snake habitat as long as they have: (1) enough water during the active summer season to supply food and cover (minimum April - July; optimum March - October); (2) grassy banks for basking; (3) emergent vegetation for cover during the active season (March - October); and (4) nearby high ground or uplands that provide cover and refuge from flood waters during the dormant season (October - March) (Brode and Hansen 1992).

In rice farming areas, giant garter snakes are most often found in older ditches with steep sides. V-shaped ditches with sloped sides are more difficult for the snake to maneuver in when trying to reach water or escape predators. However, GGS also avoid capture by being near vegetative cover, burrows, and cracks in the ground.

Giant garter snakes move around to find suitable habitat as conditions in the rice fields, marshes, and canals and ditches change, especially during the dry summer months. Thus, connectivity between canals and ditches in different areas and between these systems and other habitat types is extremely important for genetic interchange and ability to find summer habitat.

Vegetation

Cover species adjacent to aquatic habitats include mustard (*Brassica geniculata*) and milk thistle (*Silybum marianum*). Hansen and Brode (1992a) found habitat used by garter snakes to include common tules (*Scirpus acutus*), cattails (*Typha* sp.), or grasses "which grew in continuous stands or isolated patches at or below the high water line." Vegetation on the berms was dominated by mustard, milk thistle, star thistle (*Centaurea* sp.), saltgrass (*Distichlis spicata*), and smartweed (*Polygonum* sp.). The report notes, "Vegetation was present either as growing green stands or as dry tangles throughout the year and provided shelter for the GGS and protection from predators." The plant species may not be as important as the structure; dense cover is preferred. Garter snakes can bask on vegetation or in small open areas. Vegetation impenetrable to humans or predatory birds is important in protecting giant garter snakes from capture and predation.

Basking Sites

Basking occurs on banks of canals and levees, on broken down tules in the water, in branches of willows or saltbush over water, on the ground at water's edge in concealing vegetation, and on dead snags. Juveniles may bask on floating mats of vegetation. Basking may be an important aid to digestion, gestation, healing, and warming the body.

Basking sites need to be open to sunlight (not beneath heavy riparian vegetation) but ideally should have sufficient cover to escape from predators and allow for thermoregulation. Preferred basking sites are located adjacent to escape cover, including water or vegetation.

Food

The giant garter snake specializes in aquatic prey, including small fish and frogs, carp, mosquitofish, bullfrogs and treefrogs.

Refuge/Winter Retreats

Giant garter snakes take refuge from heat and predators in ground squirrel holes, gopher burrows, or suitable vegetation (e.g., beneath dense bushes, emergent vegetation, or piles or mats of broken down vegetation). Winter retreats used by the snakes include small mammal burrows on the sides of levees, ditches and drains, railroad embankments, and other upland habitats, as well as man-made structures, such as piles of large rocks or rip rap. Close proximity of overwintering sites to aquatic summer habitats is

preferred; however, giant garter snakes have been found overwintering up to 200 yards from the shoreline of summer habitat (Hansen and Brode 1992a). Burrows, vegetation, and other shelter from predators enhance the suitability of overwintering sites. It is also helpful if winter retreats are above winter flood levels and if the snakes have access to upland retreats during runoff or flooding.

d. GGS Numbers, Distribution, and Ecology in the NBHCP Area

Current Numbers/Baseline

Currently, the U.S. Fish and Wildlife Service recognizes 13 separate populations of giant garter snakes within the State of California. Each population is isolated without protected dispersion corridors to link to adjacent population groups. The Natomas Basin contains the largest single element of the American Basin's population of the giant garter snake that has been studied.

Previous surveys and other historical information indicate a fairly widespread distribution of giant garter snakes within the Natomas Basin (Figure 12, Giant Garter Snake Records). Virtually all these Natomas sightings are from areas where rice is grown. Within these areas they are strongly associated with the rice fields themselves and the associated canal/drain components of the water conveyance system. On this basis, a reasonable surrogate variable for estimating the total amount of giant garter snake habitat in the Natomas Basin is the amount of rice fields in the Basin and canal/drain habitat embedded in the rice landscape. These are estimated at 22,692 acres of rice fields and about 247 miles of canals and drains in the Basin. A BRD study conducted from 1998 to 1999 recorded 277 individual giant garter snakes in the Natomas Basin (Wylie and Casazza, 2000). Giant garter snakes were found in a network of ditches and rice field habitats, including several occurrences in Fisherman's Lake and other RD 1000 canals within the Basin. The most recent giant garter snake survey information (Wylie, 2001) showed that fewer giant garter snakes were captured relative to previous years, but this does not necessarily mean that the giant garter snake population in the Natomas Basin is in decline (USFWS, 2002)

However, there is expected to be considerable patchiness in giant garter snake distribution, even within the rice-growing regions of the Basin, and field surveys, to some extent, have supported this expectation (Brode and Hansen 1992). Where garter snakes do occur, as many as 10 snakes have been observed per linear mile of ditch or drain during walk-through surveys under optimal conditions (Hansen, pers. comm.). However, there are significant limitations in the capability of visual survey methods to estimate actual snake population densities, because giant garter snakes spend the majority of their time resting in burrows, beneath dense vegetation or under objects, and because they often do not move as observers approach. Consequently, visual surveys may underestimate actual abundance, perhaps by an order of magnitude.

The 2002 NDDB records show 168 giant garter snake occurrences in California. Of these, 38 of these occurrence records were in the Natomas Basin. The U.S. Geological Survey, Biological Resources Division (USGS, BRD) also conducts surveys of the giant garter snake. As noted above, BRD surveys

conducted from 1998 to 1999 recorded 277 individual giant garter snakes in the Natomas Basin. Note that not all occurrences from the BRD are officially included in the NDDB.

Within Sutter County, this species has been located at: (1) Riego Road 0.5 miles west of Highway 99; (2) within a canal on the northern side of Howsley Road 0.8 miles east of El Centro Boulevard west of Pleasant Grove; (3) within a canal on the west side of El Centro Boulevard 0.4 miles north of Sankey Road; (4) north of drainage canal at Riego Road 0.7 miles east of Powerline Road; (5) just south of the Natomas Cross Canal 1.6 miles west of Highway 99 2.5 miles northeast of Verona; (6) within the Natomas Basin 1.8 kilometers north northwest of the intersection between Sankey Road and El Centro Road; and (7) within a canal 1.2 kilometers east of the crossing between the north main canal and Riego Road. Within Sacramento County, occurrences have been noted near Sacramento International Airport, Fisherman's Lake area and other canal areas.

U.S. Geological Survey Study

Studies currently being undertaken by the U.S. Geological Survey, Biological Resources Division (BRD) can contribute to the understanding of the ecological requirements of the giant garter snake and may suggest appropriate census methods (see Biological Monitoring section, Section VI.E). The BRD is currently studying the giant garter snake on state and National Wildlife Refuge lands north of the Natomas Basin, and is developing protocols for further studies and future study areas.

Giant garter snake data being developed as part of the BRD studies will begin to establish population baseline information. The BRD proposal for giant garter snake includes focused studies, inventories, and genetic studies. The stated objectives of the study include: (1) development of appropriate population census techniques; (2) determination of giant garter snake habitat use; (3) estimation of life history and population parameters; (4) study of response of the giant garter snake population to experimental management (e.g. natural marsh vs. rice fields); and (5) establishment of a GIS data base for giant garter snake habitat (Glenn Wylie, BRD, pers. comm.).

The BRD is currently using mark-recapture studies to establish baseline density estimates and monitor population trends of the GGS. At present, no radio tracking is being conducted. Under the Adaptive Management provisions of the Plan, BRD study results available in the future could form part of the basis for modification or revision of NBHCP conservation practices, thus allowing the most up-to-date information on giant garter snakes to be used throughout the 50-year life of the permits.

3. **Swainson's Hawk** (*Buteo swainsoni*)

a. Species Description

Swainson's hawk is state listed as a threatened species. Historically, it nested throughout lowland California; however, the current Swainson's hawk nesting distribution is limited to the Mojave Desert,

northeastern California, the Central Valley, and a few isolated locations in the Owens Valley (California Department of Fish and Game 1992b, 1994). The Swainson's hawk typically occurs in California only during the breeding season (March through September) and winters outside of the U.S. in Mexico and South America.

The species was once thought to winter exclusively in Argentina; however, recent telemetry studies (satellite radio) have shown the species to winter in Mexico, with additional detections in Central America and South America. The Central Valley population migrates only as far south as Central Mexico (Estep 2001). Additionally, thirty (30) individual hawks have been wintering in the Delta for several years (Estep 2001) and there are records of small numbers of Swainson's hawks wintering in southern Florida and Texas.

Historically, as many as 17,000 Swainson's hawk pairs may have nested in California (California Department of Fish and Game 1992b, 1994). Currently, an estimated 700 to 1,000 Swainson's hawk pairs nest in the state. This appears to represent a decline of more than 94% in California's historical nesting population (Bloom 1980, California Department of Fish and Game 1989). Currently, there are 882 known extant nesting site occurrences in California (Estep 2001). The Central Valley supports an estimated 600 to 900 of the remaining breeding pairs. The overall Swainson's hawk population is considered to be declining (California Department of Fish and Game 1992b, 1994). However, the Central Valley's breeding population has remained stable over the past 10 years (Estep 2001).

The Swainson's hawk (*Buteo swainsoni*) is a medium sized buteo (25-35 ounces). There are three primary color phases (plumage morphs) of the Swainson's hawk, including : a light-morph, dark-morph, and rufous-morph. Additionally, this hawk species can be an intermediate morph, with variations of the three primary morphs (Estep 2001).

The dark-morph hawks differ from the light-morph in that they are entirely brown with a light patch under the tail. The trailing edges of the wing are slightly lighter in color than the leading edges. The dark phase of the Swainson's hawk represents 35% of the Northern California population. Both the dark and light morphs can have white undertail coverts.

The third variation is a rufous-morph, which is characterized by a lighter color of brown with rusty barrings on the underparts.

The Swainson's hawk soars with its wings held above the horizontal in a dihedral or "v" shape. When perched, the species' wings are slightly pointed and extend to or beyond the tail feathers.

b. <u>Activity Cycle/Behavior</u>

Swainson's hawks begin to arrive in the Central Valley from wintering grounds in Mexico, Central America and South America in March to breed and raise their young. The species typically roosts and

migrates in groups. Territories are usually established by April with incubation and brooding occurring through June. The earliest fledging of young occurs in July and the young remain with the parents for approximately one month following fledging or until the southern migration in early fall. Recent telemetry studies have shown that some fledglings leave the nesting area and their parents to join a juvenile group or remain alone before the fall migration (Estep 2001).

Swainson's hawks are opportunistic foragers, flushing prey (rodents, insects and some birds) from fields, pastures and grasslands adjacent to their nests. In the Central Valley, their primary diet consists of small rodents, including the *Microtus californicus*, or meadow mice. During the summer months, the hawks consume large quantities of insects (Estep). Males provision females while they incubate the eggs. Later, both parents feed the young.

c. Habitat Associations/Requirements

Swainson's hawks prefer large nesting trees with a panoramic view of their foraging grounds. Foraging habitats, open fields and grasslands, need to be within flying distance (maximum observed is 18 miles) and adequate to support the high densities of microtine rodent populations and birds upon which they feed. During the breeding season, Swainson's hawks require suitable foraging habitat in association with suitable nesting habitat (California Department of Fish and Game 1992, 1994). Swainson's hawk nesting preference is for large valley oaks (*Quercus lobata)*, cottonwoods (*Populus fremontii*), or willow (*Salix goodingii*). In the interior of the Natomas Basin, the species will often nest in smaller trees due to the lack of large trees (Estep 2001).

The area required for foraging depends on the season and crop cycle, as the species' foraging ranges depend on the dynamics of the agricultural system and how it affects prey abundance and availability. Swainson's hawks highly active foraging behavior may result in birds traveling as far as 18 miles from a nesting site (Estep 1989). Swainson's hawks have been observed foraging behind farm machinery (moving harvester blade or disc) and capturing rodents exposed by ground disturbance (Estep 1989). Swainson's hawk foraging ranges during the breeding season have been estimated to be 1,000 acres to almost 7,000 acres (Bechard 1982, Estep 1989, Johnsgard 1990).

Suitable cover types for foraging habitats include, in order of suitability: (1) native grassland; (2) agriculture soon after discing; (3) alfalfa and other hay crops;(4) fallow fields; (5) lightly grazed pasture; (6) combinations of hay, grain, and row crops; (7) rice fields prior to flooding and after draining; and (8) heavily grazed pasture. Unsuitable cover types for foraging habitat include vineyards, mature orchards, cotton, thistle in fallow fields and any crop where prey are unavailable due to high vegetation height and density, as well as flooded rice fields. Recent observations by CDFG indicate that rice farming lands are also used by Swainson's hawks for foraging, particularly where there is vegetation at the perimeter of the fields (Dave Zezulak, pers. comm.). While generally considered less than suitable habitat for Swainson's hawk, rice fields do provide for invertebrate production, water and refugia (levees) for upland species, and forage before and after flooding.

d. Numbers, Distribution and Ecology in the NBHCP Area

Swainson's hawk nesting in the Natomas Basin occurs primarily in along the western boundary of the Basin (Figure 13). Most nest sites are located along the Sacramento River where large trees are available. The most recent survey of the Natomas Basin vicinity (SHTAC, 2001) shows 35 nest sites along the Sacramento River (22 on the east side and 13 on the west side). The 35 nest sites located along the river are all outside the Natomas Basin as defined by the NBHCP. Twenty-seven nest sites are located within the Basin, for a total of 62 nest sites in or immediately adjacent to the Natomas Basin. Two of these sites are considered abandoned because the nest trees have been removed.

In 2000, the Swainson's Hawk Technical Advisory Committee monitored 24 known nesting sites in the Basin, 17 of which were used in 2000. Of these, 10 successfully nested in 2000 (i.e., reared young to fledgling), producing a total of 20 fledglings (SHTAC, 2001). Of the 27 territories in the Basin, 19 were used in 2001, producing 16 fledglings.

Although nest sites are not found exclusively in riparian habitat, more than 87 percent of the known nest sites in the Central Valley are within riparian systems (Estep, 1984; Schlorff and Bloom, 1984). This is primarily a function of tree availability and not a preference for large riparian stands or the presence of other components of a riparian forest. Swainson's hawks also nest in mature roadside trees, isolated individual trees in agricultural fields, small groves of oaks, and trees around farm houses (CDFG, 1992, 1994)

The Sacramento River location affords the hawk relatively easy access to foraging uplands on either side of the river including substantial open space and reserve lands located in Yolo County. Relative to the Natomas Basin HCP area specifically, information indicates that nesting sites and foraging activity occur throughout the Basin (Estep 2001), again depending on the presence of suitable trees in proximity to upland foraging areas. As such, part of the NBHCP Conservation Strategy is to both preserve to the extent practicable habitat within the Swainson's Hawk Zone adjacent to the Sacramento River and also to enhance and expand Swainson's hawk habitat through provision of suitable trees and groves in proximity to upland foraging reserves.

It should be noted that for management purposes, an active nest site is considered a nest site that has been used by a nesting pair to lay and incubate eggs, regardless of success of that nesting attempt. Swainson's hawks show a high degree of nest fidelity and generally return to the same area in which they nested previously. They will investigate several nest sites within this "territory," and settle on one nest dependent on local disturbances, surrounding habitat variables, the proximity of other nesting raptors (i.e., great horned owls, redtail hawks, etc.), and nest condition, although this selection mechanism is not well understood. Some pairs may repair several nests before settling in on one nest site. In the case of juvenile birds, they may build and/or repair a nest and then leave without laying eggs. Therefore, in any given year, and any given area depending on nest site availability, many of the available nest sites may not be used.

Generally, in the Natomas Basin, one in every three nest sites are used each year, based on annual surveys of successfully nesting Swainson's hawks (T. Roscoe, pers. comm.).

4. Other Covered Species Which May Occur in the NBHCP Area

Additional listed, candidate, or other species may potentially occur in the Natomas Basin based on the following criteria: (1) habitat utilized by the species occurs in the Basin; (2) the Basin is within the known range of the species; or (3) the Basin is within the flyway of and contains suitable winter habitat for migrating birds. Brief descriptions of these species and their habitats are included below.

a. Birds, Mammals, Invertebrates

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

The Valley Elderberry Longhorn Beetle (VELB) is a federally listed Threatened species. The VELB is a cerambycid beetle in the coleoptera family. The male VELB has a dark pattern of the elytra reduced to four oblong spots, and the basal segments of the antennae are usually covered with pale hairs (Barr 1991). The beetle is totally dependent on elderberry shrubs, using both *Sambucus mexicana* and *S. caerulea*. Elderberry shrubs are a common component of the remaining riparian forests and adjacent upland habitats in the Central Valley. The beetle has a two-year life cycle. Adults lay their eggs on elderberry bushes. The emerging larvae bore into and feed upon the stems of the plant. The beetle emerges as an adult during the flowering period of the plant, usually late March through June. The adults feed upon the elderberry flowers, reproduce, and die. The NDDB records sightings of VELB in or adjacent to the study area (Figure 14, Other Species Records). The USFWS general compensation guidelines for the VELB are described in Appendix C and Section VII.B.3.

Species Description and Taxonomy

Valley elderberry longhorn beetle (VELB) is a distinctive black and red-orange beetle with long antennae. Full-grown beetles are ¾ of an inch long (2 centimeters). Females are typically larger than males, and both have bright red to orange color on their wings. The forewings of the females are dark metallic green with reddish trim, the male's forewings may be similar, or may be red-black with dark green spots.

Distribution

VELB has probably always been rare and of limited abundance (U.S. Fish and Wildlife Service 1984). Information on the historical distribution and abundance of VELB is scarce. The substantial reduction in Central Valley riparian vegetation in the last 150 years suggests that the beetle's range has contracted and that remaining populations are discontinuous (U.S. Fish and Wildlife Service 1984).

The VELB's range extends from Redding at the northern end of the Central Valley south to the Bakersfield area (Barr 1991). Along the eastern edge of the species' range, adult beetles have been found in the foothills of the Sierra Nevada at elevations up to 2,200 feet (676.8 m), and beetle exit holes have been located on elderberry plants at elevations up to 2,940 feet (896.3 m). Along the western edge of the species' range, adult beetles have been found on the eastern slope of the Coast Range at elevations up to 500 feet (152.4 m), and beetle exit holes have been detected on elderberry plants at elevations up to 730 feet (222.6 m) (Barr 1991).

Habitat Associations/Requirements

VELB is closely associated with blue elderberry, an obligate host for beetle larvae. The presence of exit holes in elderberry stems indicates previous VELB habitat use. Exit holes are cylindrical and approximately 0.25 inch (0.6 cm) in diameter. Exit holes can be found on stems that are 1-8 inches (2.5-20.3 cm) in diameter. The holes may be located on the stems from a few inches above the ground to about 9-10 feet (2.7-3.0 m) above the ground (Barr 1991).

Numbers, Distribution, and Ecology in the NBHCP Area

The known range of the VELB is limited to the Central Valley of California (USFWS, 1999). The USFWS designated critical habitat for the VELB, located along the American River Parkway in two places, upstream of the S.R. 160 overcrossing and in the Goethe Park area. In addition, the Recovery Plan designates the area along the American River, east of Nimbus Dam, as essential habitat, as well as an area along Putah Creek ink Solano County (USFWS, 1984).

Currently, there are approximately 168 known occurrences of VELB in California. All 168 known occurrences are presumed extant. Sutter County supports seven of these occurrences and Sacramento County supports 20 of these occurrences. There are several NDDB occurrences of VELB along the Sacramento River on the western and southern edge of the Natomas Basin. Sutter County VELB occurrences are spread throughout the County and are often associated with major rivers and waterways. In Sacramento County, habitat is located along the American River Parkway in two places, upstream of the S.R. 160 overcrossing and in the Goethe Park area.

There are no known occurrences of VELB in the Plan Area (NDDB 2001). Although the historical abundance of VELB is unknown, extensive loss of riparian habitat and, to a lesser extent, upland habitats in the Central Valley during the past 150 years has reduced the amount of habitat available to the species, and likely decreased and fragmented the species' range (USFWS, 1984). Loss of riparian habitat is attributable to flood control projects (e.g., levee construction, stream and river channelization, placement of riprap), land reclamation, and urban development. Additional factors affecting the VELB include grazing practices, herbicide spraying, and predation by nonnative species. There is, however, suitable VELB habitat (i.e., elderberry shrubs) along the western and southern borders of the NBHCP area (i.e., in riparian areas associated with the Sacramento and American Rivers). Small patches of suitable habitat also exist

along the East Drainage Canal, West Drainage Canal, and Main Drainage Canal (City of Sacramento Department of Utilities and Jones & Stokes Associates 1996). Isolated elderberry shrubs or patches of shrubs also occur in several oak groves and old farm residences.

Tricolored Blackbird *(Agelaius tricolor)*

The tricolored blackbird is considered a Species of Concern by USFWS and is a state Species of Special Concern (California Department of Fish and Game 1992). Tricolored blackbird (Agelaius tricolor) is a medium sized blackbird that is distinguished from other blackbirds by its distinctive white-tipped red shoulder patches on mature males. This species is commonly found in large flocks, foraging in marshes, rice fields, and wet meadows. Females show varying amounts of red on the shoulders, and their plumage is sooty brown and streaked overall. The species nests in large colonies in marshes, silage and grain fields, and blackberries.

Status and Distribution

The species is largely endemic to California, with smaller populations in Baja California, Nevada, Oregon, and Washington (DeHaven 2000). During the breeding season, tricolored blackbirds occur in the Central Valley, the low foothills of the Sierra Nevada and Coast Range from Shasta County south to Kern County, along the coast from Sonoma County south to the Mexican border, and on the Plateau (Grinnell and Miller 1944, Beedy et al., 1991). Band recoveries from this species indicate that some wintering individuals travel nomadically along the entire length of the Central Valley, into the San Francisco Bay and Sacramento-San Joaquin Delta area, up to the northern and eastern plateau region of California, and into southern Oregon (DeHaven et al., 1975). Tricolored blackbirds continue to breed throughout their historic range, although populations have declined within this range (McCaskie et al., 1979).

Habitat Associations/Requirements

The tricolored blackbird is generally considered a marsh species, nesting primarily in tule (*Scirpus* spp.) and cattail (*Typha* spp.) marsh habitats. High quality nesting substrates tend to occur in conjunction with one of three Central Valley managed wetland types, including: permanent; semi-permanent; or seasonal wetland (DeHaven 2000). With the reduction of wetland habitats in California, an increasing percentage of tricolored blackbirds have recently been found nesting in nonmarsh habitats, such as blackberry (*Rubus* spp.) brambles, thistle (*Cirsium* spp.) stands, and nettle (*Urtica* spp.) stands (Beedy et. al 1991). Proximity to suitable foraging habitat such as flooded fields, grassy fields, and pond margins is an important factor in nest site selection (Grinnell and Miller 1944). In the San Joaquin Valley, the remaining breeding population is currently associated with large dairy operations. These colonies are using the dairies' grain fields for nesting. In the Central Valley, the cattail marshes have had a universally low reproductive success, due to the large predator populations of Black-crowned Night Herons. Such cattail marshes include refuges and those associated with rice fields. In general, vineyards and orchards provide

low habitat value for the tricolored blackbird, due to the lack of adequate nesting substrate and limited foraging area (DeHaven 2000).

Tricolored blackbirds nest in small to large colonies (up to 50,000 individuals). They often return to the same nesting areas in subsequent years, but will occasionally relocate their breeding colonies if suitable habitat is available elsewhere. Nests are built in close proximity in dense emergent vegetation bordering open water. Dense nesting colonies of tricolored blackbirds are highly susceptible to disturbance. The tricolored blackbird breeds in large colonies near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, and wild rose. Ideal breeding habitat for the tricolored blackbird includes two elements: (1) dense nesting substrate (i.e., blackberry or aquatic emergent vegetation), which provides protection from predators; and, (2) a large supply of insects within proximity to nests and occurring at the time of fledging (DeHaven 2000).

Tricolored blackbirds forage in large flocks and may travel up to 4 miles (6.4 km) from nest or roost sites to forage. Tricolored blackbirds forage on ground in croplands, grassy fields, flooded land, and along edges of ponds (Zeiner et al., 1990). In the Central Valley, foraging habitat consists primarily of pastures and certain types of agricultural fields. Tricolored blackbirds eat mostly insects and selection of colony sites is primarily a function of proximity to concentrated insect food supplies (e.g., grasshoppers [*Orthoptera*], beetles and weevils [*Coleoptera*]) (Beedy et al., 1991). In winter, tricolored blackbirds often leave the immediate vicinity of their nesting colonies and concentrate in huge roosts in marsh habitat (Grinnell and Miller 1944).

Numbers, Distribution, and Ecology in the NBHCP Area

Historically, the nesting population of the tricolored blackbird was in the millions. Between the 1930s and 1970s the population declined by approximately 50 percent. This decline is thought to be a result of habitat conversion from pasture lands and hay crops to vineyards and orchards. The 1970s tricolored blackbird population included 41 nesting colonies and 133,000 birds (DeHaven 2000). A survey conducted by Ted Beedy and Bill Hamilton in 1997 found approximately 230,000 breeding tricolored blackbirds in California. A follow-up survey conducted in 1999 found fewer than 95,000 breeding individuals in California (Thomas Reid Associates 2000). The current population in the Central Valley is approximately 79,325. This includes 13 colonies that were located in the surveys conducted by DeHaven and Hamilton in 2000. The DeHaven/Hamilton surveys indicated that the general range and major breeding areas of the tricolored blackbird in the Central Valley had remained largely unchanged since the 1930s when J.A. Neff conducted surveys of the population (DeHaven 2000).

There have been nine documented occurrences (seven extant, two extirpated) in Sutter County. The two extirpated occurrences are located slightly northwest of the confluence of the Sacramento River and the Feather River, northwest of the Basin. Tricolored blackbirds were located 0.2 mile below the Sacramento/Sutter County line, west of Natomas Drain Levee Road.

Tricolored blackbirds currently nest in the Natomas Basin. The Natomas District colony resides on a 330-acre parcel in the Basin that was recently acquired by the Natomas Basin Conservancy (Betts-Kismat-Silva reserve in the eastern edge of the Natomas Basin. The population of this nesting colony gas increased in recent years (Roberts, pers. comm.). This colony of tricolored blackbirds includes approximately 4,000 nesting birds, which have located their nests in five scattered clumps of blackberry bushes near irrigated pastureland (DeHaven 2000).

Significance of NBHCP Area to Species

The large amount of irrigated pastureland mixed with dense, healthy blackberry bushes in the Natomas Basin could be expected to make it an attractive breeding habitat for the tricolored blackbird. Additionally, the area includes pastures that are moderately grazed by livestock and flooded during the bird's nesting times. The moderate grazing, which creates optimal foraging (vegetative) levels of alfalfa and hay, in combination with the large insect population enhance the birds' ability to feed (DeHaven 2000).

The Plan Area also supports scattered copses of emergent marsh vegetation mostly within agricultural ditches that may potentially provide nesting habitat for the species, although it is not currently known to be utilized. However, the tricolored blackbird is an occasional visitor and actively forages in the Plan Area. Emergent marsh is the preferred nesting habitat for the species; however, because of the paucity of this habitat in the Plan Area the species has sought alternative nesting sites in agricultural fields. Unfortunately, as mentioned above this can result in significant mortality of eggs and young birds. Additionally, some of the farming practices such as those employed in the area are not compatible with tricolored blackbird breeding patterns.

The Natomas District colony is thriving in current conditions. However, the long range concern is the ability of the 330-acre parcel to carry a breeding colony of tricolored blackbird because of the urbanizing area to the north (DeHaven 2000).

Aleutian Canada Goose *(Branta canadensis leucopareia).*

The Aleutian Canada goose was delisted by the USFWS on March 20, 2001 (FR 66:15643), and is considered a federal Species of Concern that is still protected by the Migratory Bird Treaty Act. The goose is a small stocky goose with a black head and neck, and a distinctive white "chin strap". The Aleutian Canada goose is distinguished from the other smaller subspecies of Canada goose by its slightly larger size, paler breast, and broader white neck ring. This species favors wetlands, grasslands, and cultivated fields near water.

The Aleutian Canada goose will be monitored for a period of five years by USFWS. If evidence acquired during this monitoring period shows that endangered or threatened status should be reinstated to prevent a significant risk to the subspecies, the Service may use the emergency listing authority provided

by the Act to do so. At the end of the five-year monitoring period, the Service will decide if relisting, continued monitoring, or an end to monitoring is appropriate.

Distribution

The Aleutian Canada goose nests in the western Aleutian Islands and traditionally occurs during migration along coastal Oregon and in Del Norte and Humboldt Counties in northern California. Aleutian Canada geese generally winter in two localized areas in central California: one is near Modesto and Los Banos and the other is near Colusa. These areas support pasture, corn, wheat, and rice crops.

Wintering Aleutian Canada geese are a large migratory waterfowl species that typically spend summer in northern portions of the United States, Canada, and Alaska, and overwinter in warmer climates in southern Oregon and California.

Habitat Associations/Requirements

Wintering Aleutian Canada geese forage in agricultural fields supporting pasture, wheat, and rice crops. They prefer to forage in short-cropped, dry and irrigated pastureland and cornfields. Foraging geese have also been observed in marshes, rice stubble, and freshly sprouted wheat and barley fields. Wintering Aleutian Canada geese observed near Modesto during 1975-1980, fed in flood-irrigated pastures composed primarily of grasses and clovers when they first arrived in the San Joaquin Valley. Wintering Aleutian Canada geese roost in large ponds, flooded fields, and rice checks. In the San Joaquin Valley, they are known to roost on artificially impounded waters such as farm ponds, sewage ponds (e.g., the Modesto oxidation ponds), and duck club ponds.

Numbers, Distribution, and Ecology in the NBHCP Area

Currently, there are 13 known occurrences of wintering Aleutian Canada geese in California (NDDB 2001). All 13 of these occurrences are presumed extant. Of these 13 occurrences, four occur in Sutter County. These occurrences are all located in agricultural fields around the Sutter County/Colusa County line, north of the NBHCP area. There are no known occurrences in the Plan Area. However, Aleutian Canada geese likely stop in the Natomas Basin for brief periods during migration to and from their traditional wintering areas.

The Aleutian Canada goose winters in the Sacramento Valley and is an occasional winter visitor in the NBHCP area. Approximately 40,000 acres of suitable winter foraging habitat (e.g., row crops, especially rice) occurs in the NBHCP area (Thomas Reid Associates 2000).

White-faced Ibis *(Plegadis chihi)*

This species is considered a Species of Concern by USFWS and is a state Species of Special Concern (California Department of Fish and Game 1992a). This species is a slender, gregarious long-legged wader with a very long and slender downward curved bill. The breeding adult's plumage is glossed with green or purple on the head and under parts, making the bird look dark at a distance. It is distinguished from the glossy ibis by its reddish bill, red eye, all red legs, and a white feathered border around its red facial skin. This species is found in shallows and mudflats in both fresh and brackish areas. The species has declined in California probably as a result of loss or deterioration of extensive marshes in the Central Valley, which are required for nesting.

Distribution

The white-faced ibis occur in two disjunct populations, one largely in western North America and the other in central and southern South America. The largest North American breeding colonies of white faced ibis occur in Utah (Great Salt Lake), Nevada (Carson River Basin), Oregon (Harney Basin), and coastal Texas and Louisiana. The largest breeding colonies in the Central Valley have been reported from the Mendota Wildlife Area and the Colusa National Wildlife Refuge.

Currently, the white-faced ibis winters primarily in the San Joaquin and Imperial Valley but is recorded widely in California as a transient (Zeiner *et al.*, 1990a). The wintering population concentrates near Los Banos in Merced County (McCaskie *et al.*, 1979). Historically, the white-faced ibis was a locally common summer resident in California and its breeding distribution was centered in the San Joaquin Valley. Currently, there are seven known occurrences of nesting areas (rookeries) of the white-faced ibis in California. All seven of these occurrences are presumed extant. There are no occurrences of nesting white-faced ibis in the Natomas Basin (NDDB 2000). The nearest known nesting habitat for the white-faced ibis is in Yolo County, north of the City of Woodland.

Habitat Associations/Requirements

The white-faced ibis requires extensive marshes for nesting (Zeiner et al., 1990a). Large tule stands surrounded by open water provide high-quality nesting habitat for the species. The white-faced ibis typically nests in dense tule and cattail stands, but will sometimes nest in trees with other colonial-nesting species (Eckert 1981, U.S. Fish and Wildlife Service 1985c). Habitat used for nesting ranges from 1.3 acres to 600 acres (0.5 ha to 242.8 ha) (U.S. Fish and Wildlife Service 1985e).

This species forages in fresh emergent wetland, shallow flooded pond margins, and muddy ground of wet meadows and irrigated, or flooded, pastures and croplands. Ibis eat primarily invertebrates such as earthworms, insects, and crustaceans. They also eat small fish, amphibians, and reptiles. White-faced ibis probably roost in dense emergent vegetation (Zeiner *et al.*, 1990a).

Numbers, Distribution, and Ecology in the NBHCP Area

There are seven known occurrences (rookeries) in California (CDFG 2001). There are no known nesting occurrences in Sutter or Sacramento Counties. The nearest known nesting occurrence is in Yolo County, north of Woodland. The white-faced ibis is a rare visitor to the Natomas Basin, found in the Sacramento area during its migration. No suitable nesting habitat occurs in the Natomas Basin for ibis, although approximately 24,900 acres of suitable winter habitat (i.e., rice, alfalfa, and other agricultural fields) exists in the Natomas Basin for ibis (Thomas Reid Associates 2000 and CH2MHill, 2001).

In the Sacramento Valley, wintering ibis were very rare in the 1970's with the highest counts numbering only 11 birds in 1978 and 1979. In 1996, Hickey and Shufford estimated that a minimum of 10,000 to 11,000 ibis were in the Sacramento Valley (Thomas Reid Associates 2000). White-faced ibis is now a common winter visitor to the Natomas Basin, but are not known to breed in the Basin.

Loggerhead Shrike *(Lanius ludovicianus)*

This species is a state Species of Special Concern (California Department of Fish and Game 1992a). It was designated as a Category 2 candidate for federal listing as threatened or endangered throughout its range in 1991. However, on November 15, 1994, the USFWS eliminated all subspecies of the shrike, except the migrant loggerhead shrike of the central, eastern, and southern United States, from the federal candidate list. The USFWS determined that populations of the other loggerhead shrike subspecies, including populations of the subspecies that occur in California, were more abundant or widespread than previously thought and were not subject to any identifiable threat (59 FR 58992, November 15, 1994). Therefore, no loggerhead shrike subspecies that occur in California are candidates for federal listing.

The loggerhead shrike (*Lanius ludovicianus*) is a small bird of fields and grasslands that hunts from lookout perches such as fence posts or tree limbs, using the lookout to spot, then swoop down on insects, rodents, snakes, or smaller birds. This species lacks talons, and instead impales its prey on thorns or barbed wire. The loggerhead shrike is bluish-gray on the back and head, and white on its under parts. The species has a broad black mask that extends from across the eye to the top of the beak. Its beak is black and short, with a slight curve. This species is distinguished from the more common northern shrike because of its smaller size, darker coloration, larger mask, and smaller, less hooked beak.

Distribution

The loggerhead shrike is a widespread breeding species in North America. It occurs from the southern Canadian provinces south across most of the United States and into Mexico (American Ornithologists Union 1957). The shrike is a resident species throughout the lowlands and foothills of California (Grinnell and Miller 1944).

Shrike populations have declined over much of the United States, especially in the central and eastern portions of the country. Shrike populations in the western United States declined slightly between 1955 and 1979 but currently appear to be stable.

Habitat Associations/Requirements

The loggerhead shrike occurs in grasslands, agricultural lands, open shrublands, and woodlands (Bent 1950). It prefers areas with perch sites (Zeiner et al., 1990). A study conducted in Illinois reported that shrikes were most abundant near pastures, hedgerows, cornfields, and rural residential areas (Smith and Kruse 1992). Shrikes nest in low trees, dense shrubs, and vines. They feed on insects, small reptiles, and small mammals (e.g., mice). This species requently skewers prey on thorns, sharp twigs, barbed wire, or forces prey into a confined area.

Numbers, Distribution, and Ecology in the NBHCP Area

The loggerhead shrike is common throughout most of lowland California (California Department of Fish and Game 1990). This species is observed regularly throughout Natomas Basin (Thomas Reid Associates 2000). Suitable nesting and foraging habitat is common throughout the Basin. Several shrikes were observed on or near the Metro Air Park project site during a site reconnaissance conducted on March 23, 2000 (Thomas Reid Associates 2000), and three shrikes were observed along the eastern portion of the Plan Area during NBHCP habitat mapping surveys in 2001.

Burrowing Owl *(Athene cunicularia hypugea)*

Burrowing owls are not listed under either the federal Endangered Species Act or the California Endangered Species Act. However, burrowing owls are considered a Species of Concern by the USFWS, and a Species of Special Concern by CDFG. The western burrowing owl is a small raptor. It is distinguished from other small owls by its long legs. The adult is brown to buff in color, with numerous whitish spots and barring on the back and under parts. Juveniles are buff colored below. Western burrowing owls nest in single pairs or small colonies. This species is considered a year-round resident. It is possible that burrowing owls in northern California have some local migratory behavior, but little information is known about the migration habitats of the northern California population (Haug, et al., 1993). The species utilizes the burrows of ground-dwelling species, such as California ground squirrel, or artificial structures (e.g., culverts) for nesting. It is also found in grass, forb and open shrub stages of pinyon-juniper and ponderosa pine habitats. It uses rodent or other burrows for roosting and nesting cover. Reduction of prey base, including ground squirrels, has contributed to the decline of this species. The CDFG's mitigation guidelines for the burrowing owl are shown in Appendix D.

Distribution

The burrowing owl is a year-long resident of open, dry grassland and desert habitats throughout the California deserts, Central Valley, and coastal areas. It is fairly uncommon along the coast north of Marin County, and rare east of the crest of the Sierra Nevada. Additional populations are reported from the Imperial Valley, Modoc Plateau, and Great Basin region. Fragmentation or elimination of much of the historic habitat of this species, and population declines have been noted throughout its range.

Habitat Associations/Requirements

This species is associated with open lands including grasslands, rolling hills, desert floors, and open bare ground characterized by low-lying vegetation. As noted, the species utilizes rodent burrows, especially California ground squirrel burrows, or artificial structures (e.g., culverts) for nest sites (subterranean nester), and favors elevated places such as berms, levees, road and rail beds where it can overlook open lands.

Numbers, Distribution, and Ecology in the NBHCP Area

There are 370 known occurrences in California (NDDB 2001). Three hundred of these occurrences are considered extant. Eighteen occurrences are known in Sacramento County, and 17 of these occurrences are considered extant. Three occurrences are recorded in the Natomas Basin, with another three known burrowing owl sites on the Conservancy's Betts-Kismat-Silva property. One occurrence is known in Sutter County. This occurrence is also considered extant (NDDB 2001).

Burrowing owls occur in low numbers in the NBHCP area, but no systematic surveys have been conducted in the Plan Area. One burrowing owl was observed near a burrow on the Metro Air Park project site in March 2000. The owl was observed along Powerline Road between Elverta Road and Elkhorn Boulevard on a canal bank (Thomas Reid Associates 2000). Burrowing owls also occur at the Sacramento International Airport. During NBHCP habitat mapping surveys, three pairs of burrowing owls were observed along a water conveyance canal in the eastern portion of the Plan Area. Burrowing owls also have been observed northeast of the intersection of San Juan and El Centro Roads and west of East Levee Road on the south side of Elkhorn Boulevard (NDDB 2001).

The Natomas Basin supports approximately 247 miles of canals and ditches and associated adjacent agricultural fields. The levees and upper banks of canals and ditches are potential burrowing owl nesting habitat. Canal and ditch maintenance activities often make these areas unsuitable burrowing owls nesting habitat; therefore, owls usually nest along canals with limited maintenance activities. Other suitable habitat includes grasslands or fields that are rarely disced (although they may be mowed), such as local airports.

Bank Swallow (*Riparia riparia*)

The bank swallow is listed as a Threatened species within the California Endangered Species Act and is not listed under the Federal Endangered Species Act. Breeding colonies of this species are provided some additional protective status under state Fish and Game Code and the federal Migratory Bird Treaty Act. Bank swallow (*Riparia riparia*) is a slender bird with long, pointed wings known from rivers and streams. An adept aerialist, the species darts to catch flying insects, usually above water. The species is distinguished from other swallows and swifts by its brownish gray breast band, often extending in a line down the middle of the breast. It has light gray under parts that contrast with its darker brownish gray wings. The species nests in colonies, excavating burrows in steep riverbank cliffs, gravel beds, and highway cuts.

Distribution

Historically, bank swallows nested on coastal bluffs in southern California and riverbanks throughout the Central Valley and northern California; however, the state's nesting population of bank swallow is currently concentrated on the banks of Central Valley streams. Approximately 75 percent of the current breeding population occurs along banks fo the Sacramento and Feather rivers. Other colonies persist along the central coast from Monterey to San Mateo Counties, and northeastern California in Shasta, Siskiyou, Lassen, Plumas and Modoc Counties (Remson, 1978). There are very few known breeding colonies of this species in California, with the primary breeding area described as the banks of the Sacramento River, from Shasta County south to Contra Costa County. The range of this species is estimated to be reduced by as much as 50% since 1900 (California Department of Fish and Game 1992b). Formerly more common as a breeder in California, the estimated breeding population of 16,000 in 1986 was reduced to about 4,500 pairs by 1990 as a result of flood control and levees stabilization projects throughout its range. Now, only approximately 110-120 colonies remain within the state.

About 50-60 colonies remain along the middle Sacramento River and 15-25 colonies occur along lower Feather River where the rivers meander still in a mostly natural state. Other well known breeding colonies include Shasta Valley and the Klamath River Basin in Siskiyou County; in Fall River in Shasta County; the Modoc Plateau and in the Basin Ranges region of Modoc and Lassen County, near Alturas in Modoc County, and near Termo and Honey Lake in Lassen County. There are no known breeding colonies remaining in southern California.

Habitat Associations/Requirements

The bank swallow occurs in California during the breeding season (May through July) and winters in South America. Bank swallows begin arriving in the Central Valley from wintering grounds in South America in early March to breed and raise their young. Numbers decline in July and August as nesting colonies are abandoned and migration begins. Colonies are vacant by early August and some migrants could be observed through early- to mid-September. Bank swallows are rarely seen in California during

the winter. During migration, bank swallows mingle with other swallow species, foraging for insects over water in open lowland habitats, especially favoring lakes and rivers.

This species is a colony nester and nests primarily in riparian and other lowland habitats west of the desert. This species requires vertical banks/cliffs with fine-textured/sandy soils to dig a nesting hole near streams, rivers, lakes, and oceans. The bank swallow uses holes dug in cliffs and river banks for cover; logs, shoreline vegetation, and telephone wires are also used for roosting. Bank swallows tend to return to these colonial nests year after year.

The bank swallow breeds from early May through July. Breeding occurs from about sea level to as high as 6,900 feet. Pairs usually nest colonially in groups of 10 to 1,500 although most colonies have 100-200 nesting pairs. Bank swallows forage by hawking insects during long, gliding flights. Foraging occurs primarily over open riparian areas, but also over grassland, shrubland, and savannah habitats during the breeding season. Bank swallows feed on a wide variety of aerial and terrestrial soft-bodied insects, including flies, bees, and beetles.

Numbers, Distribution, and Ecology in the NBHCP Area

There are 171 known bank swallow occurrences in California (NDDB 2001). One of these occurrences is extirpated. There are 35 bank swallow occurrences (all presumed extant) in Sutter County and seven occurrences in Sacramento County (all presumed extant). Although there is no suitable nesting habitat in the Natomas Basin, bank swallows from nearby nesting colonies have the potential to forage in the Basin, and foraging could also occur during migration to nesting sites north of the Basin.

Northwestern Pond Turtle (*Clemmys marmorata marmorata*)

The northwestern pond turtle is considered a Species of Concern by USFWS and is a state Species of Special Concern (California Department of Fish and Game 1992a). Northwestern pond turtle is a medium sized aquatic turtle that forages on plants, insects, worms, small fish, and carrion. The species is distinguished by its low, roundish olive to dark-brown carapace, with a network of faint spots, lines or dashes of dark brown to black that radiate from the center of the shields. This species is a thoroughly aquatic species of ponds, marshes, rivers, and streams that favors low emergent aquatic vegetation for cover, and logs or mud banks for basking.

Distribution

The northwestern pond turtle occurs in suitable aquatic habitats west of the crest of the Sierra Nevada in California and in parts of Oregon, Washington, and Mexico (Stebbins 1985, Zeiner et al., 1988). The northwestern subspecies is generally found from San Francisco Bay north to the Columbia River drainage in Oregon and Washington (57 FR 45761-45762, October 5, 1992). The northwestern pond turtle still occupies most of its historic range. However, populations are declining throughout the range

(Holland and Bury 1992) and local populations, particularly of the southwestern subspecies, have been extirpated from many areas within this range (57 FR 45762, October 5, 1992). The few remaining areas in the northwestern pond turtle's range that support moderate to large viable populations of the northwestern pond turtle are considered at risk (57 FR 45761-45762, October 5, 1992).

Habitat Associations/Requirements

The northwestern pond turtle is generally associated with permanent or nearly permanent wetlands in a wide variety of environments, including permanent ponds, lakes, streams, irrigation ditches, or permanent pools along intermittent streams, up to 6,000 feet (1,829.3 m) elevation (Zeiner et al., 1988) . Hatchlings and juveniles require more specialized habitats than adults (57 FR 45761-45762, October 5, 1992). The northwestern pond turtle occurs in quiet waters of lowland ponds, marshes, lakes, and reservoirs, and in streams with deep pools. Rocks, logs, open mud banks, and streamside vegetation provide escape cover and basking sites (Stebbins 1972).

Northwestern pond turtles are highly aquatic but leave the water for basking and egg-laying. Egg-laying may occur along sandy wetland margins or at upland locations as far as 1,300 feet (396.3 m) from water (Holland and Bury 1992). Hatchling and adult turtles may overwinter in upland sites. Northwestern pond turtles feed primarily on small aquatic invertebrates (57 FR 45761-45762 October 5, 1992).

Numbers, Distribution, and Ecology in the NBHCP Area

There are 117 known occurrences of northwestern pond turtle in California, and one of the occurrences is considered extirpated (NDDB 2001). There are 13 known pond turtle occurrences in Sacramento County that are presumed extant and 2 known pond turtle occurrences in Sutter County that are presumed extant. The canals throughout the Natomas Basin are considered suitable aquatic habitats for pond turtles. Currently, there are about 247 miles of canals and ditches in the NBHCP area (see Table II-2). Fisherman's Lake in the southwestern portion of the NBHCP area is high quality aquatic habitat for pond turtles. Because most of the Basin is developed agricultural land or commercial/residential development, many of the potential breeding habitats have been eliminated. Despite this, potential breeding habitat probably occurs along many of the canals and aquatic habitats. Therefore, the Natomas Basin probably supports a limited pond turtle population; however, no systematic surveys have been conducted. During the NBHCP habitat mapping surveys, many pond turtles were observed along the Natomas Main Drainage Canal during March 2001.

<u>California Tiger Salamander (*Ambystoma californiense*)</u>

The California tiger salamander is a federal Candidate species and a state Species of Special Concern. California tiger salamander is a large, stocky salamander with small eyes, a broad rounded snout and tubercles on the undersides of the front and hind feet. The species is distinguished from other

salamanders by its distinctive coloration consisting of spots or bars of white, cream or yellow on a black background. This species frequents slow-moving waters of swales, ponds and shallow lakes.

Distribution

Historically, the species is likely to have occurred in grassland habitats throughout much of the state. Habitat conversion for agricultural and urban land uses has substantially reduced the species' range and number of breeding populations. Bullfrogs and nonnative fishes have also reduced population numbers of this species. Both bullfrogs and nonnative fish prey on California tiger salamander larvae and have been reported to eliminate larval salamander populations from breeding sites, such as stock ponds.

Currently, the California tiger salamander occurs in the Central Valley and Sierra Nevada foothills from Yolo County south to Tulare County, and into the coastal valleys and adjacent coastal foothills from Sonoma County south to Santa Barbara County (Zeiner et. al 1994). Isolated populations are reported from Grey Lodge Wildlife Area in Butte County, and from Grass Lake in Siskiyou County. Although populations of California tiger salamander have declined, the species continues to breed in a relatively large number of locations within its range (59 FR 18353-18354, April 18, 1994).

Activity Cycle/Behavior

Adults spend much time underground. Adult California tiger salamanders are found under objects such as boards, rocks, brush or other wood debris or in rodent burrows near water. During late winter (December to late February in the Central Valley) the adults emerge to breed at night, traveling to nearby ponds, temporary pools (including vernal pools), and swales during or immediately after rain events. Larvae grow rapidly; metamorphosis begins in late spring or early summer and is followed by the dispersal of juveniles from their natal ponds into terrestrial upland habitat. There they spend the dry season in burrows or crevices and emerge again with the first autumn rains to return to the breeding pond.

Habitat Associations/Requirements

California tiger salamanders inhabit valley and foothill grasslands and open woodlands usually within 1 mile (1.6 km) of water (Brode, pers. comms.). Tiger salamanders breed in reservoirs, ponds, vernal pools, small lakes, and slow-flowing streams that do not support predatory fish (Stebbins 1972, Zeiner et al., 1988). Adult salamanders migrate from upland habitats to aquatic breeding sites during the first major rainfall events of the fall and early winter. Adults return to upland habitats after breeding. Juveniles disperse from aquatic breeding sites to habitats after metamorphosis. California tiger salamanders may not reproduce during years of low rainfall (Jennings et al., 1994).

Numbers, Distribution, and Ecology in the NBHCP Area

There are 465 known tiger salamander occurrences in California (NDDB 2001). All of these occurrences are presumed extant (NDDB 2001). There are four occurrences in Sacramento County and one occurrence in Sutter County; however, none of these occurrences are in the Plan Area. The nearest known tiger salamander occurrences are in northern Yolo County near Dunnigan and near Rancho Seco in southeastern Sacramento County. Vernal pools occur along the eastern edge of the Natomas Basin. These pools are considered potential, but marginal tiger salamander breeding habitat, based on their disturbed condition and limited extent in the study area. Tiger salamanders are not likely to occur in the Plan Area.

Western Spadefoot Toad (*Scaphiopus hammondii*)

The western spadefoot toad is a California Species of Special Concern, and is a fully protected amphibian pursuant to regulations promulgated by the Fish and Game Commission (*Id.*, § 41). Western spadefoot toad is a smallish dusty green to gray toad often with four irregular, light-colored stripes on its back. Its underside is whitish and unmarked, and the species has a wedge-shaped glossy black spade on each hind foot. Its call is described as a hoarse, snore-like rasping sound.

Distribution

The range of this species includes the Central Valley and adjacent foothills, and the area spanning the southern Coast Ranges to northern Baja California, extending from sea level to about 4,500 feet in elevation. Its primary habitat is grasslands, but it is also occasionally found in valley-foothill, hardwood woodlands.

Habitat Associations/Requirements

This species occurs in shallow, seasonal wetlands (which are essential for breeding and egg-laying) in valley and foothill grasslands, open chaparral, and pine woodlands below 3,000 feet in elevation. This species is associated with seasonal wetlands and other temporarily ponded areas in low-lying grasslands, fields, washes, river floodplains, alluvial fans, alkali lakes and playas, but is also found in adjacent foothill and mountain habitats. Western spadefoot toads prefer slow-moving waters such as pools and plunge pools of small creeks, and short grasses with sandy or gravelly soils.

Numbers, Distribution, and Ecology in the NBHCP Area

There are 173 known western spadefoot occurrences in California, and only one of them is considered extirpated (NDDB 2001). There are five spadefoot toad occurrences in Sacramento County and none in Sutter County. All of the Sacramento County spadefoot toad occurrences are considered extant. There are no records of western spadefoot toads in the Natomas Basin (NDDB 2001). The nearest

known occurrences are in Placer County at Fiddyment and Phillip Roads (about 6 miles east of the Plan Area) and at Mather Field in central Sacramento County. Some suitable spadefoot toad breeding habitat (i.e., vernal pools) occurs along the far eastern edge of the Natomas Basin, however, there are no records for this species in the Plan Area to date. Based on the lack of occurrence records, the marginal suitability of the vernal pool habitat, and the distance to the nearest occurrence of the species, overall potential for occurrence for this species within the NBHCP study area is considered low.

Vernal Pool Shrimp

The following species of vernal pool shrimp are restricted to vernal pools in the State of California and are in danger of extinction as a result of loss of habitat from urban development, agricultural conversion, and random extinction by virtue of the isolated nature of remaining habitat. None of the species is known to occur in riverine waters, marine waters, or other permanent bodies of water. They are ecologically dependent on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year, duration of inundation, and other environmental factors including specific salinity, conductivity, dissolved solids, and pH levels. Water chemistry is one of the most important factors in determining the distribution of fairy shrimp and tadpole shrimp. Fairy shrimp are well-adapted to the flood/drought cycle found in California vernal pools. However, they have developed no defenses against predation and are consumed readily by migrating waterfowl and various aquatic invertebrates. Fairy shrimp will not persist if their vernal pools become connected to bodies of water which support fish. The species listed below are sporadic in their distribution, often inhabiting only one or a few pools in otherwise more widespread vernal pool complexes. Each of the following species may occur in the NBHCP area during the life of the Permits.

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

The vernal pool fairy shrimp is a federally listed threatened species. The vernal pool fairy shrimp is a small (<1 inch) freshwater crustacean belonging to the order of fairy shrimp (*Anostraca*). Like all other fairy shrimp, the males of vernal pool fairy shrimp have enlarged second antennae used for clasping the female during mating.

Distribution

Vernal pool fairy shrimp has one of the broadest distributions of the California endemic fairy shrimp species. It occurs most of the length of the Central Valley, from the Millville Plains and Stillwater Plains in Shasta County south to Pixley in Tulare County and the eastern margin of the central Coast Range from San Benito County south to Ventura County (Helm 1998, Eng et al., 1990, and Sugnet & Associates 1991). Disjunct populations occur on the Santa Rosa plateau and near Rancho Santa California in Riverside County. The species has recently been found within the Medford area of southern Oregon (Helm pers. comm.).

Habitat Associations/Requirements

This species is most often observed in vernal pools (79% of observations), although it is also observed in a variety of other natural and artificial habitats including seasonal wetlands, alkali pools, ephemeral drainages, stock ponds, roadside ditches, vernal swales, and rock outcrop vernal pools (Helm 1998). The species occurs on many geologic formations and land forms. Regardless of the landform, this species is most often found in small (less than 200 meter square) and shallow (5 centimeters deep) habitats, although it also can occur in large and deep vernal pools (Helm 1998).

Although the vernal pool fairy shrimp is found in different habitat types, it is not abundant in all of them. It often occurs with California *linderiella*, vernal pool tadpole shrimp, and occasionally with Conservancy fairy shrimp in the Vina Plains Preserve and is never the numerically dominant one (Eng et al., 1990).

Numbers, Distribution, and Ecology in the NBHCP Area

There are 270 reported extant occurrences of vernal pool fairy shrimp in California, 50 of which are reported from Sacramento County and one of which is reported from Sutter County (NDDB 2001). There are no vernal pool fairy shrimp occurrences in the NBHCP Plan Area, although there are several occurrences east of the Plan Area in Elverta and Rio Linda (NDDB 2001).

Potential vernal pool fairy shrimp habitat occurs in the vernal pools on the east side of the Plan Area. Additional potential habitat occurs in other seasonal wetlands in the Plan Area.

Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)

The vernal pool tadpole shrimp is a federally listed Endangered species. The vernal pool tadpole shrimp is a small (<3 inches in length) aquatic crustacea within the tadpole shrimp order (*Notostraca*). The common name "tadpole shrimp" presumably addresses the general shape of the creature when viewed from above. The animal is covered by a plate-like carapace, with only the posterior portion of the animal being exposed. It can be discerned from other tadpole shrimp within California by the presence, shape, and ridges of the sub-anal plate.

Distribution

Vernal pool tadpole shrimp is one of the three most common large branchiopods occurring in the Central Valley (Helm 1998). The vernal pool tadpole shrimp is found in scattered localities in the Central Valley from Stillwater Plains and Millville Plains in Shasta County, south to Flying M Ranch, and west to San Luis National Wildlife Refuge in Merced County (Helm 1998, U.S. Fish and Wildlife Service 1992) South to Tulare County and from one single vernal pool complex on the San Francisco Bay National Wildlife Refuge in the City of Fremont (Alameda County) (U.S. Fish and Wildlife Service 1994b).

Habitat Associations/Requirements

It generally occurs in very small (i.e. 2 meters square) to very large (i.e. 356,253 meters square) vernal pools with a variety of depths and volumes of water during the wet cycle (Helm 1998). The species is associated with vernal pools on the following geomorphologic surfaces: alluvial fan, basin, basin rim, floodplain, marine terrace, high terrace, stream terrace, very high terrace, low terrace, and volcanic mudflow landforms (Helm 1998).

The vernal pool tadpole shrimp has been observed in stock ponds, vernal pools, pools in old alluvial soil in grass bottom swales or mud-bottomed pools, and other seasonal wetlands (Helm 1998).This species occurs with California *linderiella*, vernal pool fairy shrimp, and Conservancy fairy shrimp (Helm 1998). Unlike many of the fairy shrimp eggs, the vernal pool tadpole shrimp eggs do not need to go through a freezing or drying period to hatch (Ahl 1991).

Numbers, Distribution, and Ecology in the NBHCP Area

There are 154 reported occurrences of vernal pool tadpole shrimp in California, one of which is considered extirpated (NDDB 2001). Of the total number of occurrences in California, a total of 54 extant occurrences are reported from Sacramento County, and 4 from Sutter County. There are no reported occurrences within the NBHCP Plan Area (NDDB 2001), although there are two nearby occurrences located southwest of the intersection of Sankey Road and Pleasant Grove Road, and one occurrence at the intersection of Pleasant Grove Road and Howsley Road. Suitable tadpole shrimp habitat occurs along the eastern edge of the Plan Area.

Midvalley Fairy Shrimp (*Branchinecta mesovallensis n.sp.*)

The midvalley fairy shrimp has no official state or federal listing, although it appears to meet the status of rare, threatened, or endangered under CEQA and an emergency petition for listing by USFWS is under review. The midvalley fairy shrimp is similar in morphology to the vernal pool fairy shrimp (Helm pers.comm.) and is also a freshwater crustacean belonging to the order of fairy shrimp (*Anostraca*). Like all other fairy shrimp, the males of midvalley fairy shrimp have enlarge second antennae used for clasping the female during mating.

Distribution

This species has been found in scattered localities in the middle portion of the Central Valley from Sacramento County to Fresno County (Helm 1998). Based on the species' limited distribution and sparse population size, it is likely to become a candidate for listing under the federal Endangered Species Act.

Habitat Associations/Requirements

This species occurs in grassland pools and intermound pools within mound-intermound topography. This species has been found inhabiting the most ephemeral of seasonal wetland types, presumably due to its ability of rapid maturity (Helm 1998). This species appears to be a vernal pool obligate species, as it was observed to occur in vernal pools 93% of the time, and in vernal swales only 7% of the time (Helm 1998). This species is associated with the smallest (less than 202 meters square) and most ephemeral (average ponding depths of 10 centimeters) vernal pools (Helm 1998).

Numbers, Distribution, and Ecology in the NBHCP Area

There are 14 known occurrences of midvalley fairy shrimp reported in California, all of which are considered extant. Of these occurrences, one is reported from Sacramento County, and no midvalley fairy shrimp are reported from Sutter County (NDDB 2001). No occurrences of midvalley fairy shrimp are reported from the NBHCP Plan Area, however, suitable seasonal wetland and vernal pool habitat occurs along the extreme eastern edge of the Plan Area.

b. Plants

Delta Tule Pea *(Lathyrus jepsonii var. jepsonii)*

The delta tule pea is considered rare, threatened or endangered in California and elsewhere (List 1B) by the California Native Plant Society (Skinner and Pavlik 1994), and is a federal Species of Concern (former federal candidate for listing). Delta tule pea is a biennial to perennial herbaceous species. Like other members of the pea family (*Fabaceae*), it has a largish brightly colored pink to lavender flower with a distinctive banner and keel. The species, like other peas has grasping tendrils and a climbing habitat, and can be seen climbing over the tops of tules, through riparian vegetation, and even onto grasses and shrubs in roadside ditches.

Distribution

Delta tule pea is found along the floodplain of rivers and sloughs in Contra Costa, Fresno, Lake, Lassen, Marin, Napa, Plumas, Sacramento, San Benito, Santa Clara, San Joaquin, and Solano Counties. Unlike the related wild sweet pea (*Lathyrus jepsonii var. californica*), delta tule pea is found at elevations below 98.4 feet (30 m).

Habitat Associations/Requirements

The species is associated with alluvial floodplain soils of deltas and major river systems. The species is most commonly associated with both brackish and freshwater marsh vegetation, but can root near the water and extend into riparian and upland areas such as roadside ditches. Associated species include tule (*Scirpus acutus var. occidentalis*), blackberry (*Rubus* spp.), and rushes (*Juncus* spp.).

Numbers, Distribution, and Ecology in the NBHCP Area

Delta tule pea is known primarily from the Sacramento-San Joaquin River Delta. Most known occurrences are recorded from Solano (39 records), Contra Costa (15), Sacramento (14), and San Joaquin (9) Counties (CalFlora, 2001). All Sacramento County occurrence records are from the Delta region, with the nearest reported occurrences in the Walnut Grove area (CDFG, 2001). Delta tule pea is not known to occur in Sutter County. Little information is known about the population status of the delta tule pea, but the species is considered by the California Native Plant Society to be threatened by agricultural practices, water diversions and erosion (Skinner and Pavlik, 1994). Currently, there are 115 known occurrences of Delta tule pea in California, 14 of which are reported from Sacramento County, and none are reported from Sutter County (NDDB 2001). All of the reported occurrences are considered extant. No occurrences of this species are known from the NBHCP area (NDDB 2001). The nearest reported occurrence are in the Walnut Grove area. Potential habitat occurs where riparian vegetation or emergent marsh vegetation exists in sloughs and marshes.

Sanford's Arrowhead *(Sagittaria sanfordii)*

Sanford's arrowhead is considered a Species of Concern by USFWS and rare and endangered (List lB) by the California Native Plant Society (Skinner and Pavlik 1994). Sanford's arrowhead is an aquatic perennial that is a member of the water-plantain family (*Alismitaceae*), and occurs under shallow-water conditions in freshwater marshes. Its leaves are long, linear, and three-angled or narrowly ovate. The inflorescence is generally borne on an emergent peduncle, and it displays three-petaled unisexual flowers at the nodes. The female flowers are borne at the lowest node and the male flowers occur at the higher nodes. The flowering period for Sanford's arrowhead is generally from May through August.

Distribution

Sanford's arrowhead is known primarily from the Central Valley, but has been found below 2,000 feet (609.8 m) elevation (Hickman 1993) in Butte, Del Norte, Fresno, Kern, Merced, Marin, Sacramento, Shasta, San Joaquin, and Tehama Counties. Although the species is distributed widely in California, it is uncommon. Historically, Sanford's arrowhead was also found in Orange and Ventura Counties, is now considered extirpated from these areas.

Habitat Associations/Requirements

Sanford's arrowhead is found in ponds, ditches, vernal pools, sloughs, and other slow-moving waterways. It is commonly associated with yellow water primrose (*Ludwigia repens*), barnyard grass (*Echinochloa crus-galli*), water plantain (*Alisma plantago-aquatica*), and cattails (*Typha* ssp.) (NDDB 2000).

Numbers, Distribution, and Ecology in the NBHCP Area

There are 65 known occurrences of Sanford's arrowhead in California, one of which is presumed extirpated (NDDB 2001). Of these known occurrences, 30 extant occurrences are reported from Sacramento County and none are reported from Sutter County. No occurrences of this species are known from the NBHCP Plan Area (NDDB 2001). In Sacramento County, several occurrences are reported along the American River Parkway along small oxbows and sloughs (CDFG, 2001). Sanford's arrowhead is an endemic species, but is considered by CNPS to be threatened by agricultural practices, water diversions and erosion (Skinner and Pavlik, 1994). The nearest reported occurrence is located along a slough connected to the American River, approximately 1.5 miles south of the study area. Potential habitat occurs where riparian vegetation or emergent marsh vegetation exists in sloughs, marshes, and unmaintained agricultural canals.

Boggs Lake Hedge-Hyssop *(Gratiaola heterosepala)*

The Boggs Lake hedge-hyssop is a State listed endangered species. Boggs Lake hedge-hyssop (*Gratiola heterosepala*) is a small, semi-aquatic, herbaceous annual. It is mostly glabrous (smooth) and a member of the figwort family (*Scophulareaceae*). The stems are erect and 1-5 inches (2.5-12.7 cm) long. The leaves are opposite and entire. The basal leaves are 0.2-1.0 inch (0.5-2.5 cm) long, lanceolate, and slightly clasp the stem. The upper leaves are blunt or notched at the tip and are shorter and wider at the tip than at the base. The inflorescences are open and borne on stout stalks. The flowers are tubular and have five petals. The upper two petals are yellow and fused nearly to the tips. The lower three petals are white and separate. The flowering period for Boggs Lake hedge hyssop is generally from April through June.

Distribution

Boggs Lake hedge-hyssop is found in the following counties in California: Modoc, Lassen, Shasta, Tehama, Lake, Solano, Placer, Sacramento, Madera, and Fresno (Skinner and Pavlik 1994). Boggs Lake hedge-hyssop is found in five widely disjunct areas in California: Boggs Lake in Lake County, Rio Linda and Elk Grove in Sacramento County and near Roseville in Placer County, Big Table Mountain in Fresno County, Kennedy Table in Madera County, and near the Pit River in Shasta County (NDDB 2000). It has also been reported at one site in Lake County, Oregon (Skinner and Pavlik 1994).

Habitat Associations/Requirements

Boggs Lake hedge-hyssop occurs in shallow waters or moist clay (adobe) soils, in vernal pools, and along lake margins. Populations are usually composed of scattered individuals. May Consulting Services' file data indicate that Boggs Lake hedge-hyssop is often associated with bractless hedge-hyssop, coyote thistle, hairy clover-fern (*Marsilea vestita*) and slender orcutt grass (*Orcuttia tenuis*). At higher elevations, such as Boggs Lake in Lake County and near the Pit River in Shasta County, the species is

found in close proximity to foothill woodland species, such as black oak (*Quercus kelloggii*) and foothill pine (*Pinus sambiana*), and northern juniper woodland species, respectively.

Numbers, Distribution, and Ecology in the NBHCP Area

Currently, there are 86 known occurrences of Boggs lake hedge-hyssop in California, one of which is presumed extirpated (NDDB 2001). Of the 85 extant occurrences, 10 are known from Sacramento County, and no occurrences known from Sutter County. There are no known occurrences of this species in the NBHCP area (NDDB 2001) although limited potentially suitable vernal pool habitat occurs along the far eastern boundary of the project area north of Del Paso Road. The closest known occurrences are from Rio Linda, approximately 2 miles east of the Plan Area.

Sacramento Orcutt Grass *(Orcuttia viscida)*

Sacramento orcutt grass is listed as Endangered by both the state and federal Endangered Species Acts and is considered rare, threatened, or endangered in California and elsewhere (List 1B) by the California Native Plant Society (Skinner and Pavlik 1994). Sacramento orcutt grass (*Orcuttia viscida*) is a gray-green annual grass species (Family: *Poaceae*) approximately 3 to 5 inches in height with one to several stems arising from the plant's base. The inflorescence is distinctively more densely packed than other species in the genus *Orcuttia*. As with other orcutt grasses, Sacramento orcutt grass is covered with a sticky, viscid, and aromatic exudate when mature. The flowering period for this species is from May to July.

Distribution

Sacramento orcutt grass has been identified at nine sites in Sacramento County; there are no known occurrences of this species in the Natomas Basin (NDDB, 2001). The closest known occurrences are reported in the vicinity of Kiefer Road in eastern Sacramento County, approximately eight miles southeast of the Natomas Basin.

Habitat Associations/Requirements

Sacramento orcutt grass typically occurs in medium to large vernal pools with relatively long inundation periods. The species is associated with very old alluvial surfaces (also referred to as high terrace landforms), such as historic floodplains of pre-historic rivers and creeks. Associated species include vernal pool endemic plants, such as common spikerush (*Eleocharis macrostachya*), rayless lasthenia (*Lasthenia glaberrima*), and coyote thistle (*Eryngium vaseyi*).

Numbers, Distribution, and Ecology in the NBHCP Area

Sacramento orcutt grass is known from only nine occurrences in California, all of which are reported from Sacramento County, one of which is presumed extirpated (NDDB 2001). There are no records of Sacramento orcutt grass in Sutter County, and no known occurrences of this species in the NBHCP area (NDDB 2001). The closest known occurrences are reported in the vicinity of Kiefer Road in eastern Sacramento County, approximately 8 miles southeast of the Plan Area. Limited potential habitat occurs in the vernal pools along the eastern edge of the Plan Area.

Slender Orcutt Grass *(Orcuttia tenuis)*

Slender orcutt grass is listed as Threatened under the federal Endangered Species Act and Endangered under the state Endangered Species Act, and is considered rare and endangered (List 1B) by the California Native Plant Society (CNPS) (Skinner and Pavlik 1994). Slender orcutt grass is a gray-green annual grass species (Family: *Poaceae*) approximately 3 to 5 inches in height. The stems of the species are slender, often branching from the upper nodes. The inflorescence is less densely packed than other species in the genus *Orcuttia*, but individual spikelets within the inflorescence are larger. As with other orcutt grasses, slender orcutt grass is covered with a sticky, viscid, and aromatic exudate when mature. The flowering period for this species is from May to July.

Distribution

Slender orcutt grass is currently recorded at 74 locations in Lake, Plumas, Sacramento, Shasta, Siskiyou and Tehama Counties (NDDB, 2001). Of these occurrences, two are reported from Sacramento County and no occurrences are reported from Sutter County. There are no known occurrences of this species in the Natomas Basin (NDDB, 2001). The closest known occurrences are in eastern Sacramento County, between Kiefer Road and Rancho Seco.

Habitat Associations/Requirements

Slender orcutt grass typically occurs in medium to large vernal pools with relatively long inundation periods. The species is associated with very old alluvial surfaces (also referred to as high terrace landforms), such as historic floodplains of pre-historic rivers and creeks. Associated species include vernal pool endemic plants such as wire rush (*Eleocharis macrostachya*), rayless lasthenia (*Lasthenia glaberrima*), and coyote thistle (*Eryngium vaseyi*).

Numbers, Distribution, and Ecology in the NBHCP Area

Slender orcutt grass is currently reported from 74 occurrences in California, of which 4 occurrences are reported extirpated, and 3 other occurrences were not relocated at a previously reported location (NDDB 2001). Of the 70 extant occurrences, two are reported from Sacramento County, and

no occurrences are reported from Sutter County. There are no known occurrences of this species in the NBHCP area (NDDB 2001). The closest known occurrences are in eastern Sacramento County between Kiefer Road and Rancho Seco. In general, vernal pools in Natomas Basin lack that particular high terrace landforms that are associated with the species, therefore, potential for occurrence within the Plan Area is considered low.

Colusa Grass (*Neostapfia colusana*)

Colusa grass is both a federally and state listed Endangered species. It is also considered rare and endangered (List lB) by the California Native Plant Society (Skinner and Pavlik 1994). The Colusa grass (*Neostapfia colusana*) is a low (2 to 3-inch or 7.6-to 30.5-cm) tufted annual. Typically, it has several stems that are decumbent (arching) at the base. The upper stem is erect and terminates in a dense cylinder inflorescence. The inflorescences have sheathing leaves that make them superficially resemble ears of corn and individual florets that are broadly fan-shaped. At maturity, Colusa grass, like the orcutt grasses, is covered with a sticky brownish exudate. The flowering period for Colusa grass is generally from May through July.

Distribution

Currently, Colusa grass is found in Merced, Solano, and Stanislaus Counties below 700 feet (213.4 m) elevation. It has been extirpated from Colusa County where it was originally discovered (Skinner and Pavlik 1994). The species' historical range was previously not much larger than is its current range. However, populations of Colusa grass were much more abundant historically than they are currently.

Habitat Associations/Requirements

Colusa grass is usually found in fairly monotypic stands in the drying beds of larger vernal pools, usually occurring in the deepest portions of the pools (Stone et al., 1988). It usually occurs in the deepest portions of the pools (May Consulting Services file information). When Colusa grass is present, other vernal pool plants are often sparse or absent. When found with other species, Colusa grass is often associated with Hoover's spurge or orcutt grasses (*Orcuttia* sp.)(Stone et al., 1988).

Numbers, Distribution, and Ecology in the NBHCP Area

There are currently 59 known occurrences of Colusa grass in California. Of these 59 occurrences, 48 are presumed extant, 7 are considered extirpated, and an additional 4 occurrences have not been relocated at a previously reported location. Of the 48 extant occurrences, none are reported from Sacramento and Sutter Counties. There are no known occurrences of this species in the NBHCP area (NDDB 2001). Limited potential habitat occurs in the vernal pools along the eastern edge of the Plan Area.

Legenere *(Legenere limosa).*

Legenere is considered a Species of Concern by USFWS and rare and endangered (List 1B) by the California Native Plant Society (Skinner and Pavlik 1994). Legenere (*Legenere limosa*) is an inconspicuous annual that is a member of the bellflower family (Campanulaceae). It is generally 4-6 inches (10.2-15.2 cm) tall but can attain heights of up to 12 inches (30.5 cm). It has erect lateral branches that are stiff and sometimes fleshy. The leaves are sessile, narrowly triangular entire, and early deciduous. The minute flowers are white and are absent on lower portions of the stem. The flowering period for legenere is generally from April through June.

Distribution

Legenere is found below 500 feet (152.4 m) elevation (Hickman 1993) in Lake, Napa, Placer, Sacramento, San Mateo, Solano, and Tehama Counties (Skinner and Pavlik 1994). Historically, it was also found in Sonoma and Stanislaus Counties but is now considered extirpated from these areas (Skinner and Pavlik 1994).

Habitat Associations/Requirements

Legenere is found along lakeshores and in vernal pools, marshes, and other seasonally inundated habitats. May Consulting Services' file data indicate that legenere is commonly associated with stipitate popcornflower, common spikerush (*Eleocharis macrostachya*), rayless goldfields (*Lasthenia glaberrima*), and coyote thistle.

Numbers, Distribution, and Ecology in the NBHCP Area

Currently, there are 49 known occurrences of legenere in California. Of these known occurrences, 6 have been extirpated and one occurrence has not been relocated at a previously known location. Of the 42 extant occurrences, 18 are reported from Sacramento County, and none are reported from Sutter County. There are no reported occurrences in the NBHCP area, although potentially suitable vernal pool habitat occurs along the far eastern boundary of the project area north of Del Paso Road.

D. SPECIES WHICH MAY OCCUR IN THE NBHCP AREA

Table II-4 provides a list of vertebrate wildlife species which may occur in specific habitat types in the Permit Areas. This information is provided for reference purposes only. These species are not considered Covered Species in this NBHCP or under the incidental take permits unless they are listed in Table I-1 of this NBHCP.

TABLE II - 4
VERTEBRATE WILDLIFE WHICH MAY OCCUR IN THE NATOMAS AREA BY HABITAT TYPE

OPEN WATER (including flooded rice fields)

MAMMALS

Muskrat	Beaver	River Otter

BIRDS

Pied-billed Grebe	Bald Eagle	Double-crested Cormorant
Canada Goose	Mallard	Pintail
Common Goldeneye	American Coot	Ruddy Duck
Wood Duck	Forster's Tern	California Gull
Whistling Swan	Snow Goose	Ross' Goose
Cinnamon Teal	American Wigeon	Kingfisher

REPTILES/AMPHIBIANS

Giant garter snake	Common garter snake	Bullfrog
Western Pond turtle		

FRESHWATER MARSH & MARGINS OF OPEN WATER

MAMMALS

Muskrat	Beaver	River otter
Harvest mouse	Shrews	Long-tailed weasel
Skunk	Ringtail	Various bats (forage over marshes)

BIRDS

Great Blue Heron	Yellowthroat	Green Heron
Marsh Wren	Black-crowned Night Heron	Killdeer
Belted Kingfisher	Black Phoebe	Black Tern
Yellow-headed Blackbird	Tricolored Blackbird	Red-winged Blackbird
Bewick's Wren	Song Sparrow	American Bittern
Purple Gallinule	Great Egret	Snowy Egret
Cattle Egret	American Avocet	Sora
Long-billed Curlew	Yellowlegs	Willet
Black-necked Stilt	Northern Harrier	

REPTILES/AMPHIBIANS

Giant garter snake	Common garter snake	Gopher snake
Bullfrog	Pacific tree frog	Western toad

RIPARIAN SCRUB-SHRUB

MAMMALS

Opossum	Shrews	Beaver
Long-tailed weasel	Skunk	Pocket gopher
Harvest mouse	Cottontail	California vole

Deer mouse	Black-tailed deer	Bats
River otter	Raccoon	

BIRDS

Great Blue Heron	Egret	Green Heron
Wood Duck	White-tailed Kite	Rufous-sided Towhee
Screech Owl	Tree Swallow	Black Phoebe
Bewick's Wren	Yellowthroat	Brown Towhee
Scrub Jay	Downy Woodpecker	Barn Owl
White-crowned Sparrow	Ringtail	

REPTILES/AMPHIBIANS

Common garter snake	Racer	Gopher snake
Common king snake	Alligator lizard	Pacific tree frog
Bullfrog		

VALLEY RIPARIAN FOREST

MAMMALS

Opossum	Shrews (several species)	Mole
Coyote	Gray fox	Gray squirrel
Pocket gopher	Wood rat	California ground squirrel
Cottontail	Black-tailed deer	Beaver
Long-tailed weasel	Harvest mouse	Deer mouse
Ring-tailed cat		

BIRDS

Screech Owl	Great-horned Owl	Anna's Hummingbird
Flicker	Scrub Jay	Tree Swallow
House Wren	Violet-green Swallow	Swainson's Hawk
Crow	Red-shouldered Hawk	Great blue Heron
Wood Duck	Turkey Vulture	White-tailed Kite
American Kestrel	Red-tailed Hawk	Bewick's Wren
Vireos (several species)	Warblers (several species)	Black-headed Grosbeak
Rufous-sided Towhee	Brown Towhee	Finches (several species)
Fox Sparrow	Titmouse	Western Tanager
Western Bluebird	Golden-crowned Sparrow	Woodpecker (several species)
Robin	Northern Oriole	

REPTILES/AMPHIBIANS

Common garter snake	Southern Alligator lizard	Western fence lizard
Pacific tree frog	Ring-necked snake	Gopher snake

VALLEY OAK WOODLAND

MAMMALS

Opossum	Shrew (several species)	Mole
Raccoon	Long-tailed weasel	Skunk
Gray fox	Coyote	Graysquirrel
California ground squirrel	Pocket gopher	Deer mouse
Black-tailed deer		

BIRDS

American Kestrel
Rough-legged Hawk
Great horned Owl
Anna's Hummingbird
Kingbird
Warblers (several species)
Crow
Robin
Sharp-shinned Hawk
White-crowned Sparrow
Turkey Vulture
Swainson's Hawk
Barn Owl
Woodpecker (several species)
Scrub Jay
Western Bluebird
Raven
Meadowlark
Yellow-billed Magpie
White-tailed Kite
Mourning Dove
Screech Owl
Ash-throated Flycatcher
Finches (several species)
Western Tanager
Woodpecker (several species)
Northern Oriole
Lark Sparrow

REPTILES/AMPHIBIANS

Western fence lizard
King snake
Western toad
Ring-necked snake
Gilbert skink
Gopher snake
Pacific tree frog
Racer
Alligator lizard
Western rattlesnake
CA slender salamander
Common garter snake

GRASSLAND/SAVANNA

MAMMALS

Opossum
Gray fox
California ground squirrel
Deer mouse
Black-tailed deer
Mole
Coyote
Pocket gopher
California vole
Skunk
Bats (several species)
Harvest mouse
Black-tailed hare

BIRDS

Turkey Vulture
Red-tailed Hawk
Short-eared Owl
Yellow-billed Magpie
Raven
Finches (several species)
Golden-crowned Sparrow
Barn Owl
American Kestrel
Swainson's Hawk
Western Bluebird
Crow
Kingbird
Horned Lark
White-crowned Sparrow
White-tailed Kite
Golden Eagle
Loggerhead Shrike
Great horned Owl
Northern Oriole
Lark Sparrow
Brewer's Blackbird

REPTILES/AMPHIBIANS

Horned lizard
Gopher snake
Alligator lizard
Western fence lizard
Racer
Common garter snake
Common king snake
Western toad
Gilbert skink

GRASSLAND, LEVEE SIDES AND OLD FIELD

MAMMALS

Opossum
Gray fox
California ground squirrel
Deer mouse
Black-tailed deer
Mole
Coyote
Pocket gopher
California vole
Skunk
Bats (several species)
Harvest mouse
Black-tailed hare

BIRDS

Turkey Vulture	American Kestrel	Red-tailed Hawk
Swainson's Hawk	Golden Eagle	Mourning Dove Acorn
Woodpecker	Western Bluebird	White-tailed Kite
Loggerhead Shrike	Yellow-billed Magpie	Crow
Raven	Kingbird	Northern Oriole
Finches (several species)	Horned Lark	Lark Sparrow
White-crowned Sparrow	Golden-crowned Sparrow	Brewer's Blackbird
Short-eared Owl	Great horned Owl	
Northern Harrier		

REPTILES/AMPHIBIANS

Horned lizard	Western fence lizard	Common king snake
Gopher snake	Racer	Western toad
Alligator lizard	Common garter snake	

Source: Cribbs & Associates

III. LAND USE ISSUES

The Land Use Issues chapter describes: A. Authorized development by Jurisdiction, B. Existing land uses, and C. Potential development under the NBHCP.

A. AUTHORIZED DEVELOPMENT BY JURISDICTION

The NBHCP establishes a multi-species conservation program to mitigate the expected loss of habitat and incidental take and/or loss of Covered Species that would result from planned urban development and other Covered Activities. Within each jurisdiction, certain levels of planned urban development are covered by this NBHCP. These levels are referred to as "Authorized Development" and are identified for each jurisdiction.

Based on a growth scenarios outlined by existing general plans for each Land Use Permittee, the total acreage potentially to be developed in the Natomas Basin is 13,533 to 20,033 acres, depending primarily on the extent of urbanization in Sutter County (see Table III-5). Although the adopted General Plans include a range of development, the NBHCP and related incidental take permits coverage, and the ITP issued to MAP, is limited to a maximum of 17,500 acres of urban development within the footprint for urban development shown on Figure 16 ("Planned Development") . The NBHCP provides coverage for Authorized Development for each of the NBHCP Land Use Agency Permittees intending to allow urban development within the Natomas Basin (City of Sacramento and Sutter County). Such Authorized Development is limited to 15,517 acres. This Authorized Development, combined with MAP's 1,983 acres of development authorized under a separate HCP and ITP's, totals 17,500 acres and this combined acreage is referred to herein as Planned Development.

Any development in excess of that authorized by this HCP would not have take coverage under this HCP and such take coverage would require either an amendment to this HCP and permits or preparation of a separate HCP and approval of separate permits for that additional development, including an updated assessment of impacts and mitigation measures. The total acreage of Authorized Development in the Natomas Basin proposed to be covered under the City and Sutter County's permits along with the acreage covered under the recently approved Metro Air Park incidental take permits is shown in Table III-1.

All lands within the NBHCP area that are not indicated as existing development on the Land Use Agencies' "Baseline Maps" (for City of Sacramento's Baseline Map and for Sutter County's Baseline Map, see Exhibits B and C of the NBHCP Implementation Agreement) will be subject to full compliance with the NBHCP when or if they are developed. The one exception to this would be open areas left in an undisturbed state within areas otherwise developed, if the Natomas Basin Conservancy agrees to accept fee title to such lands or (see Section VI.D) a conservation easement over them.

TABLE III-1
PLANNED DEVELOPMENT BY PERMITTEE

Permittee	Planned Development Considered Within the NBHCP
City of Sacramento	8,050 acres
Sutter County	7,467 acres
Metro Air Park[1]	1,983 acres
Total	**17,500 acres**

1. *The Metro Air Park (MAP) project located in Sacramento County will impact a total of 1,983 acres. While MAP is not a Permittee under this NBHCP, MAP has submitted a similar HCP and has obtained ITPs from the CDFG and the USFWS. Total development allocated to the City and Sutter County, combined with the anticipated 1,983 acres of MAP development, result in a total of 17,500 acres of development in the Basin.*

All lands within the NBHCP area that are not indicated as existing development on the Land Use Agencies' "Baseline Maps" (for City of Sacramento's Baseline Map and for Sutter County's Baseline Map, see Exhibits B and C of the NBHCP Implementation Agreement) will be subject to full compliance with the NBHCP when or if they are developed. The one exception to this would be open areas left in an undisturbed state within areas otherwise developed, if the Natomas Basin Conservancy agrees to accept fee title to such lands or (see Section VI.D) a conservation easement over them.

The Authorized Development allowed under the NBHCP for the City and Sutter County as specified in Table III-1 shall remain covered by the NBHCP for the City of Sacramento and Sutter County regardless of the rate of the development or modifications to land use designations of other jurisdiction(s). Jurisdictions which are not party to the NBHCP and propose urban development in the basin would be required to independently obtain incidental take coverage and achieve compliance with the state and federal Endangered Species Acts in a manner that does not undermine the species protection measures and conservation strategy of the NBHCP.

In particular, any increase in the total authorized level of Authorized Development covered by the NBHCP beyond 15,517 or an increase beyond the proposed 17,500 acres of Planned Development shall require an amendment to the NBHCP and shall be subject to additional biological or other analysis as deemed appropriate by the USFWS and the CDFG (see Section VI.C) and will require an amendment to the incidental take permits or issuance of new permits.)

The Sacramento International Airport is within the NBHCP Plan Area, but expansion of the airport is not covered by the NBHCP Incidental Take Permits. The airport will mitigate for future disturbance to airport lands through coordination between the Airport and Sacramento County, and obtain any necessary

incidental take coverage from USFWS and CDFG. The specific areas of potential airport expansion are not currently specified.

Authorized Development may not be transferred among jurisdictions unless an analysis of the effects of such transfer on the effectiveness of the conservation strategy contained in the Plan's Operating Conservation Program demonstrates that the transfer would not compromise the effectiveness of the Operating Conservation Program. Such a transfer would also require the consent of all agencies or entities affected by the transfer, including affected Land Uses Agencies and the Wildlife Agencies and would require review in accordance with all applicable state and federal laws.

B. EXISTING LAND USE

Existing land uses in the HCP were developed based on the 1997 database for land uses as updated by field check and geographic information system mapping conducted by CH2MHill in 2001. The 2001 break-out of land use by type (acres) provided by CH2MHill is included in Table III-4. Agricultural cover types described herein reflect conditions as of 1997. Urban development acreage and drainage/waterway data have been updated to reflect 2001 conditions.

1. Agriculture

Agriculture is the primary land use in the Natomas Basin with approximately 42,800 acres in agricultural production in 1997. Land under Williamson Act contracts (entered into pursuant to the Land Conservation Act, California Government Code Section 51200, *et seq*. "The Williamson Act") in the Sacramento County portion of the Natomas Basin comprises 9,195 acres (Sacramento County General Plan Land Use Map). Sutter County began participating in the Williamson Act program in 2000, and as of February 2002 there were 2,076 acres of land within Sutter County's portion of the Natomas Basin under Williamson Act contract. Primary crops grown in the Natomas Basin include rice, safflower, wheat, barley, alfalfa, corn, pasture land, tomatoes, and fruit trees. Rice cultivation within the Natomas Basin as of 1997 is shown on Figure 15.

The relationship between agriculture in the Natomas Basin Plan Area to the integrity of the Natomas Basin giant garter snake population is unique as compared to the relationship between other land uses in the Natomas Basin to the population's viability. Agriculture within the Natomas Basin: (1) provides habitat that the giant garter snake can occupy; (2) provides waterways necessary to the giant garter snake's mobility throughout the Natomas Basin; (3) contributes to economies of scale for the use of resources such as water, thereby lowering the costs for operating the agricultural reserves; and (4) non-rice farming within the Natomas Basin increases the long term habitat opportunities for the giant garter snake by allowing rice farms to rotate to other crops when the cost of rice is down, rather than letting the farm go fallow, losing the water supply, and creating significant start-up costs to return the acreage to habitat.

Rice: About 95% of all California rice is grown in the Sacramento Valley (U.C. Agricultural Issues Center 1994); and rice lands in the Natomas Basin grow about 3% of the State total. Rice crops are grown in standing water for most of the season; heavy (impermeable) soils and a plentiful water supply are essential. Rice fields are first prepared by discing and leveling using heavy equipment. Fields are then flooded with water from the applicable irrigation source to a depth of 2 to 3 inches. Water requirements for rice farming in the Sacramento region have been estimated at between 4.82 and 6.70 acre-feet of water per acre each year (WESCO 1991). This includes consumption through evapotranspiration and percolation and outflow to the Sacramento River or to recirculation systems. Herbicides are applied to the water to control growth of aquatic weeds and insecticides are applied to combat water weevil and shrimp. The herbicides and the insecticides are held in the water on the fields until the chemicals begin to degrade due to their exposure to sunlight. Following their degradation, and two to three weeks before harvest, the water is drained from the field. Ninety percent (90%) of the rice crops have a 145-day growing season from mid-April to mid-August.

The residual rice straw in the fields after harvesting is typically burned, plowed under, or flooded. Flooding to dispose of rice straw is becoming more prevalent as the practice of burning rice straw is being phased out due to air quality prohibitions. In addition to rotting the rice stubble, flooded rice fields provide wetland habitat for ducks, geese and other migratory waterfowl.

Agricultural water is provided by groundwater or is diverted from the Sacramento River by Natomas Mutual which supplies the Natomas Basin. The company is a private mutual water company that holds water rights for landowners. Natomas Mutual has several diversion canals on the Sacramento River which feed a network of smaller canals and ditches leading to the agricultural fields. This network includes ditches owned by the RD 1000.

The U.S. Department of Agriculture (USDA) has subsidy programs which are administered through the Farm Services Agency (FSA) at the county level. Farmers participate in the program by annually reporting their base crop acreage to the FSA. Participating farmers can receive a price deficiency payment when market prices fall below the target price established by Congress as the break even point. Table III-4 shows 1997 totals for agriculture in the Natomas Basin.

2. Waterways

The Natomas Basin is served by an extensive network of water delivery and drainage channels operated by Natomas Mutual and RD 1000. These channels, combined with the extensive rice fields within the Basin, are important habitat areas for the giant garter snake and other wetland associated species within the Basin. Since giant garter snakes live in the canals and ditches maintained by RD 1000 and Natomas Mutual, canal and ditch maintenance activities of the Water Agencies may result in take of the listed species. RD 1000 and Natomas Mutual are committed to reducing impacts of operation and maintenance practices on Covered Species and, to the extent practicable, to observing practices that are beneficial to these species, particularly the giant garter snake.

The acreage calculations and mile calculations for canals and drains in the Natomas Basin, as of the 2001 baseline, and by jurisdiction, are shown below in the following two tables. Table III-2 shows the number of miles of canals and drains by Class in 2001 for the City of Sacramento, Metro Air Park, Other Sacramento County, and Sutter County, with totals for each class and jurisdiction. Table III-3 shows the acres of canals and drains, by jurisdiction, for the same 2001 baseline. The canal types are separated into four classes; Class I, Class II, Class III, and Class IV. Class I canals are the largest canals within the Basin and have been mapped upon aerial photos to determine the land area within these major canal. Class II through Class IV canals are lesser canals with assumed widths that range from 66 feet to 38 feet in width, respectively.

TABLE III-2
CANALS AND DRAINS IN THE NATOMAS BASIN - 2001 (MILES)

Canal Type	***City of Sacramento***	***Metro Air Park***	***Other Sacramento County***	***Sutter County***	**TOTAL**
Class I	13.9	0.0	14.9	7.1	35.9
Class II	4.0	4.0	18.0	24.5	50.5
Class III	15.1	3.5	50.5	28.5	97.6
Class IV	5.1	4.1	31.4	22.3	62.9
TOTAL	38.1	11.6	114.9	82.4	246.9

Source:CH2M Hill, September 2001.

3. Road Network

The road network in the Natomas Basin occupies a substantial acreage of land. The Natomas Basin is traversed by 25 miles of State and Interstate highway corridors (I-80, I-5, and State Route 70/99). These roadways have several traffic lanes in each direction and the right-of-way widths vary with terrain and interchanges (Caltrans, District 4, pers. comm.). Smaller (2-lane) surface streets serving agricultural areas in Sacramento County and Sutter County add to the linear mileage of the paved roadway network. In the Natomas area of the City of Sacramento, roads serving the Arco Arena and other urbanized areas have also been constructed. In 1993, Thomas Reid Associates estimated that 1,527 acres (3% of the land area in the Basin) had been paved either in freeway or local roads. Table III-4 shows acreage totals for highways in the Natomas Basin in 2001. Other roads are included in the "Urban" category of Table III-4.

TABLE III-3
CANALS AND DRAINS IN THE NATOMAS BASIN - 2001 (ACRES)

Canal Type	*City of Sacramento*	*Metro Air Park*	*Other Sacramento County*	*Sutter County*	TOTAL
Class I	129	0	308	66	503
Class II[a]	32	32	144	196	404
Class III[a]	90	21	301	170	582
Class IV[a]	23	19	145	103	289
TOTAL	275	72	898	534	1,779

a Class II, III, and IV canals and drains are linear features in the GIS database. Conversion to area features required using a standard width for each canal type, which was determined to be 65.9, 49.2, and 38.0 feet for Class II, III, and IV canals, respectively, based on information from Natomas Mutual. These standard widths include adjacent upland areas (e.g., maintenance roads) in addition to channel width.

Source:CH2M Hill, September 2001.

4. Urban Development

Before the original HCP was adopted and the incidental take permits were issued to the City of Sacramento in December 1997, existing urban development in the Natomas Basin was concentrated in the southern portion of the Basin near Interstate 80. Most residential development existed within the South Natomas area of the City of Sacramento in the southeastern portion of the Basin, east of I-5 and south of I-80. Other residential areas included rural estates north of Del Paso Road and west of Natomas East Main Drainage Canal (now known as Steelhead Creek), a mobile home park on El Centro Road, and miscellaneous scattered single family residences. In addition to residential uses, other areas of development included the Natomas Sewage Treatment Pumping Station, Natomas Air Park (now closed), Sacramento International Airport (formerly known as Sacramento Metropolitan Airport), Arco Arena, Raley's Distribution Center, and the Northgate Business Park industrial area. Overall, as of 2001, about 7,267 acres had been urbanized, (including highways, airport and other uses) in the Basin and therefore did not provide habitat for Covered Species or require mitigation. Table III-4 shows the land use acreage totals in the Natomas Basin in 2001.

Between 1998 and December 2001, about 3,787 acres of urbanization occurred in the Natomas Basin. About 2,250 acres of residential areas in North Natomas and the western portion of South Natomas were developed. The following non-residential projects were built in North Natomas: a 600,000 square foot retail center, known as Natomas Marketplace at Truxel Road and I-80; 108,000 square foot office building along Del Paso Road; 80,000 square foot office building at Arena Corporate Center along Arena Boulevard; and three office buildings at Gateway Park and Arena Boulevards, totaling about 100 acres. Also, the following non-residential projects were built in South Natomas: Sutter Health building, California

Farm Bureau building, BTV Crown Corporate Center office buildings, and the alternative high school, totaling about 75 acres. Also, about 300 acres of infrastructure were developed between 1998 and 2000 in the Natomas Basin, including comprehensive drainage plan improvements, detention basins, streets, water mains and other miscellaneous improvements. During the 2001 construction season, 1,062 acres of land were converted to development under the City's Settlement Agreement.

TABLE III-4
LAND USES BY JURISDICTION - 2001 (ACRES)

Land Use Class[a]	City of Sacramento	Metro Air Park	Other Sacramento County	Sutter County	TOTAL
Airport	18	0	1,512	21	1,551
Alfalfa	0	0	137	234	371
Canals	129	0	308	66	503
Grassland	454	0	293	138	886
Highways	450	0	414	571	1,435
Idle	838	50	480	94	1,464
Non-rice Crops	4,905	325	8,591	2,866	16,686
Oak groves	15	2	70	11	98
Orchard	13	0	169	0	182
Other	148	0	305	15	468
Pasture	35	22	261	355	674
Ponds and seasonally wet areas	7	4	75	10	96
Rice	987	1,541	8,427	11,737	22,693
Riparian	24	0	93	6	124
Ruderal	1,429	6	261	274	1,970
Rural residential	49	10	170	148	377
Tree groves	36	23	39	8	106
Urban	3,298	0	229	327	3,854
TOTAL	**12,836**	**1,983**	**21,836**	**16,881**	**53,537**

Source: Habitat and Land Use Assessment Database, (CH2M Hill, 2001).

Note: Urban uses noted herein reflect 2001 conditions. Agricultural cover types reflect 1997 uses. Since 1997, all rice production within Metro Air Park has been discontinued.

Airport	Lands within the ownership boundary for the Sacramento International Airport, including all land use types (e.g., facilities, runways, open lands and farmlands adjacent to runways) within boundary. Does not include airport buffer lands (e.g., south of I-5). Also includes the former Natomas Air Park and several small rural airstrips (one in Sacramento County and two in Sutter County).
Alfalfa	Based on a subset of the DWR "Pasture" land use category that includes alfalfa production, as estimated for the 2001 baseline. Includes known alfalfa fields along Garden Highway in Sutter County.
Canals	The largest (Class I) canals and drains (including adjacent maintenance roads) in the Natomas Basin, primarily the ones already digitized for the DWR land use maps. Includes the East Drain, West Drain, Main Drain, North Drain, and the Central Main Canal. Does not include smaller canals and drains, which are recorded in the project database as linear features.
Grassland	Based on DWR "Native Vegetation" land use category with additional information provided by May & Associates field data and aerial photo interpretation, as estimated for the 2001 baseline. Includes known uncultivated grasslands, primarily along the eastern border of the Natomas Basin.
Highways	Includes Interstates 5 and 80, S.R. 99/70, and interchanges, including all areas within medians.
Idle	Based on DWR "Idle" land use category - agricultural lands temporarily out of production.
Non-Rice Crops	Based on the DWR land use categories of "Grain and Hay Crops," "Field Crops," and "Tilled Lands." In the Natomas Basin, this category includes primarily wheat, corn, safflower, and tomatoes.
Oak Groves	Includes several isolated pockets of mature oak trees east of Garden Highway.
Orchard	Based on the DWR land use categories of "Deciduous Fruits/Nuts" and "Citrus and Subtropical." In the Natomas Basin, this includes primarily pear, peach, and walnut orchards adjacent to Garden Highway.
Other	Miscellaneous land uses not captured by other land use categories. Includes Teal Bend Golf Course, the wastewater plant at Sacramento International Airport, and several utility substations.

Pasture	Based on DWR "Pasture" land use category, including primarily irrigated pasture in the Natomas Basin.
Ponds/Wet Areas	Wetland/marsh areas including Pritchard's Lake and several isolated locations throughout the Natomas Basin. Based on DWR's "Water Surface" land use category and some "Riparian Vegetation" categories, with additional information provided by May & Associates data and aerial photo interpretation.
Rice	Based on DWR's "Rice" land use category.
Riparian	Based on DWR's primary "Riparian" category, with additional information provided by May & Associates data. Includes cottonwood/willow areas along primary canals and drains, including the Fisherman's Lake area.
Ruderal	Includes former agricultural lands that are no longer in production, primarily due to proximity to urbanized areas (e.g., surrounding Arco Arena). Includes DWR's "Barren" and "Vacant" land use categories. Ruderal lands typically consist of non-native grasses, and most are occasionally tilled for fire control.
Rural Residential	Includes farmhouses and farm equipment yards. Includes DWR's "Semi-Agricultural" land use category, with additional information provided by aerial photo interpretation.
Tree Groves	Includes non-riparian stands of trees other than mature oaks. Based on DWR's "Native Vegetation" land use category, with additional information by May & Associates data and aerial photo interpretation.
Urban	Urbanized areas. Primarily in the City of Sacramento, but also including unincorporated areas along El Centro Road in Sacramento County and Pacific Avenue in Sutter County.

5. Sacramento International Airport

Sacramento International Airport (SIA) currently uses 2,800 acres for runways, terminals, hangers and extensive north-south flyover buffers (see Figure 2, Natomas Basin and Affected Jurisdictions). The airport owns additional land as shown in the breakdown below. The airport property is generally bounded by the County line to the north and the Sacramento River to the south, and extends roughly 1.5 miles west from Powerline Road. The Airport is owned and operated by the County of Sacramento.

Land under the control of the Sacramento County Department of Airports includes the airport facilities and surrounding buffer lands acquired to minimize conflicts between airport operations and

encroaching urban development (see Figure 17). These areas have been mapped by CH2M Hill and the actual airport facilities (land inside the airport fenceline) is estimated to include 1,505 acres. Additionally, the Department of Airports has acquired approximately 4,050 acres of surrounding buffer lands. Thus, the total area under the direct control of the County Department of Airports is 5,565 acres. The Department is also currently seeking to acquire an additional 438 acres of buffer lands.

In March 1996, the Sacramento County Department of Airports adopted a Wildlife Hazard Management Plan (WHMP) as required by the Federal Aviation Administration (FAA) under 14 CFR 139.337 (Hall 1996). The WHMP assesses the extent of wildlife hazards at SIA and directs the Airport to manage wildlife hazards to reduce risk to public safety and risk of property damage. The WHMP plan is based on an Ecological Study completed in July 1993.

The main wildlife hazard is bird strikes--i.e., collisions between aircraft and birds. Modern aircraft engines and windshields are designed to resist damage from bird strikes and strikes seldom result in accidents. However, bird strikes do cause significant repair expense. The greatest threat to aircraft is large bird species, which individually can cause significant damage, and flocking birds, which can result in multiple strikes.

The most prominent wildlife hazards for airports are birds that occur on or near airport grounds and that fly across an aircraft's flight path during landing or takeoff. Most airports experience 70%-90% of all strikes in this area under 500 ft AGL (above ground level). At SIA, about 50% of the strikes occur under 500 ft AGL. SIA is located in the Pacific Flyway and is in the Sacramento Valley, a major waterfowl wintering area. Wintering waterfowl contribute to a greater than average frequency of birds struck above 500 ft AGL because waterfowl tend to fly high to and from feeding and roosting/loafing areas. Waterfowl account for 50% of the strikes at SIA where the species could be determined and the majority of strikes at SIA, 46%, occur in winter during the months of December, January, and February. SIA experiences a higher than average bird strike/air operations ratio than most airports at about 1 in 4,000 landings or takeoffs. FAA encourages keeping strikes below 1 in 10,000.

The WHMP addresses a range of on-site management actions to be undertaken by the airport to reduce attractiveness of the airport lands to birds and to disperse birds that occur. Birds are attracted by open water, including ponded rainwater, and food from crops or recently tilled lands. Birds are dispersed by "hazing" (frightening birds with loud noises or recorded distress calls). One component of the WHMP calls for reducing open water in drainage ditches, which could reduce GGS habitat. Another component calls for elimination of hawk roost trees near the runway and could marginally affect Swainson's hawk habitat.

In general, the FAA identifies the area within two miles of the runway centerline as the critical zone for managing wildlife hazards. For the Natomas Basin, the 2-mile zone extends east nearly to U.S. 99. The WHMP directs airports to avoid placing bird attractant uses in the critical zone, including solid waste disposal sites and wildlife refuges. FAA regulations govern placement of refuse dumps near airports.

In May, 1997, the FAA published an Advisory Circular concerning wildlife attractants near airports (FAA 1997). This Advisory Circular recommends the following distances between an airport's aircraft movement areas, loading ramps, or aircraft parking areas and the wildlife attractant: (1) 5,000 feet for airports serving piston-powered aircraft; and (2) 10,000 feet for airports serving turbine-powered aircraft. In addition, the Circular recommends that a distance of five statute miles be maintained between a wildlife attractant and the airport's approach or departure airspace if the attractant may cause hazardous wildlife movement into or across the approach or departure airspace.

Rice farming has been a historic, ubiquitous use of the agricultural lands surrounding SIA and are typically considered impractical and unnecessary to regulate by the Department of Airports (Glen Sanders, Sacramento County Department of Airports, and Thomas Hall, USDA, Animal Damage Control, pers. comm). Rice farming near the runways is not considered to be a significant source of wildlife hazards in the Natomas Basin, with the exception of grain spillage left in the fields following harvest, which attracts birds. During the summer growing season, migratory waterfowl are absent and fields attract a relatively small number of other birds, such as egrets and herons, that are considered a potential threat to aircraft. Once harvested, however, grain spillage creates an obvious attraction to waterfowl, especially in rain flooded fields. The practice of winter flooding in lieu of burning to remove the rice straw may broaden the range of birds attracted to the rice fields and pose a more significant threat to aircraft (Thomas Hall, pers. comm). In addition, the use of managed marsh as wetlands as described in Chapter IV of the NBHCP (see Sections IV.C.3.d and VI.) is unlikely to pose bird strike hazards to SIA due to both their being sited within prescribed safe distances indicated and by the fact that they are not designed to attract migratory waterfowl, the type of bird the SIA evidences is of most concern. These factors must be taken into account when selecting and managing reserve lands under the NBHCP.

Sacramento International Airport (Buffer Lands)

Surrounding Sacramento International Airport, there are airport buffer lands which are maintained in agricultural uses. These lands are considered beneficial to the Covered Species within the Basin in that they provide a large contiguous block of predominantly upland habitat. Development of these buffer lands to industrial or other commercial uses will be considered a significant change in the NBHCP and would require that the County either participate in a revision to the HCP, or apply for an individual take permit that mitigates for project impacts. Although the Permittees are not relying on the Airport buffer lands as mitigation for effects within the Natomas Basin, retaining these lands in agricultural uses will contribute to the overall success of NBHCP conservation strategies for the Covered Species.

C. POTENTIAL DEVELOPMENT

Three separate local governments have jurisdiction over the NBHCP Area. Within the Basin, 16,581 acres lie in Sutter County and 36,656 acres lie in Sacramento County. Within Sacramento County, 12,836 acres of the Basin lie within the city limits of the City of Sacramento. The City portion of the Basin

consists of the North Natomas Community Plan Area, and the South Natomas Community Plan Area. Each of the land use planning agencies in the Natomas Basin (City of Sacramento, Sacramento County, and Sutter County) have land use plans governing anticipated future development within the NBHCP area. The status of land use planning within each jurisdiction is discussed below.

1. Foreseeable Urban Development and Status Under the NBHCP

Local governments guide land use through their general plans. While the general plans of the City, Sutter, and Sacramento County are subject to amendment over the 50-year term of the NBHCP and permits, they offer a reasonable basis for predicting the extent and location of future development. The following discussion of land use planning is not a limitation of the NBHCP or its associated permits; the permits will apply to all Authorized Development in the Natomas Basin. For purposes of the permits, the NBHCP makes no distinction between areas with approved land use plans and areas with current agricultural zoning, and nothing in the NBHCP affects the land use status of any parcel. The underlying development activities must be authorized by the local agency before incidental take authorization under the City or Sutter County's incidental take permits will be extended to that project. Land use entitlements will continue to remain under the authority of the respective local jurisdictions. Figure 2 shows the footprint of the area in which Authorized Development would be covered by the incidental take permits. Impacts to habitat and species and the related mitigation program are based on an analysis of the effects of land use development within the areas shown.

TABLE III-5
POTENTIAL URBAN DEVELOPMENT

AREA/PROJECT	LAND PLAN USES (acres)
Sutter County	3,500 to 10,000[a]
Sacramento Airport	Unspecified
Metro Air Park (Sacramento Co.)	1,983
North Natomas Community Plan (City of Sacramento)	7,150[b]
South Natomas (City of Sacramento)	900[b]
TOTAL	**13,533 - 20,033**

a. *Maximum development scenario derived in the 1995 Sutter County general plan which designates 10,000 acres within the Natomas Basin as Industrial/Commercial Reserve and allows development of 3,500 acres by year 2015.*

b. *The total number of acres projected for development in the NNCP area is 7,150 acres, including 6,510 acres within the City limits (as of 12/31/00) and 640 acres within the County area anticipated to be annexed into the City during 2002 (excluding existing development shown in the Baseline Map - Exhibit A in the Implementation Agreement). The total number of acres projected for development in the SNCP area is 900 acres, including the approximately 50 acre property annexed into the City (Costa, Giannoni, Parr). As of 12/31/00, Urban Development Permits have been issued on 2,676 ± acres in both the NNCP and SNCP areas. The entire 8,050 City of Sacramento acres (North Natomas and South*

Table III-5 shows the currently approved or reasonably foreseeable maximum growth scenario for the Natomas Basin. As discussed below, a range is shown for Sutter County. The purpose of these data is to provide an estimate of potential urban development and resulting take and to provide a basis to assess funding requirements. Existing plans prepared by the City, Sutter, and Sacramento County are discussed solely for the purpose of identifying likely levels of development and its potential impacts.

a. Sacramento County

The Sacramento County General Plan was updated in December 1993. There are two urban policy areas affecting County lands within the Natomas Basin, the Sacramento International Airport/Vicinity Special Planning Area (Metro Air Park) and the North Natomas Community Plan Area (the majority of which is in the City of Sacramento). The Sacramento County General Plan Land Use Diagram (Sacramento County General Plan Update 1993) incorporates the land use designations specified within both these special planning areas. The majority of Sacramento County land within the Basin and outside of these policy areas is designated for retention as Agricultural Cropland by the Sacramento County General Plan. At this time, it is not anticipated that these agricultural lands will be converted to urban land uses.

There is currently a proposal before Sacramento County to expand the Urban Services Boundary to include approximately 6,500 acres. This proposal would affect land within Sacramento County's northeast portion of the Natomas Basin. This proposal has not been analyzed within or covered by the NBHCP and the effects on endangered species and mitigation for the development of this land would not be provided through the NBHCP. Thus incidental take authorization for such potential development would not be based on the NBHCP. Any further urban development would require new biological analysis and regulatory review and associated permits.

Sacramento County currently is not seeking coverage under the HCP. Other than MAP, whose landowners association has obtained a separate incidental take permit, Sacramento County currently has no approved development plans.

Metro Air Park

The Metro Air Park Special Planning Area lies east of the airport property and encompasses 1,892 acres. In August 1993, Sacramento County amended its zoning ordinance to allow airport related uses, light manufacturing, high tech research and development, professional office space, limited support retail, and recreation. Essentially all of the area is foreseen for urbanization. Also, 119 acres of off-site improvements are anticipated for the Metro Air Park project - 28 acres are in the City of Sacramento and 91 acres are in the unincorporated portion of Sacramento County (therefore 1,983 acres of development are assigned to Metro Air Park in Tables III-1 and III-5).

b. City of Sacramento

North Natomas Community Plan Area

The North Natomas Community Plan was adopted in 1986 by the City of Sacramento and was amended in 1994. North Natomas is designated by the City's General Plan to be the City's major growth area for housing and employment. The Arco Arena, a major event center for sports and concerts, is located here. The planned community encompasses 9,038 acres (7,438 acres within Sacramento city limits and 1,600 acres currently of unincorporated Sacramento County land). A 640 acre portion of the unincorporated county area is currently under consideration for annexation into the City of Sacramento and is included in the City's Authorized Development shown in Table III-1.

The North Natomas Community Plan sets forth a vision, guiding policies and implementing policies for each plan element: Land Use, Circulation, Community Services and Facilities, and Implementation Programs. The North Natomas Community Plan sets forth a new urban form for North Natomas that includes (1) a Town Center and Regional Park as the "heart of the community"; (2) sustainable neighborhoods each with an elementary school as its focal point with a variety of housing types, parks and open space, commercial services, and transit service close to employment; (3) employment centers designed to be mixed-use centers with primarily employment generators (office, industrial) but may include residential and retail uses also; and (4) land use is designed to encourage the use of alternative modes of travel, specifically transit, bicycling, and walking. The recent inventory of planned land uses in the NBHCP are as follows:

Major Employers	2,378 acres
Residential	3,599 acres
Public/Civic Uses	269 acres
Parks	494 acres
Agricultural and Freeway Buffers	255 acres
Drainage and Detention Facilities	420 acres
Other Open Space	354 acres
Agriculture	125 acres
Roads/Light Rail right-of-way	1,144 acres
Total	9,038 acres

Of this total, the following existing projects within the City were exempt from compliance with the NBHCP because they comprise development existing before the 1997 NBHCP: 185 acres Arco Arena Sports Complex; 75 acres Coral Business Center (including Coke and Raley's); 25 acre County Sanitation property; 10 acres Natomas School along Del Paso Road; 25 acres Stadium Estates mobile home park; and miscellaneous existing road and utility facilities totaling 964 acres. Also, approximately 924 acres within the unincorporated portion of the County (south of Del Paso Road) were existing development and will not be subject to compliance with the NBHCP. Based on the 964 acres of existing development in the City

and 924 acres of existing development in the County, 7,150 remaining acres of the total 9,038 acres in the North Natomas Community Plan will be subject to compliance with the NBHCP (about 6,510 acres in the City and 640 acres in the County- north of Del Paso Road).

Between the inception of the 1997 NBHCP in December 1997 and December 2001, private and public development has paid mitigation fees on 3,821 acres of the 8,050 acres in the City's Permit Area, with fees totaling $13.9 million.

South Natomas Community Plan Area

The South Natomas Community Plan Area was adopted by the City of Sacramento in 1988. The Community Plan Area totals 3,464 acres and is largely urbanized with residential, office, light industrial, and other development. As of December 1997, 900 acres of South Natomas remain undeveloped and subject to future compliance with the HCP. Since the inception of the 1997 NBHCP, private and public uses have paid the mitigation fee and been issued Urban Development Permits on 276 acres. (The South Natomas Community Plan area includes the Natomas West area, west of the Main Drain, formerly known as Willow Creek or known as West Natomas.)

Annexation Requests and Potential Expansion of Sphere of Influence

As mentioned above, the annexation area known as the panhandle has always been included in the North Natomas Community Plan and is included in the Authorized Development area of the City; however, the City's incidental take permits would not apply to the panhandle area until and unless the area is annexed to the City. The City has also received development applications or preliminary expressions of interest for two properties adjacent to the current city limits within the Natomas Basin: 1) West Lakeside, and 2) Greenbriar Farms.

West Lakeside: This proposed annexation area is located at the northwest corner of Del Paso Road and the current city limits, next to the developing Westlake neighborhood. The property is 135 acres in size and an environmental document has been started.

Greenbriar Farms: This proposed annexation area is between the developing North Natomas neighborhoods and the Metro Air Park. The area is 573 gross acres in size.

On June 27, 2000, the Sacramento City Council embarked on a study to consider expansion of the City's sphere of influence. The sphere of influence is currently co-terminus with the city limits in the Natomas Basin. If eventually requested by the City and approved by the Local Agency Formation Commission (LAFCo), the City's sphere of influence could be expanded. However, no coverage for this expanded area is provided under the NBHCP.

c. Sutter County

The adopted Sutter County General Plan (1995) designates County areas within the Natomas Basin as Agriculture and Industrial/Commercial Reserve. The Sutter County General Plan designated 10,500 acres in South Sutter County as Industrial/Commercial Reserve, with approximately 10,000 of these acres located in the Natomas Basin. The 1995 General Plan allowed the development of 3,500 acres of this land within the Industrial/Commercial Reserve for the 20 year planning horizon of the General Plan. Under the current Sutter County General Plan, the balance of the Industrial/ Commercial Reserve has the potential to develop over the 50 year term of the NBHCP.

Sutter County has recently approved the South Sutter County Specific Plan (SSCSP), which allows an initial 3,500 acres of development within the County's Industrial/Commercial Reserve. The boundaries of the Specific Plan Area are depicted on Figure 2 - Natomas Basin and Affected Jurisdictions. For purposes of this NBHCP, the Specific Plan Area is considered to be very likely to develop, while the remaining land within the Industrial/Commercial Reserve is considered to have the potential to develop over the term of the NBHCP.

The total area of the Industrial/Commercial Reserve within the Natomas Basin includes approximately 10,000 acres. A portion of this total area falls within one mile of the Sacramento River and is, therefore, within the Swainson's Hawk Zone. Sutter County has excluded land within the Swainson's Hawk Zone from its Permit Area and will seek no coverage for development in the Zone under the NBHCP or the associated ITP's. Land within the Industrial/Commercial Reserve that is more than one mile from the river, and therefore outside the Swainson's Hawk Zone, totals approximately 8,573 acres. Following adoption of the NBHCP and issuance of ITP's, the County will initiate a General Plan Amendment to remove the land within the Swainson's Hawk Zone from the Industrial/Commercial Reserve and designate such land for agricultural uses.

Because the effectiveness of the NBHCP's Operating Conservation Program to adequately minimize and mitigate the effects of take of the Covered Species depends in part on the exclusion of future urban development from the Sutter County portion of the Swainson's Hawk Zone, approval by Sutter County of future urban development within the Swainson's Hawk Zone would constitute a significant departure from the Plan's OCP and would trigger a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional urban development, and/or possible suspension or revocation of Sutter's Permits.

While the SSCSP identifies 3,500 acres of land for near term development, the remaining areas to be developed within the Industrial/Commercial Reserve have not been specified. Within the total 17,500 acres of development to be considered within the NBHCP, 7,467 has been allocated to Sutter County. Therefore, approximately 1,106 acres of the 8,573 acre Industrial/ Commercial Reserve located outside

the Swainson's Hawk Zone cannot be developed under the take authorization sought under the NBHCP and the associated ITP's.

Prior to 1997, a total of 146 acres of urban development and 291 acres of roads and highways existed in Sutter County. This pre-existing development is exempt from mitigation requirements under NBHCP. From 1997 through 2001, a single project was constructed within Sutter County, the SYSCO warehouse facility that occupies approximately 50 acres in the vicinity of Pacific Avenue and Sankey Road. The SYSCO project is located within the proposed South Sutter County Specific Plan and this project is counted among the total acres of Authorized Development that is allocated to Sutter County under the NBHCP. Mitigation measures have been adopted by Sutter County, which include purchase of 25 acres of habitat mitigation land consistent with NBHCP guidelines. The purchase of the 25 acres will be in accordance with all provisions identified in the NBHCP. It is anticipated the purchase may be combined with other TNBC purchases.

2. Conversion of Agricultural Lands

In 2001, approximately 46,230 acres in the Natomas Basin were either in agriculture or other undeveloped uses. As the adopted general plans described above are implemented, agricultural lands will be converted to urban uses. This conversion process is expected to occur over many years. In the Sutter County portion of the Basin, large areas of agriculture will likely persist, after completion of NBHCP Authorized Development. Under the current Sacramento County General Plan (1993), agriculture in unincorporated Sacramento County outside the two urban policy areas designated by the County (Metro Air Park and North Natomas Community Plan Area) will continue to exist.

Development in the early years of the NBHCP will result in some loss of currently-farmed rice land. As of 1997, the North Natomas Community Plan Area had 987 acres in rice. At the time of the 2001 baseline land use inventory for this HCP, the Metro Air Park had some 1,541 acres in rice. Outside the North Natomas Community Plan Area, the current distribution of rice in the Basin is roughly 42%. Because the Natomas Basin is partially urbanized, individual property owners of farm lands make decisions regarding types of crops, and in the case of rice, whether to fallow or drain fields fairly frequently. Thus, the acreage of agriculture by crop type, is often changing. The best available baseline of agricultural land uses by crop type as determined by CH2MHill and field checked by May and Associates (2001) is used as the baseline for this HCP and related analysis.

It is significant to note that total acres of cultivation and types of crops grown can vary significantly from year to year based on various factors, including market conditions and soil capability. Additionally, there has been a trend of property owners in urbanizing areas to fallow rice fields in expectation of urban development. This NBHCP presents a conservation plan based upon the recent agricultural production as generally described above and specifically noted within Table II-1.

IV. CONSERVATION PLAN

A. PLAN PURPOSE

This chapter describes the Conservation Plan to be implemented by the Plan Operator, The Natomas Basin Conservancy (TNBC). The Chapter sets forth the guidelines and practices to be used by TNBC including the size and amount of reserves to be established, acquisition criteria for upland and wetland areas to be acquired and managed by TNBC, and reserve management practices to be employed by the TNBC to ensure successful habitat enhancement to support the Covered Species. Chapter V describes related and supportive avoidance and mitigation measures which will be undertaken by the Permittees including the TNBC, Land Use Agencies and Water Agencies. It is important to review both Chapters IV and V in concert in order to understand the full mitigation strategy of the HCP. Finally, Chapter VI describes provisions related to NBHCP implementation and establishes additional procedures and obligations for both TNBC and the other Permittees. (Note that the TNBC is both Plan Operator and a Permittee. The TNBC is a Permittee for purposes of participation in the NBHCP and for receipt of an Incidental Take Permit related to management of the habitat reserves on behalf of the City, Sutter County and other potential Permittees. The TNBC's Permit Area is however, different from the other Permittees in that it includes the entire Natomas Basin Plan Area, and Area B thereby allowing the TNBC to purchase or otherwise control and operate habitat lands throughout the greater Natomas Basin area.)

The NBHCP sets forth a program for the preservation and protection of habitat for threatened and endangered species potentially found in the Natomas Basin. Of the 53,537 acre Natomas Basin, about 7,267 acres were already developed in 1997, leaving a balance of 46,270 acres of undeveloped and agricultural land. The primary objective of the NBHCP is to provide a practical program to promote biological conservation along with Authorized Development in the Permit Areas and Water Agencies Covered Activities. The NBHCP is not intended to cover incidental take of listed species within the Natomas Basin resulting from activities which are not included as Covered Activities or are conducted by entities other than the NBHCP participants outside of the Permit Areas.

Among the mitigation and minimization measures outlined in the Plan, is a program that establishes a multi-habitat, multi-species conservation program to mitigate the incidental take of and expected loss of habitat for state and federally listed species and other species noted as covered by the Plan that would result from urban development and operation of irrigation and drainage systems. Activities covered by the NBHCP could result in incidental take, or take for scientific purposes (see Section VII), of some of the Covered Species (see Table I-1). Thus, the NBHCP constitutes the basis for requested incidental take permits for these species under the state and federal ESAs. Take of other species addressed by the NBHCP is expected to be infrequent or unlikely, but may occur in isolated cases (see Chapter VII). These species also would be covered by the permits if such take should occur.

Current development approvals, City and County general plans and community plans, and other plans (including MAP) are the basis for estimating development rates anticipated in the Basin, the resulting

habitat loss expected from the Covered Activities authorized by the incidental take permits, and for evaluating the corresponding environmental impacts pursuant to NEPA and CEQA. Take resulting from urban development on Sacramento International Airport land would not be authorized by the NBHCP Incidental Take Permits. Apart from take associated with the MAP HCP which is accounted for in the NBHCP, the Plan does not permit the take of Covered Species within Sacramento County, with the following two exceptions: (1) take resulting from TNBC reserve operations; and (2) take resulting from the Water Agencies Covered Activities. The airport will mitigate for take of listed species affected by activities on airport lands through coordination between the Airport and Sacramento County, with USFWS and CDFG approval as previously described.

Under the NBHCP, the acquisition of lands or conservation easements for the purpose of creating and managing permanent habitat reserves is the primary mitigation for impacts to habitat of Covered Species resulting from urban development. For purposes of the Plan, the term "system of reserves" means mitigation lands generally and includes all habitat conserved and managed for the Covered Species, including rice fields by TNBC. The NBHCP describes a method for funding the land acquisition and management program for the acquired lands.

B. PLAN OPERATOR

In anticipation of the completion of the HCP and issuance of ITP's, TNBC was formed as a non-profit corporation under the laws of the State of California in 1994. It is governed by the terms of the NBHCP, its commitments within the NBHCP Implementation Agreement for the respective Permittees, a Board of Directors, and Bylaws. Since January 1998, with the issuance of the ITP on December 31, 1997, the City of Sacramento appointed 5 Board members to the TNBC. The City collected Mitigation Fees of $13.9 M from 1996 (when the interim fee was put in place) to December 2001. The history of fee increases is shown on Table VI-3. In cooperation with USFWS, CDFG and the City, TNBC has acquired 2,104.14 acres of habitat reserve land to date on behalf of the City (See Table IV-1 below). To date, 100 percent of the mitigation land is within the Natomas Basin.

As well as acquiring habitat reserve land, the Conservancy has completed Site Specific Management Plans (SSMPs) on all but the 2 most recently acquired properties. A contract was granted in November 2001 to complete a Site Specific Land Management Plan for those 2 properties. The Conservancy has also completed an annual report each year since its inception per Section VI.G of the NBHCP, including Authorized Development activities, Conservancy activities, and annual surveys of the GGS and Swainson's Hawk. A 5-year comprehensive Basin-wide survey of the Covered Species will be started in 2003 and completed in 2004.

TABLE IV-1
TNBC MITIGATION LAND ACQUISITION (January 2002)

Property	Date Acquired	Acres
Silva	1.7.99	159.200
Betts	4.5.99	138.992
Kismat	4.16.99	40.293
Bennett North	5.17.99	226.675
Bennett South	5.17.99	132.486
Lucich North	5.18.99	267.986
Lucich South	5.18.99	351.889
Brennan	6.15.00	241.376
Frazer	7.31.00	92.600
Souza	7.2.01	44.68
Natomas Farms	7.9.01	96.46
Ayala	2.2.02	311.5
Sills	7.15.02	575.56
Total		**2679.7**
Alleghany	pending	50.00
Total		**2729.7**

TNBC Board of Directors is comprised of representatives from NBHCP Permittees, to be appointed as follows:

Number: The authorized number of Directors shall be a minimum of three and a maximum of fifteen. No reduction of the authorized number of Directors shall have the effect of removing any Director before that Director's term of office expires.

Designation by the City of Sacramento: The City of Sacramento, as the original NBHCP Permittee, designated five (5) Directors when the City received its Permits in December 1997.

Designation by Sutter County: At such time as Sutter County adopts the NBHCP and executes the associated I.A., Sutter County shall be entitled to designate five (5) Directors when Sutter County has received its Permits.

Designation by Natomas Mutual: At such time as Natomas Mutual adopts the NBHCP, executes an Implementation Agreement with the USFWS and CDFG, and receives its Permits, it may appoint one (1) Director to TNBC Board.

Designation by RD 1000: At such time as RD 1000 adopts the NBHCP, executes an Implementation Agreement with the USFWS and CDFG, and receives its Permits, it may appoint one (1) Director to TNBC Board.

TNBC performs an important function for the NBHCP by establishing and overseeing a concerted program for acquiring, enhancing and managing mitigation lands in perpetuity on behalf of the Permittees. Specifically, TNBC will receive mitigation fees collected by the City and County (and from the County of Sacramento for the Metro Air Park Project) , using the fees to establish mitigation lands, and to manage the mitigation lands for the benefit of the Covered Species. Mitigation lands are established through fee simple or easement acquisition. TNBC may legally buy and sell land, lease land for revenue, hold title to conservation easements, etc. As a non-governmental entity, TNBC has no powers of condemnation and can only purchase lands from willing sellers. TNBC also has the authority to establish and sign contracts with appropriate individuals or organizations for the purpose of carrying out specific activities under the NBHCP, including, but not limited to, managed marsh construction, habitat restoration, and monitoring.

All proceedings of TNBC shall be conducted in public, in a manner consistent with the Ralph M. Brown Act (California Government Code, Section 54950 *et seq.*) regarding open and public meetings, and with the California Public Records Act (California Government Code, Section 6250, *et. seq.*) regarding maintenance of public records. TNBC may conduct closed sessions for real estate negotiations as permitted in its bylaws, included in Appendix F as may be amended from time to time ("TNBC Bylaws"). Pursuant to the TNBC Bylaws, the provisions of the Ralph M. Brown Act regarding the disclosure of information with respect to real property transactions (including but not limited to Gov. Code Sections 54954.5(b); 54956.8 and 54957.1(a)(1)) whether such transactions are pending or completed shall not apply. As used herein, "real property transactions" shall include options to purchase or lease real property, conservation easements, as well as farming contracts affecting real property that TNBC has acquired or is in negotiations to acquire. Moreover, any documents relating to real property transactions, either pending or completed, of TNBC shall be exempt from disclosure. TNBC may, in time, be succeeded by another suitable non-profit entity or by CDFG (see Section 3.2.11 of the Implementation Agreement).

1. NBHCP Technical Advisory Committee

Upon approval of the 1997 City of Sacramento NBHCP and issuance of ITP's, the NBHCP Technical Advisory Committee (TAC) was formed. The TAC is and shall be comprised of representatives from the USFWS, CDFG, the Permittees, and any other future Permittees to advise TNBC in implementing the NBHCP. Each Land Use Agency, Water Agency, or other Permittee, the USFWS, and CDFG will appoint one or more members to the TAC. In addition, TNBC Board of Directors may invite, as needed, other qualified experts on Covered Species or marsh construction, administrative and legal personnel to

assist the TAC, for limited time periods. The TAC's role under the NBHCP is intended to be strictly technical and scientific. It is to advise TNBC in making technical and biological decisions with respect to: reserve land selection, enhancement, and management; monitoring programs and needs; species relocation or reintroduction plans; and other issues pertinent to technical implementation of the Plan. Only TAC representatives from the Permittees, the USFWS, and CDFG shall have the authority to vote with respect to any TAC decision.

C. CONSERVATION STRATEGIES TO MITIGATE FOR URBAN DEVELOPMENT

1. General Strategies to Mitigate the Impacts of Urban Development

This section describes the Conservation Plan that will serve to mitigate the impacts of Authorized Development on Covered Species and habitat values in the Natomas Basin. Generally, this Conservation Plan will be implemented by TNBC, with direction provided by USFWS, CDFG and the Permittees through the TAC and through agency approval of acquisitions and management plans. Mitigation required of Authorized Development projects will include the collection and use of mitigation fees, and in some cases acceptance of land dedications, to set aside and manage 0.5 acres of habitat mitigation land for each 1.0 gross acre of development that occurs in the Basin. Additionally, the Land Use Agencies shall apply measures to avoid, minimize and mitigate take of Covered Species as described in Chapter V. The 0.5-to-1 ratio will specifically mitigate for the loss of wetland habitat values necessary for the giant garter snake and other wetland associated species (see below, Section IV.C.2), and for the loss of upland habitat values necessary for the Swainson's hawk and other upland species (see below, Section IV.C.3).

Habitat reserves will be managed by TNBC and will consist of managed marsh habitats, upland habitats, rice fields (which will typically be leased for use to rice farmers), and associated buffers and infrastructure. The NBHCP does not specify any particular land area for acquisition for habitat reserves, since many factors will affect which land areas are ultimately purchased. Rather, this section specifies the criteria to be considered when reserve lands are selected. An exception to this policy for reserve locations is the City of Sacramento's Settlement Agreement that resulted from the NBHCP litigation. The Settlement Agreement requires a limited number of reserve acres to be located within Sacramento County, including specific target lands near Fisherman's Lake, a requirement that may further enhance the ultimate TNBC reserve system. The Settlement Agreement applies only to a limited number of acres of the City's Authorized Development that occurred between the settlement agreement and the adoption of this NBHCP.

For purposes of the NBHCP, Authorized Development of all currently undeveloped land within the Permit Areas of the City of Sacramento and Sutter County will be subject to the mitigation fee, including urban uses (residential, commercial, industrial), roads and utilities (public or private), schools and other public facilities, golf courses, and other developed parks, except as otherwise specified (see Section 4.6 of the Implementation Agreement).

a. Basis for 0.5 to 1 Mitigation Ratio

The NBHCP proposes a 0.5-to-1 mitigation ratio to be applied to the 17,500 acres of Authorized Development. This mitigation strategy will result in 8,750 acres of habitat reserves to be established and managed by TNBC. It should be noted that the effective habitat reserve ratio is actually higher than the 0.5 to 1 ratio, because not all lands to be developed under the NBHCP Permits are of high value to the Covered Species as habitat. Because portions of the Natomas Basin currently have marginal value as habitat, and because all land to be developed in the Basin will be subject to mitigation fees, in some cases the 0.5-to-1 mitigation ratio will result in a substantial increase in overall habitat value. Listed below are the key considerations in determining that the 0.5 to 1 mitigation ratio mitigates the impacts of incidental take authorized under the NBHCP:

(1) Overall, TNBC reserves will be of greater habitat value than the existing agricultural land that will be converted to urban development. The TNBC reserves will be specifically managed to create habitat to support the covered species, and species friendly management practices will be utilized by TNBC for the rice reserves operated by TNBC.

(2) Much of the land to be developed after issuance of the NBHCP Permits is either of limited value as habitat or serves as habitat to a limited number of the Covered Species. In contrast, TNBC reserves will be enhanced and managed to provide a greater diversity of habitat that will serve a larger number of Covered Species. Thus, the reserves to be created through habitat management will offer greater opportunities for species survival by providing a refuge from persistent mechanical or in some cases chemical disturbance often associated with common agricultural practices.

(3) In the case of several wetland and vernal pool related plant species, TNBC reserves will provide habitat for native species' restoration and reintroduction, if appropriate.

(4) Numerous migratory bird species currently have minimal utilization of the Basin, but would have increased opportunities within TNBC managed reserves.

(5) TNBC reserves will be managed to minimize take related to agricultural and land management activities.

(6) TNBC system of reserves will be managed and maintained in perpetuity, providing permanent habitat for the Covered Species.

(7) The NBHCP incorporates a detailed monitoring program that will track Covered Species population trends within TNBC reserves as well as at selected locations outside TNBC reserves within the Natomas Basin. The NBHCP monitoring data will inform and guide the Adaptive Management process, to achieve the Plan biological goals and objectives.

(8) TNBC reserves will generally be consolidated into large, biologically viable units with connectivity between individual reserve units.

b. Preparation of Site Specific Management Plans.

Generally, TNBC will improve and manage the system of reserves in a manner that will, to the maximum extent practicable, benefit all Covered Species. This shall be accomplished through preparation and implementation of Site Specific Management Plans that will address the specific resources and habitat values of each reserve site. While the TNBC system of reserves is intended to benefit all Covered Species, individual reserve sites may focus on either upland or wetland habitat that supports only a portion of the Covered Species. Overall, public access to TNBC reserves will be limited and TNBC endeavor will use its best efforts to eliminate illegal and incompatible uses such as dumping. trespass, or unauthorized off-road vehicles. Specific guidelines for the management of TNBC Reserves are provided in Section IV.D.1. The TAC will participate in the review of the management plans, and shall ensure that the management guidelines are incorporated into each management plan. The Wildlife Agencies will approve all SSMPs.

c. Buffers within the Reserve Lands

Buffers shall be considered during the preparation of a site specific management plan for each reserve site.

Definition of Buffers: To the extent necessary and practicable, reserve lands that are modified to create improved wetland habitat shall be surrounded by adequate buffers to minimize the effects of incompatible adjoining land uses, and to ensure a functional transition from improved habitat to adjacent land uses. In addition, the buffers will help ensure that the management of reserve lands does not impose an unnecessary burden on adjoining landowners. Buffers shall be established so that they are inside the reserve system (i.e., the buffers shall be part of, not outside of, reserve lands) and shall count as mitigation land. For example, an upland buffer surrounding a wetland area, may in the individual site management plan be designed to provide foraging areas for some species, as well as providing a buffer or transition between uses

Buffers between improved wetlands and surrounding land uses will extend from the outside edge of the reserve (i.e., levee toe or maintenance road) to the boundary edge of the improved wetland area. The width of the buffer and the management/uses of the buffer area shall be established at the time a Site Specific Management Plan is prepared for the particular reserve site. Typically, buffers will consist of native or ruderal vegetation and will vary between 30 and 75 feet in width, based on the compatibility of adjacent land uses. Where agricultural uses are incorporated within a reserve site, such agricultural uses (with appropriate best management practices to protect wildlife) may serve as the buffer area. Other uses that may be appropriate within the buffer area include TNBC access roads.

Reduction in Buffer Width: Buffers may be reduced to less than 30-feet in width where so designated in Site Specific Management Plans as reviewed by TAC and approved by USFWS and CDFG. Reduction of buffers may occur only where: (1) there is clear evidence that the buffer is unnecessary (e.g., the reserve site is adjacent to another reserve or similar natural habitat); (2) it is determined that buffers are not the best use of reserve land; and, (3) that the lack of buffers will not create use conflicts for owners of property adjacent to the reserve (e.g., issues of vector control or other nuisance). Decisions about the need for buffers and buffer widths shall be included in the management plan(s) for any given parcel or block of reserve land (see below, Section IV.C.1.d.).

Thus, the presence, width, or extent of buffers may vary with the situation, as long as they adequately reduce population mortality effects. For example, if the reserve lands are adjacent to other protected natural habitat or open space, then buffer widths could be reduced or eliminated.

d. Connectivity

A primary goal of the NBHCP is to ensure connectivity between individual reserves, and connectivity between reserves and surrounding agricultural lands. Connections can be provided on along land, through water and through air to enable the necessary mobility of species within their ranges. One primary means of connection between water areas will be the drainage/irrigation canals within the Basin. Under the management of RD 1000 and Natomas Mutual, this system of canals will be managed to enhance habitat values and minimize harm to Covered Species as specified in the NBHCP.

The NBHCP conservation strategy emphasizes maintaining connectivity between TNBC reserves to allow giant garter snake movement within the Natomas Basin. This species is highlighted for two reasons: 1) giant garter snake is the most prevalent Covered Species within the Basin that requires land/water connectivity to travel within the Basin and 2) if adequate connectivity is provided for giant garter snake, then it is anticipated that other Covered Species will also be afforded adequate opportunities to migrate within the Basin.

The primary opportunity for connectivity between reserves is the system of channels maintained and operated by RD 1000 and Natomas Mutual. RD 1000 and Natomas Mutual anticipate continuing the maintenance and operation of the canals into the future. These Water Agencies have noted that the elimination of existing channels within the Land Use Agencies' Permit Areas would generally only occur in response to urban development. Because TNBC, under the guidelines of the NBHCP, generally acquires land separated from urban development, it is anticipated that urban development impacts on channels adjacent to reserves will be minimal.

The Water Agencies have not elected to apply for incidental take permits through this NBHCP, but may elect to pursue permits either through this Plan as written or through a modified version of this plan in the future. As such, this NBHCP and the related EIR/EIS have assessed the effectiveness of the NBHCP in the event the Water Agencies choose to participate or should they choose not to participate in the

NBHCP. Since the canal system operated by Water Agencies provides the key movement corridors for the GGS, as identified through monitoring, the NBHCP acknowledges the process of avoidance and mitigation of impacts to GGS and connectivity in the event a canal essential to the GGS is closed. Once TNBC reserves have been acquired and key connectivity corridors have been identified, changes in water delivery and drainage operations affecting key channels must be considered by TNBC and appropriate actions shall be taken to ensure connectivity is maintained between reserves, thus ensuring connectivity throughout the reserve system. One of the mechanisms identified in the NBHCP to ensure viability of the reserve system is through relocating reserve components. Other options, which could be used to maintain integrity of existing reserves, include MOAs, easements, and outright purchases of land, which would be designed to ensure connectivity for GGS between TNBC reserves.

Since the system of canals in the Natomas Basin has shown the presence of the GGS and is known as habitat for the GGS, the NBHCP does not include the closure of canals as a Covered Activity. In other words, the proposed Covered Activities of the Water Agencies (See Chapter I, Covered Activities) do not include closure of canals or substantial modifications of canals, which may be subject to Section 404 of the Clean Water Act. Therefore, in the event of a proposed canal closure, the Water Agency (or project sponsor for canal closure) would likely be required to comply with the ESA and mitigate impacts under either Section 10 of the ESA (amendment of the NBHCP if the Water Agencies participate in this HCP effort, or preparation of a separate HCP) or Section 7, if federal funds or federal approval is required (as in the case of Section 404 Clean Water Act permits). Under either of these processes, direct impacts to the GGS as well as indirect impacts to the NBHCP/TNBC reserve system would be considered by USFWS and CDFG and would be mitigated by the Water Agency and/or project sponsor. Where possible, this HCP contemplates that the USFWS will support granting of MOAs or transfer easements or land in fee title to the TNBC to reduce impacts to the GGS and preserve connectivity of habitat areas between reserves in the Natomas Basin. In the event TNBC purchases essential canals to protect the GGS and connectivity, such acquisition shall be considered part of the reserve system, shall be counted as Mitigation Lands, and shall not be subject to the minimum reserve size, buffer and setback criteria established in the NBHCP for typical Mitigation Land reserves.

While TNBC will be the entity directly responsible for implementing measures to maintain connectivity between TNBC reserves, it is ultimately the obligation of the Land Use Agency Permittees to ensure that the NBHCP Operating Conservation Plan succeeds in achieving the goals and objective of the NBHCP. If it is determined that adequate connectivity is not being maintained within the Basin, then the Land Use Agencies' incidental take permits will be at risk. Under such circumstances, the Land Use Agencies would be obligated to provide TNBC with the means to maintain adequate connectivity, possibly through increasing the NBHCP Mitigation fee, seeking outside funding sources to enhance connectivity between TNBC reserves, or other strategies available to the Land Use Agencies.

With regard to basin-wide connectivity, RD 1000 has identified key drainage channels (see Figure 17) that provide the backbone drainage system within the Basin and would be retained regardless of urban development. Urban development in the Natomas Basin relies on the system of canals for flood protection

and to convey storm water runoff to the rivers. As evidenced on Figure 17, the channels of RD 1000 and Natomas Mutual are extensive throughout the Natomas Basin. The combination of primary drainage channels (drainage channels anticipated to remain through the term of the Permits), secondary drainage channels (which tend to remain unless affected by urban development), and irrigation channels provide substantial connectivity between the existing TNBC reserves. The system of canals identified on Figure 17, is anticipated to remain to serve both approved urban development and also provide the backbone of canal connections between reserves. In addition to the primary drainage structures identified on Figure 17, the one-mile wide Swainson's Hawk Zone has been excluded from the Sutter County Permit Area. This land will remain undeveloped until such time as the County addresses impacts to listed species. As such, this land is anticipated to remain available for purposes of biological connectivity. In addition to the major canal within the Swainson's Hawk Zone that is identified on Figure 17, there are numerous lesser canals operated by RD 1000 and Natomas Mutual, as well as lesser irrigation canals operated by individual farmers. Therefore, it is anticipated that this area will continue to provide connectivity between present and future reserves located in Sacramento and Sutter Counties.

As noted above, any substantial change to the connectivity of reserves that would affect Covered Species will be considered by the TNBC Board and TAC and Adaptive Management strategies, or longer term channel control strategies such as MOA's, MOU's, and easements will be considered and implemented as feasible and appropriate to ensure connectivity is maintained. This decrease in connectivity is considered a relatively remote circumstance since the system of canals identified in Figure 17 are essential for flood control and drainage in the Basin.

In addition to the channel connectivity described above, TNBC will consolidate reserve acquisitions during the fifty (50) year life of the permits in order to build larger blocks of habitat reserve lands. Minimum requirements for reserve sizes are discussed below. The connectivity promoted through TNBC acquisitions will reduce isolation of habitat reserves, thereby increasing the long-term viability of wildlife populations within the Natomas Basin.

In addition to promoting connectivity between reserves and surrounding agriculture, the Land Use Agencies, through their adopted general plans, community plans, and specific plans, will promote compact urban development within limited portions of the Natomas Basin. The boundaries of City of Sacramento and Metro Air Park development are clearly defined and well consolidated. Urban development within Sutter County will be limited to the Industrial/Commercial Reserve (exclusive of that portion of the Industrial/Commercial Reserve within the SHZ), an area totaling 8,575 acres within the Natomas Basin. A total of 7,467 acres of development is allowed within this area under the NBHCP, leaving 1,100 acres within the Industrial/Commercial Reserve with no take coverage under the NBHCP. Because of the cost of constructing and extending facilities and roads, development in Sutter County will be consolidated and will follow the footprint of the Permit Area shown for Sutter County. Additionally, during Sutter County's Mid-Point Review, development patterns shall be analyzed to determine whether the remainder 1,100 acres of habitat within the Industrial/Commercial Reserve is becoming fragmented.

Additional connectivity review measures shall include Plan Operator approval to grant access across reserve lands for canal modification unless the authority for such access already exists. The Plan Operator's approval of any canal modification on Mitigation Lands will be contingent upon Wildlife Agency review.

While the NBHCP allows for the participation of the Water Agencies, such participation is not anticipated until outstanding issues affecting the Water Agencies are resolved. Because the NBHCP does not contemplate coverage for canal closure or substantially modified canal management guidelines for the Water Agencies, whether or not the Water Agency participates in the NBHCP will not substantially affect connectivity between TNBC reserves.

e. Foraging Habitat

The NBHCP Operating Conservation Program provides avoidance, take minimization and mitigation for impacts to Covered Species. An underlying assumption of the NBHCP is that the system of reserves comprising the Mitigation Lands, in conjunction with foraging opportunities within the general area, will provide for the long-term viability of Covered Species within the Natomas Basin. While these additional foraging areas will not be under the control of TNBC, are not mitigation included in the NBHCP, and the Land Use Agency Permittees have limited control over the use of such lands, the presence of foraging lands outside of TNBC reserves supports various Covered Species, in particular, the Swainson's hawk.

Analysis of the effectiveness of the NBHCP is based on the assumption that some portion of the existing foraging habitat would remain outside of the Permit Areas as development occurs under the NBHCP. This assumption is based on the following historic land use patterns, adopted general plans and policies, state and Federal regulations and provisions of the NBHCP:

1. Outside of the Permit Areas, limited changes to existing land uses are allowed by right, including development of individual homes on existing agricultural parcels (e.g., 1 dwelling unit on 40-acre parcels). Based on data available as of 2002, historic land use patterns indicate that approximately 377 acres within the entire 53,537 acres of the Basin are in rural residential uses. Substantial increases in this type of land use are not anticipated over the life of the NBHCP due to (a) the limited amount of such development which has occurred historically in the Basin, (b) the County of Sutter and the County of Sacramento General Plan and zoning designations limiting most land to agricultural and open space uses, (c) the large parcel sizes of Basin land outside of the Permit Areas, and (d) limitations on the provision of water and sewer services to areas located outside of the Sacramento County Urban Services Boundary and the City of Sacramento Sphere of Influence.

2. Under the adopted land use plans and policies, extensive analysis and amendments to the adopted plans and policies would be required prior to the approval of urban development outside of the Permit Areas. If such changes in land use were to occur during the 50-year life of the NBHCP,

conversion of Basin lands from agricultural and open space uses to urban uses, beyond the 17,500 acres of Planned Development and outside the Permit Areas, very likely would only result from the expansion of Sacramento International Airport, expanded development by the City or Sutter beyond the NBHCP Planned Development, or other urban development within Sacramento County. Expansion of the airport would require amendments to the Airport Master Plan, as well as local and federal approvals. Conversion of undeveloped lands to urban development within the remaining Sacramento County or the City of Sacramento portions of the Basin outside the Permit Areas would require either expansion of the City's Sphere of Influence or adjustments to the County's Urban Services Boundary, approval by the Local Agency Formation Commission, general plan amendments, rezoning, and changes in policies regarding the provision of services. Urban development within Sutter County beyond the NBHCP Authorized Development or outside the Sutter Permit Area also would trigger general plan amendments, specific plans, and rezoning.

3. Under the provisions of the NBHCP, neither the City or Sutter County may approve any urban development beyond the Authorized Development until the applicable Permittee conducts an evaluation of the effects of the additional development on the NBHCP's Operating Conservation Program, and the City's or the County's permit is amended to include the new areas or a new permit is issued for such additional areas. If such development is proposed and take associated with this development is authorized through either amended or new incidental take permits, the mitigation requirements applied to the additional development may vary from those established under the NBHCP. However, authorization of such additional development under a permit amendment or new permit would not alter the mitigation requirements established for the 15,517 acres of Authorized Development addressed under this NBHCP.

4. Discretionary actions including the actions described in Item 2, above which are required for the approval of major urban development by the City of Sacramento, the County of Sutter or the County of Sacramento are subject to review under CEQA. In accordance with CEQA, such analysis would consider both the effects of the actions on federal and state-listed species and the effects of the actions on the effectiveness of the NBHCP.

5. In the event Sacramento County proposes to expand the Sacramento International Airport, such actions would be subject to Section 7 review under the ESA, CESA compliance, and CEQA and NEPA analyses. As part of these reviews, Sacramento County would be required to evaluate the effects of such activities on state and federally-listed species and the NBHCP.

Notwithstanding the above discussion, in the 50-year term of the NBHCP and ITPs, it is possible that changes in the existing land uses outside the Permit Areas and within the Basin could occur over time that could impact foraging habitat anticipated under the NBHCP Operating Conservation Program. Analysis completed for the NBHCP determined that 9,188 acres of Swainson's hawk foraging habitat would be impacted by take authorized under the Natomas and MAP ITPs. Under the two HCP's, 3,372 acres of high and moderate quality upland habitat would be provided within TNBC Mitigation Land

reserves. Additionally, Sutter County's Permit Area specifically excludes 1,015 acres of the Sutter Industrial/Commercial Reserve and the County will process a general plan amendment to redesignate this land to Agriculture. This 4,387 acres of Mitigation Land and avoidance of Sutter urban development impacts, in conjunction with nesting and foraging habitat retained in the Swainson's Hawk Zone, and the NBHCP's avoidance, minimization and mitigation measures, fully mitigates the impacts of take of foraging habitat resulting from Planned Development. In addition to the 4,387 acres affected by the NBHCP, additional lands within and directly adjacent to the Plan Area are anticipated to continue to provide foraging habitat for Swainson's hawk, as described in Table IV-2.

TABLE IV-2
AVAILABLE FORAGING OPPORTUNITIES

Within Basin & TNBC Permit Area	**Acreage**
Available Foraging Provided Under NBHCP	4,387
Other Lands Available for Foraging Within Sutter County[1]	3,632
Other Lands Available for Foraging Within Sacramento County[2]	10,756

1 Includes Triangle Parcel, levee slopes, and agricultural zoned lands
2 Includes agricultural zoned lands, airport buffer lands, Sacramento County portion of Swainson Hawk's zone

Although the existing baseline foraging habitat is not considered mitigation under the NBHCP, the NBHCP adaptive management program is designed to respond to changes in baseline habitat which could occur if existing undeveloped lands in the Basin were converted to urban uses. As part of the Overall NBHCP Program Review and the Independent Program Reviews (see NBHCP Sections VI.I and VI.J), a general evaluation of Basin land uses will be conducted to determine whether amendments to adopted General Plan land use designations, master plan amendments, specific plan adoption or amendments, or rezonings to allow urban land uses outside the Permit Areas have the potential to adversely affect the NBHCP Operating Conservation Plan. In the event that foraging opportunities, as identified in Table IV-2, are converted to urban uses without adequate provisions to maintain foraging habitat, such that the effectiveness of the NBHCP Operating Conservation Program is potentially compromised, the City and Sutter County would consider and TNBC, on behalf of the City and Sutter, would implement appropriate actions, including the following or similar measures:

1. Modification of acquisition criteria to adjust for impacts to foraging habitat outside of reserves.

2. Substitution of reserve sites that have not been restored and are impacted by substantial land use changes, with replacement reserve sites that would provide improved foraging habitat opportunities.

3. Modification of the percentages of the habitat types comprising the TNBC reserve sites. Such modifications would be applied prospectively to future TNBC acquisitions and would not affect existing, improved TNBC reserves.

4. Pursuit of outside funding sources, including private, state and Federal grants, to acquire, improve and manage additional TNBC reserves that would maintain Basin foraging lands. TNBC would be responsible for preparing grant applications or undertaking other actions, as necessary, to secure these funds. Such programs would supplement the Mitigation Fees required by the NBHCP and would not be used to fund NBHCP mitigation obligations. Lack of outside funding would not preclude the City and Sutter County's obligation to implement appropriate action consistent with this provision and their respective obligations under the NBHCP.

f. 2,500-Acre/400-Acre Minimum Habitat Block Size Requirements

In order to ensure adequately sized reserves that will support long-term viability of Covered Species, the NBHCP requires that by the end of the 50 year permits, one habitat block within the reserve system shall be a minimum of 2,500 acres in size and the balance of reserve lands shall be in habitat blocks that are a minimum of 400 acres in size. It must be understood that these are minimum sizes of reserve land holdings which will be acquired over time. Also, TNBC with the approval of the Wildlife Agencies, may acquire properties smaller than 400 acres in size where biological resources merit such acquisitions.

TNBC will always have the flexibility to buy land in smaller blocks in order to eventually build up its land holdings to the required sizes by the end of 50 years. In addition, at times TNBC may determine that smaller reserves have biological significance and should be preserved. Moreover, TNBC will be able to sell or lease land in order to accomplish this minimum block requirement and other goals of the plan. Based upon the recent progress of TNBC in acquiring contiguous properties for the establishment of habitat reserves, the City and Sutter County anticipate successfully meeting the NBHCP minimum size objectives for reserve land acquisition within 50 years. Within the western portion of the Natomas Basin in Sutter County, TNBC now holds three contiguous properties and two nearby contiguous properties that total 1,071.6 acres.

After development of reserves and analysis of the function of reserves less than 400 acres in size, compelling evidence in support of reserves less than 400 acres in size may be discovered. In such cases, it would not be the intent of the NBHCP to sacrifice high quality sites of less than 400 acres in size in order to develop larger, but less biologically valuable, reserve sites.

Basis for the 2,500 Acre / 400 Acre Reserves Sizes: The basis for the 400 acres minimum block and 2,500 acre reserve block size is: 1) large blocks minimize the "perimeter effect," 2) large blocks promote biodiversity by allowing multiple species and niches to occupy the site, and 3) the benefit to genetic diversity of dispersing interconnected reserves throughout the Natomas Basin, and 4) the 400 acre reserve size is considered the minimum size to allow persistence of Covered Species.

The large block reserve site results in less perimeter relative to the area of the site. A lower ratio of perimeter to area is an advantage because it reduces the potential incompatible interface between the

reserve site and surrounding land uses. The information below shows the perimeter/ area ratio for three differently sized reserve sites:

Reserve Size (acres)	Perimeter (lin. ft.)	Area (acres)	Perimeter/Area Ratio
10	2,640	10	264 : 1
400	16,697	400	42 : 1
2,500	41,744	2,500	17 : 1

The larger reserve block results in more biodiversity on the site. A mosaic of habitats can be created on a reserve site which supplies more habitat types than a monoculture of habitat. The mosaic of habitat types encourages more types of species to fill the greater number of niches provided on site. A larger block also provides more efficient management, improved monitoring and an overall economy of scale. This reduced cost of management can be used for additional enhancement and adaptive management on the reserves.

The 400 acre blocks of reserves interconnected by waterways and dispersed throughout the Basin are beneficial to the reserve system because such a system allows for greater genetic intermixing of subpopulations, particularly amongst giant garter snake sub-populations. This system of interconnected waterways, operated by RD1000 and Natomas Mutual, will provide irrigation water delivery and flood control throughout the Basin, thereby providing connectivity between TNBC reserves.

*Review of Progress on 2,500 Acre / 400 Acre Reserve Size*s: Notwithstanding TNBC's success in the Natomas Basin to date, in order to further ensure that the 2,500 acre reserve objective and the 400 acre minimum reserve size objective are met, the City of Sacramento and Sutter County will each conduct an Independent Mid-Point Review to verify that appropriate progress is achieved in meeting the reserve size objectives. Additionally, an Overall Program Review is required once approval for 9,000 acres of Authorized Development under the NBHCP has been granted by the Land Use Agencies. The timing of these program reviews is discussed in Sections VI.I and VI.J.

2. Reserve Acquisition Guidelines and Criteria

Described below are criteria that TNBC and the NBHCP TAC shall consider when evaluating potential reserve acquisitions.

a. Setbacks Adjacent to Reserve Lands

Setback zones shall be considered prior to the acquisition of reserve lands. The purpose of the setback requirement is to minimize the impacts of conflicts of reserve lands and nearby existing development or lands that are designated for urban development by one of the Land Use Agencies on one another. The setback zone functions as a limitation on where reserve lands can be located. However, the

reserve land setback zone does not affect the ability of each of the Land Use Agencies to approve development within the setback zone and adjacent to the boundaries of reserve lands.

Width of Setback Zone: All mitigation lands acquired by TNBC or for which conservation easements are obtained shall, at the time of acquisition and with the exceptions described below, be situated a minimum of 800 feet from existing urban lands or lands that are designated for urban uses in an adopted general plan. For purposes of this provision, "existing urban lands" means lands that are intensively or completely developed for urban, commercial, or residential uses or are adjacent to or within the immediate vicinity of intensively developed areas, such that the direct and indirect effects of such development are significantly incompatible with the objectives and purposes of the reserve system and would be likely to have significant adverse effects on reserve viability or on Covered Species inhabiting the reserve lands. Lands that are located within either the City of Sacramento's or Sutter County's Permit Area shall not be acquired or accepted as TNBC Mitigation Lands without the prior review and approval by the decision making body of the Land Use Agency Permittee within which the proposed Mitigation Land is located.

Exception: Mitigation lands or easements that do not comply with the 800-foot setback requirement may be acquired on a case-by-case basis, if: (1) NBHCP's Technical Advisory Committee, including its USFWS and CDFG representatives, concur unanimously in a decision to reduce the setback distance; or (2) if not unanimous, the USFWS and CDFG concur in writing that a reduction in the setback distance is necessary or appropriate. For example, the reserve site acquired by TNBC on the west side of Fisherman's Lake was acquired because the high quality of the site warranted the acquisition, in spite of the less than 800 foot setback from designated urban lands. If TNBC proposes to establish all or part of the 800-foot setback on TNBC mitigation land (that is, the setback would be part of the reserve system), the USFWS and CDFG must review the status and adequacy of the area as mitigation land on a case-by-case basis and approve any such decision or purchase in writing. If TNBC proposes an acquisition that would result in a setback of less than 800-feet from urban development and the USFWS and CDFG approve such an acquisition, then the rationale for decisions about setback distances shall be included in the management plan(s) for any given parcel or block of reserve land.

Use of Setback Zone Land: Lands in the 800 foot setback zone between urban development and reserve areas should be in agriculture or another open-space or non-urban use. However, such lands will not likely be under the control of TNBC and will not count as mitigation land. The purpose of the 800-foot setback requirement is to ensure that reserve lands, to the maximum extent practicable, are not established near or adjacent to existing or reasonably foreseeable incompatible urban land uses. The setback standard is also intended not to impose an obligation on TNBC or the owners of the setback lands to manage such lands in any particular fashion. Thus, it is the responsibility of TNBC to locate reserve lands sufficiently far from urban areas or from lands designated for urban uses to fulfill this requirement; however, the setback requirement applies only to land acquisition by TNBC and is not to be construed as a land use restriction on privately owned land within 800 feet of any land within the NBHCP reserve system.

Review of Setbacks: The status and adequacy of the setback criteria will be reviewed and, where necessary and appropriate as determined by the USFWS and CDFG amended or corrected during the individual Permittees' (City of Sacramento and Sutter County) Independent Mid-Point Reviews and the NBHCP 9,000-acre Overall Program Review described in Section VI.I. and J. for future reserve acquisitions.

b. Out-of-Basin Reserves

Most mitigation lands under the NBHCP will be situated inside the Natomas Basin. However, the Plan recognizes one potential out-of-Basin mitigation area, shown in Figure 20, Out-of-Basin Mitigation Area. Area "B" is a 60,000-acre area of agricultural land, north of the Basin within Sutter County. While the overall habitat values and presence of Covered Species within Area B are not as will documented as within the interior of the Natomas Basin, giant garter snake presence has been confirmed in Area B. Area "B" is not within the Permit Area of Sutter County; thus, incidental take of Covered Species resulting from development in this area would not be covered by the Sutter County's ITP's. However, any take associated with management and habitat enhancement conducted by TNBC in reserve areas within Area "B" would be covered by the TNBC permits (see Section V.A).

Under the NBHCP, up to 20 percent of the reserve lands may be established in Area "B," if approved in writing by USFWS and CDFG based on available scientific information that a reserve of adequate size, viability, and habitat value can be established in this area and can support a population of giant garter snakes, Swainson's hawk and/or other Covered Species. Acquisition of reserve lands in Area "B" may occur if: (1) the NBHCP Technical Advisory Committee, including its USFWS and CDFG representatives, concur unanimously in a decision to acquire reserve lands in Area "B" and the reasons for such decision are clearly documented in the TNBC's administrative record; or (2) if not unanimous, TNBC submits a proposal for such an acquisition in writing to the USFWS and CDFG, together with an explanation of how and why the acquisition would benefit the NBHCP's reserve system and be consistent with reserve system and overall Plan goals and objectives, and the USFWS and CDFG concur with the acquisition in writing. Generally, the NBHCP assumes that flood bypass areas or other areas in Area "B" that experience deep flooding will not be acceptable as mitigation lands unless they are specially managed to meet giant garter snake needs.

Area B Acquisition Criteria

The purpose of allowing out-of-Basin reserves is to provide an alternative method for achieving the NBHCP reserve objectives that preserve suitable habitat with high habitat values, that reduces the impact of TNBC acquisitions on continuing farming in the Basin, and that allows acquisition of potentially lower cost lands that support the goals and objectives of the NBHCP. At a minimum, such acquisitions must be consistent with the NBHCP's Conservation Strategies (see above, Section IV.C.1), reserve acquisition criteria (see Section IV.C.2), and provide clear benefits to the Covered Species of the NBHCP.

In reviewing Area B acquisitions, the Wildlife Agencies shall consider the effect of acquiring out-of-Basin reserves on the viability of Covered Species populations within the Basin.

In addition to the value of proposed acquisition lands in meeting the biological goals and objectives of the NBHCP, the following factors shall be taken into consideration should TNBC seek to pursue or acquire lands in Area B:

(1) To preserve a balance, no more than 20% of the total reserve system at any given time shall be located in Area B.

(2) Area B sites may be considered and purchased when market conditions in the Natomas Basin serve as a limiting factor to successful, timely and cost effective land acquisitions in the Basin. For example, if there is a limited inventory of available land (willing seller at a reasonable price) within the basin, and/or such parcels have limited habitat value or do not meet major portions of the reserve acquisition criteria and goals, then the TNBC Board may seek acquisition of parcels in Area B.

(3) Specific circumstances under which Area B acquisitions might be appropriate include land costs for appropriate land within the Basin that are in excess of the established fair market land acquisition price established in the latest NBHCP Fee Report, or inability to conclude transactions within a reasonable time frame (approximately 6 months of initiation of negotiations).

If out-of-Basin reserve lands are acquired in Area "B" as described above, TNBC shall be responsible for managing such lands in accordance with Section IV.D below, unless: (1) another reliable, willing reserve manager for such lands is located; (2) management of such lands by another land manager is consistent with all applicable conditions of the NBHCP; and (3) such land manager continues to be subject to and to act under the direct control of TNBC; and (4) delegation of management authority to such a reserve manager is authorized by the USFWS and CDFG in writing and through revision of the NBHCP and Implementation Agreement if necessary. If TNBC desires to delegate ownership or management of any reserve lands to a third party without retaining direct control over such third party, then, in addition to the measures identified in (4) above, such delegation must be processed as an amendment to TNBC's permits and the third party must obtain separate incidental take permits.

The purpose of allowing out-of-Basin reserves is to provide an alternative method for achieving the NBHCP reserve objectives, to reduce the potential cost of establishing reserve areas by allowing acquisition of potentially lower-cost land that supports suitable habitat with high habitat values, and to reduce the impact of TNBC acquisitions on continuing farming in the Basin. However, at a minimum, such acquisitions must be consistent with the NBHCP's Conservation Strategies (see above, Section IV.C.1), reserve acquisition criteria (see Section IV.C.2), and provide clear benefit to the Covered Species of the Natomas Basin.

In summary, it is currently expected that at least 80 percent of the NBHCP's reserve lands will be established within the Natomas Basin, and up to 20 percent of the total mitigation lands required by the Plan may be acquired out-of-Basin pursuant to compliance with the criteria established above.

c. Mitigation of Effects Related to Sale or Transfer of Habitat Mitigation Reserve Sites

(1) Requirement to Mitigate Impacts Resulting from Real Estate, Right of Way or Other Acquisitions or Uses Affecting TNBC Lands. In the event public works projects or other projects require acquisition of mitigation lands operated by the TNBC, the sponsor of such activity shall be required to mitigate the impacts to the reserve system. At a minimum, the sponsor of such activities shall pay for the value of replacing every acre of reserve land impacted, and may be required to also pay for direct and indirect impacts related to the established (existing, enhanced, or restored) habitat value on the land. In addition to compensating TNBC for lost habitat reserves, such an agency shall also provide mitigation as determined appropriate to mitigate the impacts of the project that necessitated the elimination of the Mitigation Lands reserve. Such additional mitigation may include payment of the NBHCP Mitigation Fee and implementation of appropriate measures to avoid and minimize take of Covered Species. This provision for example, may apply to an agency that is requiring rights of way on TNBC lands or other activities that result in the sale or loss of reserve lands for public necessity.

(2) Requirement to Compensate for Habitat Value in the Event of Sale or Trade of a TNBC Reserve Site. In the event the TNBC Board of Directors decides to voluntarily sell or trade a Mitigation Lands reserve site, the TNBC Board shall ensure that the terms of the sale or trade include coverage for the costs or value of replacing each acre of Mitigation Lands impacted, and estimated direct and indirect impacts related to the established (existing, enhanced or restored) habitat value on the land. In the event a TNBC reserve is sold or transferred for purposes of urban development within the Permit Area(s) of the NBHCP, the developer shall also comply with the obligations of the NBHCP, including but not limited to payment of the Mitigation Fee and implementation of applicable measures specified in Chapters IV and V of the NBHCP.

d. <u>Overall Acquisition Criteria</u>

TNBC will apply the following criteria when evaluating potential reserve acquisitions. Additional criteria for primarily wetland reserves and primarily upland reserves are provided in the following sections. Prior to acquiring Mitigation Land, TNBC shall conduct a Pre-Acquisition field reconnaissance to determine the suitability of the proposed site as habitat for Covered Species and the type of habitat and associated species present on the site. This will be an overview assessment and not a full biological assessment. The purpose of this survey is to determine the potential and/or limiting factors for establishment fo habitat for Covered Species.

(1) The NBHCP provides for a general division of habitat types within TNBC's system of reserves as follows: 25% managed marsh; 50% rice production; and, 25% upland habitat.

The percentages described herein apply to the entire TNBC system of reserves and percentages within individual reserves will vary from the percentages described above. While percentages of land use types within individual reserves will vary based on site-specific conditions, the reserve system will generally contain a combination of appropriate habitats that reflect characteristics of the reserve site. For example, a reserve site may be appropriate for upland habitat and not suited to rice production or managed marsh. Therefore, a TNBC reserve site could contain only upland habitat and no managed marsh or rice production. Alternatively, a reserve may consist entirely of rice, or may be primarily marsh with a small percentage of upland habitat.

(2) Land has legal water rights to an adequate water supply to serve the anticipated uses (wetland or upland) of the proposed reserve. This would normally mean rights to water from the Natomas Mutual (or its equivalent supplier if outside the Basin), but may solely include groundwater if a groundwater well or wells exist on the property and that such wells can meet acceptable water quantity and quality needs.

(3) Land is capable of supporting appropriate agricultural cultivation in conjunction with either wetland or upland habitat reserve.

(4) Land is capable of either supporting or being improved to support various Covered Species associated with the anticipated type of habitat (wetland or upland) proposed for the potential reserve.

(5) Upland or wetland specific criteria, as described in the following sections, will be applied as determined appropriate by TNBC in consultation with the TAC.

(6) Land is adequately removed from incompatible urban development or uses (see Section IV.C.2.a. above).

(7) Habitat reserves will be established by TNBC in consultation with the TAC. Prior to purchase, all lands being considered for acquisition will be submitted to USFWS and CDFG for review and concurrence; such concurrence will be required before any land acquisitions are completed. However, formal USFWS and CDFG concurrence may be waived, provided that NBHCP's TAC, including the USFWS and CDFG representatives, unanimously concur in the proposed acquisition and that documentation of such concurrence is placed into TNBC's administrative record. If, however, there is not TAC concurrence and the TNBC's Board of Directors approves an action pursuant to this section in a regular, noticed meeting of the Board, then following the 60th day after TNBC has notified CDFG and USFWS of the proposed action, in writing by CDFG or USFWS, it is approved unless denied in writing by CDFG and USFWS .

3. Conservation Strategy for Wetland Habitat as Mitigation for Urban Development

a. Establishment and Management of Wetland Habitats

Wetland reserves are intended to provide for the long-term protection of existing and potential wetland species populations in the Basin, including the giant garter snake. In most cases, wetland reserves established for the giant garter snake will also be planned to benefit other wetland-associated Covered Species, including a range of wetland associated species such as tricolored blackbird, northwestern pond turtle and Delta tule pea. Consequently, selection of wetland reserve sites will usually focus on the needs of the giant garter snake, except in cases where, in the judgement of TNBC and the Technical Advisory Committee, specific or important needs of other wetland-associated species can be met at sites not selected primarily for giant garter snake.

A primary goal of the NBHCP is to create a system of reserves, with wetland habitats and associated uplands, that would support populations of the giant garter snake and other Covered Species which co-exist with the garter snake in the same habitat.

A primary goal of the NBHCP is to create a system of reserves, with wetland habitats and associated uplands, that would support populations of the giant garter snake and other Covered Species which co-exist with the garter snake in the same habitat. Generally habitat which supports the giant garter snake will also be of habitat value to other associated wetland species. For example, the wetland reserve management policies are designed to ensure that a water regime which provides for inundation of wetland areas to support the needs of multiple species including spring and summer inundations to support the giant garter snake, and other Covered Species that are aquatic breeders (California tiger salamander). Seasonal inundations in the fall will support waterfowl such as the Aleutian Canada goose. The wetland reserve criteria also includes upland areas within marshes for cover and hibernicula needed for a number of covered wetland species including the giant garter snake, the western pond turtle and others. Upland areas of marsh will also be designed to support habitat for the tricolored blackbird, burrowing owl and loggerhead shrike. Each Site Specific Management Plan will consider the optimal reserve restoration and management regime to support the wetland associated covered species.

b. Wetland Reserve Acquisition Criteria/Methodology

The following guidelines will be used to identify lands for wetland reserve area acquisition (see Section C.3.e below for additional reserve acquisition criteria for rice fields):

(1) Land has existing or potential wetland habitat values that currently support or can support, with necessary enhancement and restoration, giant garter snakes and other wetland associated Covered Species.

(2) Land contains soils that can support rice farming or the type of managed marsh wetlands proposed in the Plan (see Section IV.C.3.d. below).

(3) Blocks of reserve lands must also be hydrologically connected to other blocks through irrigation and drainage systems or other systems to ensure connectivity and opportunity for travel by giant garter snakes between sections of the reserve system. To the extent practicable, reserve lands should also be near or adjacent to other protected habitat lands; this would increase the overall effectiveness and size of protected lands in the Basin for Covered Species.

(4) Lands selected to provide for the NBHCP wetland habitat system shall be situated outside areas known to regularly receive deep flood waters (e.g., the Yolo and Sutter Bypasses). They shall also be situated so that they do not directly receive runoff from paved surfaces or inflow from urban storm water drainage systems.

c. Protection from Flooding

Flood water can destroy giant garter snake underground retreats by (1) liquefying the fine clay-silt substrate, allowing tunnels to collapse; (2) saturating the substrate with water, allowing the soil to swell and thus eliminating deep cracks that had been created by shrinking during a previous drying of the soil; (3) exposing slopes lying below the high water mark to the erosive force of wave action; and (4) depositing silt that blankets substrate surfaces and covers any underground retreats that survive (1), (2), and (3). While giant garter snakes can survive being flooded from underground retreats (Glenn Wylie, BRD, pers. comm.), such disruptive events are not advantageous either to garter snakes or to management of wetland reserves under the NBHCP.

The drainage regime for managed wetlands or rice fields inside the reserve system shall be designed to ensure that giant garter snake retreats are not inundated when water is drained from ditches, fields, canals or wetland areas. It is also desirable to locate upland habitats inside the wetland reserve system to avoid flooding of winter retreats.

d. Managed Marsh Design/Management

The NBHCP recognizes the wildlife values for many Covered Species associated with natural marsh and managed marsh areas as well as rice fields and seeks to protect, restore, or create such areas through the NBHCP's conservation program. Management of rice fields is discussed in Section.IV.C.3.e below.

Section IV.C.2.c. above currently requires that at least 25% of the land acquired for the NBHCP reserve system be converted into managed marsh wetlands to enhance habitat values for the giant garter snake and other Covered Species. These managed marsh wetlands, together with associated uplands, rice

fields, and water conveyance ditches and canals, are expected to form a mosaic of diverse wetland habitats in the wetland portion of the reserve system that will support giant garter snakes and other wetland associated species. Embedded within an agricultural landscape dominated by rice farming, managed marsh wetlands based on such biological principles should support giant garter snakes as well as many other Covered Species (e.g., white-faced ibis, tricolored blackbird, and northwestern pond turtle).

The specific locations where TNBC will develop managed marsh habitat are not identified in the NBHCP. Such lands will be identified by TNBC as the NBHCP is implemented, and site-specific management and monitoring plans for each managed marsh area will be developed when the site is acquired. When TNBC proposes to acquire a particular land parcel as mitigation, it will submit the proposal to the USFWS and CDFG for review and approval. Development of specific management and monitoring plans for managed marshes and other mitigation lands is discussed in Section IV.D below.

Similarly, the NBHCP does not provide site-specific prescriptions for marsh design and management, but outlines the basic habitat elements needed for managed marshes within the Plan's reserve system to support giant garter snakes and other Covered Species. It is important that these marsh elements, including the water regime and physical structure, are consistent with giant garter snake biology and that, to the extent known, they mimic relevant features of the original marsh complexes of the Central Valley where the giant garter snake evolved, or the rice culture ecosystem that currently supports the snake. These features include, but are not limited to: (1) summer dry-down of seasonal marsh; (2) availability of summer water either as pockets of deeper water that persist in the seasonal marsh or as permanent marsh, located near or adjacent to vegetated banks or suitable upland habitat; (3) open water channels in marsh habitat to provide movement corridors and foraging edge; (4) availability of abundant emergent vegetation and near shore habitat; (5) a good food supply; and (6) availability of diverse habitat elements.

The following describes these managed marsh components and other factors in more detail. Note, however, that the following descriptions for managed marsh design under the NBHCP (including water management and marsh configuration) may be modified throughout the life of the Plan according to its Adaptive Management provisions (see Section VI.F). Marsh management plans will be developed in accordance with Section IV.D below.

Water Regime: The NBHCP's wetland reserves may consist of two types of managed marsh wetlands--seasonal wetlands or permanent wetlands. As its name implies, the first type is flooded seasonally to accomplish a variety of purposes, including benefits to wildlife and vegetation management. The season when such wetlands are flooded depends on the wildlife species being targeted (e.g., spring and summer for giant garter snakes; winter for waterfowl). Though seasonal marsh may have pockets of permanent water as described below, these are the result of deep water areas that are nevertheless within the seasonal wetland, and are therefore considered separately from permanent marsh. Permanent marsh retains water year round.

Seasonal managed marshes will be flooded by about mid-April (if not flooded during the winter) so that water and prey are available when giant garter snakes emerge from winter retreats. Water will be maintained within the managed marsh during the period when rice fields dry down (approximately mid-August). This irrigation regime is intended to provide alternative habitat to GGS as rice fields are drained and concentrate giant garter snake prey species from rice field into canals and managed marshes.

Giant garter snakes are also known to use areas of permanent marsh habitat at Gilsizer Slough, Cosumnes River Preserve and on the Sacramento NWR complex, as well as permanent marsh along Fisherman's Lake in the Natomas Basin. It is considered advantageous to include within the NBHCP's wetland reserve system some areas of permanent marshes and sloughs interspersed with the seasonal marshes, rice fields, and uplands. This will increase the overall habitat diversity of the reserves for the giant garter snake as well as other Covered Species.

Uplands: While a portion of the terrestrial component of the managed marsh system will be designed to meet the buffer requirements of the NBHCP, the rest will be designed and managed to meet the needs of giant garter snakes and other upland Covered Species.

The specific proportion of wetland to upland habitat within a given managed marsh will be determined by TNBC in consultation with the Technical Advisory Committee pursuant to the provisions described in Sections IV.D below. However, a typical proportion for upland habitats within the reserve system would be approximately 20 to 30 percent. Upland areas have several purposes: (1) providing basking and resting sites, escape cover and winter retreats for giant garter snakes; and (2) providing foraging and nesting areas for other Covered Species (e.g., loggerhead shrike, tricolored blackbird, burrowing owl, and Swainson's hawk). Upland areas intended to provide upland habitat for GGS under the NBHCP may consist of dryland pasture, grasslands, levees, and any other land use approved by NBHCP's Technical Advisory Committee.

Giant garter snakes that have been flooded in their winter retreats are subject to many forms of mortality, or may be killed directly by drowning. Therefore, uplands in and around the reserve's managed marshes will be designed so that a significant portion is above expected winter flood levels. They should also provide escape cover where the permanent pools of water described above may attract garter snakes as well as snake predators.

Water Conveyance Structures/Edge: Marsh design should include edge habitat to provide foraging and movement corridors for GGS and other Covered Species. Edge can be created by providing open water channels within marsh to provide open water/emergent vegetation interface. Upland/aquatic habitat interface may also provide edge habitat where sufficient vegetation is present to provide cover for giant garter snake.

Vegetation/Cover: Vegetation in a managed marsh should support a diversity of wildlife. Plant species that currently occur in the emergent marsh habitat found in the Natomas Basin will be included in

the NBHCP's managed marsh wetlands. These include cattails (*Typha latifolia)*, tules (*Scirpus acutus)*, rushes (*Juncus* sp.*)*, river bulrush (*S. fluvialtilis*), sedges (*Carex* sp., *Cyperus* sp.*)*, and vervain (*Verbena hastata)*. Marsh edges and "islands" should be well-vegetated with plants that discourage the movement of garter snake predators, such as herons, egrets, rats, and domestic animals. Plant species such as wildrose and thimbleberry are relatively impenetrable to many predator species but not to giant garter snakes and serve as basking sites for the snakes. For illustration purposes Figure 19 shows an example of a marsh cross section depicting the distribution of wetland plants in relation to flooding depth. This figure does not necessarily reflect a specific marsh design recommended by the NBHCP.

Exotic pest plants, such as giant reed grass and Johnson grass, can choke out native vegetation and have low habitat value. Such exotics will be periodically removed from the reserve system's managed marshes where feasible and necessary. Specific decisions about the need for exotic plant control shall be included in the management plan(s) for any given parcel or block of reserve land (see below, Section IV.D).

Garter snakes utilize a variety of sites for escape cover and winter retreats, including small mammal burrows, thick vegetation such as wildrose and thimbleberry, and areas of jumbled rock such as rip rap, chunks of rock, or broken concrete. Management of wetland reserves under the NBHCP shall thus include protection and/or construction of such types of giant garter snake cover and retreats as deemed appropriate by NBHCP Technical Advisory Committee.

Access: Road kills are believed to be a significant giant garter snake mortality factor, especially for males (see Chapter II). Consequently, new roads within acquired reserve lands will be constructed to the minimum extent necessary to provide for the adequate maintenance of the marshes and other reserve lands. If roads already exist in an area acquired as a reserve, access to these roads will be restricted as necessary to protect the reserves from unnecessary disturbance and as described in the reserve management plans.

Other Factors: Soils are an important factor in designing and constructing managed marshes because they dictate whether water will be retained or lost through percolation. Generally, only those lands within the Natomas Basin that are underlain by clay soils will be conducive to the development of levee constructed managed marshes. Managed marshes must also be kept clear of winter storm runoff coming directly from urban areas. In addition, preserves cannot be used for any additional purpose for flood control or receive directly storm water or other off-site drainage from urban development. Pollutants such as petroleum compounds (e.g., motor oil) in urban runoff have been observed to cause respiratory and skin problems for the giant garter snake and may also reduce its food supply (George Hansen, pers. comm.). Water quality must also be maintained in order to maintain wildlife productivity and preclude the outbreak of wildlife diseases.

Water Control Structures: Managed marshes require a controlled source of good quality water at suitable depths, usually less than three feet (water depth is important to the establishment of appropriate

vegetation). Management and enhancement of a managed marsh can be maximized through water control. A variety of water manipulation approaches can be utilized, including levees, stoplog and screwgate water control structures to regulate water flows and depths, and dewatering systems. In fact, a dewatering system is as important to successful wetland management as a flooding system. Water manipulation can also contribute to control of exotic plants and other undesirable vegetation, wildlife diseases (such as botulism and cholera), non-native fish populations, etc.

Levees constructed on natural contours have been found to be more effective for marsh management than levees constructed across contours. Figure 19, Wetland Plant Depths and Levee Structures, provides examples of the dimensions of levees constructed for: (1) a permanent or semipermanent impoundment; (2) a seasonally flooded impoundment; (3) a header-ditch levee; and (4) a rice-dike levee.

Permanent or semipermanent impoundment levees will be used to create marsh which sets above the natural elevation of the land, much in the same way a bathtub holds water. Header-ditch levees are used along the upper elevation of a field or marsh to create the ditch or canal which brings water to the wetland. Water drops through control structures are then made through the header-ditch levee to the marsh or field. Rice-dike levees are used along natural contours in a rice field to back up water to flood the land. Depending upon the topography and the water conveyance and flooding regimes, TNBC will use a combination of these levee types to develop its marsh and rice wetlands.

Mosquito Control: Mosquito control programs operate throughout Natomas Basin. Generally, conventional mosquito control methods are compatible with garter snake habitat. Use of mosquito fish and low intensity pesticide applications would not directly threaten garter snakes or their habitat, and mosquito fish may actually serve as garter snake prey. However, mosquito control programs are more focused near urban areas, and the more intensive control methods there could harm giant garter snakes. If necessary TNBC should work directly with Mosquito Abatement Districts to determine suitable methods to resolve mosquito problems near urban areas in a manner consistent with the management of giant garter snake wetland habitats established under the NBHCP. The Site Specific Management Plans prepared for each wetland site shall identify appropriate types of mosquito control and shall also be coordinated as necessary with the Mosquito Abatement Districts.

Summary: In summary, the NBHCP wetland conservation strategy is designed to produce a net positive effect for giant garter snake in the Natomas Basin and to contribute to the recovery of the species. In order to achieve this objective, reserve lands established under the NBHCP would consist of a combination of TNBC rice cultivation and managed marsh wetland habitat for giant garter snakes, comprised of a mosaic of habitat types with variations in topography and an abundance of edges within and between habitats. Managed marsh would include seasonal marshes with shallow and deep water configurations; some permanent marshes; and upland habitats in the form of buffers, higher ground resembling the ditch banks, and levees of the Basin's water conveyance system, and "islands" scattered throughout the marshes wetland component. Permanent water features would be constructed so that they

ensure adequate nearby escape cover. A significant portion of the upland component would be above winter flood levels to protect giant garter snakes in their winter retreats. Natural marsh vegetation such as cattails, spike rush, tule clumps, wildrose and thimbleberry would be placed to maximize protected resting and basking sites and escape cover for the snakes.

Consistent with the NBHCP conservation strategy for giant garter snakes, Figure 18, Comparison of a Rice Field to a Managed Marsh, depicts for illustration purposes only, a rice field and a theoretical managed marsh design. As shown on this conceptual diagram, serpentine channels would be constructed throughout the marsh to increase channel habitat. The channels and open water areas would hold water during the summer dry-down, concentrating prey and providing surviving prey with overwintering habitat where water and aquatic invertebrates persist. Terrestrial habitat components, permanently above the flood level, would provide winter retreats as well as basking and resting sites for garter snakes.

Specific marsh designs may vary from the conceptual design illustrated in Figure 18. As explained above, specific marsh configuration and designs will be determined by TNBC in consultation with the Technical Advisory Committee and other species and restoration specialists as reserve system lands are acquired. Also, specific marsh designs will depend on the circumstances on parcels actually acquired, including the parcels' topography, location, relation to other habitats and land uses, and the presence of water conveyance systems. Preferred marsh designs under the NBHCP may change during the life of the Plan under its Adaptive Management procedures described in Section VI.F below.

In some cases, TNBC may be able to acquire an historical marsh area that has been degraded, but retains components of the original marsh, such as topography or plant communities. In such cases, the NBHCP encourages restoration of the historical marsh. Nevertheless, to the extent applicable, the same principles and factors of marsh design and management as described above will guide marsh restoration activities where such restoration opportunities can be found, either in the NBHCP Plan Area or in the out-of-Basin Area "B" as described above.

e. Management of Reserved Rice Lands for the Giant Garter Snake

As explained in Chapter II, the rice growing areas of the Natomas Basin are known to support the giant garter snake (George Hansen, pers. comm.; Glenn Wylie, BRD, pers. comm.). For example, in its ongoing radio-telemetry studies, BRD has found that half of all garter snakes telemetered utilize rice fields at one time or another (Wylie, pers. comm.). The features of these rice lands that support garter snakes appear to include the rice fields themselves, the water conveyance system that supports the fields (including delivery canals, ditches, drains, and their associated levees) and other associated features, such as tailwater marshes. The reasons giant garter snakes persist in this man-made rice culture ecosystem, and why some fields support snakes while others do not, are not fully understood (G. Hansen, pers. comm.). However, it may be because the rice fields, together with their supporting infrastructure, mimic to some extent the area's original marsh and upland habitats. It may also be because the water regime in the rice fields (spring and summer flooding and fall dry-down) coincides fairly closely with the biological needs of the species.

The rice growing ecosystem also appears to provide many of the garter snake's basic habitat needs--e.g., warm, shallow water in the rice fields with sheltering emergent vegetation (e.g., rice plants); ditches and drains, some of which retain water year round and in which giant garter snake prey species (e.g., mosquito fish) can overwinter; and associated upland areas (e.g., levees) with suitable winter retreats.

In any case, the fact that giant garter snakes persist in the Natomas Basin's rice growing areas is well documented. The rice fields themselves support giant garter snakes through the active summer season, and the water conveyance systems that serve the rice fields support snakes throughout the year. The water conveyance systems in many parts of the Basin contain pockets of permanent water where prey such as bullfrog larvae and mosquito fish overwinter, resulting in high prey availability in the spring when snakes emerge from winter retreats and begin to use the aquatic components of the rice ecosystem. The late summer/early fall dry-down of the rice fields may be important by removing predatory fish large enough to prey on giant garter snakes, and because giant garter snake prey, which have been proliferating in the ditches, drains, and rice fields, may be concentrated in the remaining pockets of standing water where snakes can gorge prior to the period of winter inactivity.

What is known about the relationship between rice farming and giant garter snakes is summarized above and in Chapter II. Additional studies are needed to better understand giant garter snake habitat needs, why and under what conditions giant garter snake populations persist where rice is farmed, and what types of reserve management would best benefit this species. Where appropriate, the results of such studies will be incorporated into the NBHCP through the Plan's Adaptive Management provisions (see, Section VI.F). Nevertheless, the NBHCP recognizes that: (1) continued rice farming in the Natomas Basin supports the giant garter snake; and (2) that maintaining rice farming on a significant portion of acquired TNBC reserve lands is--unless otherwise indicated by the Giant Garter Snake Recovery Plan (see Section VI.H.1), the Plan's Adaptive Management and Monitoring programs (Sections VI.F and G), other new scientific information, the individual Mid-Point Reviews, or the 9,000-acre Overall Program Review (Section VI.I)--an integral component of the overall conservation strategy.

With respect to the selection of rice fields for inclusion in the NBHCP reserve system, and subsequent management, the following criteria shall be applied:

(1) Rice fields will generally be selected in areas that are within, or that have connectivity to, known giant garter snake populations or known occupied garter snake habitat.

(2) Rice fields located in areas designated to receive winter flood waters will be avoided (e.g., the Yolo and Sutter Bypasses).

(3) Rice fields in the NBHCP reserve system will be managed to maximize giant garter snake compatibility. This includes maintenance of rice checks, berms, and other water control structures in as natural a state as practicable maintenance of garter snake prey species (e.g., mosquito fish) in or near the rice fields through appropriate management, and other

measures as appropriate. However, any such management will also, to the extent compatible with GGS conservation, be compatible with the needs of commercial rice production.

Specific measures for managing rice fields in the NBHCP's reserve system will be as determined by TNBC in consultation with the Technical Advisory Committee and as described in Reserve Management Plans (see below, Section IV.D).

4. Conservation Strategy for Upland Habitat as Mitigation for Urban Development

a. Establishment and Management of Upland Habitat

The upland habitat conservation strategy is intended to provide for the long-term protection of existing and potential upland habitat in the Basin that currently supports or could support the Swainson's hawk and other upland species listed in Table I-1. In most cases, upland reserves established and managed for the Swainson's hawk will also benefit other upland-associated Covered Species (e.g., the loggerhead shrike and burrowing owl). Consequently, selection of upland reserve sites will usually focus on the needs of the Swainson's hawk, except in cases where, in the judgement of TNBC and the Technical Advisory Committee, specific or important needs of other upland-associated species can be met at sites not selected primarily for Swainson's hawks.

b. Upland Reserve Acquisition Criteria/Methodology

The NBHCP's primary strategies to mitigate impacts to the Swainson's hawk caused by Authorized Development is are to avoid development in the Swainson's Hawk Zone (within the City of Sacramento and Sutter County) and to acquire upland habitat as Mitigation Lands inside the Swainson's Hawk Zone (see Figure 13). However, land outside the zone can be made attractive for the Swainson's hawk through appropriate habitat design as specified elsewhere in the NBHCP and in consultation with the Technical Advisory Committee. These primary strategies will provide optimum nesting and foraging habitat for the hawk in the area where most nesting occurs currently within the Natomas Basin along the Sacramento River. Minimum foraging habitat needed for Swainson's hawk nesting sites can vary depending on prey availability and density, which is in part a function of vegetation cover type within the foraging habitat and the activities (management practices, agricultural activities, etc.) associated with that habitat and proximity to water and other green feed that supports a prey base (Wunder, 1992). The goal of these strategies is to maintain optimum nesting and foraging habitat for the hawks nesting in this zone by providing an abundant and available prey source. In order to optimize the use of the entire Natomas Basin by Swainson's hawks, the Plan also calls for maintenance of nesting and foraging habitat for hawks nesting elsewhere in the Basin, as well as acquisition of reserve lands that benefit the other upland-associated species. In light of these considerations, upland reserve acquisition sites will be evaluated based upon the following criteria:

(1) The land contains known or potential Swainson's hawk nest trees, or includes or is adjacent to suitable foraging habitat (e.g., agricultural croplands and grasslands).

(2) Agricultural croplands and grasslands that, based on crop type or surveys, are expected to have a suitable Swainson's hawk prey base and, preferably, have historically been used by Swainson's hawks (as determined by NDDB or CDFG data and reports).

(3) The land is or can be used to grow crops conducive to Swainson's hawk foraging, including alfalfa and other hay crops, lightly grazed pasture, fallow fields, summer harvested row crops, but not cotton and other late harvest crops (see Section II.C.3.c).

(4) If possible, the land contains appropriate areas for the establishment of riparian woodland habitat, or isolated groves in agricultural fields, for future use by Swainson's hawks. Trees which may be planted include valley oaks, cottonwoods, willows, sycamores, and California walnut.

(5) Contiguity of upland reserve sites will be maximized. The Swainson's hawk conservation objectives in Chapter I direct TNBC to focus acquisition of upland reserves in the Swainson's Hawk Zone. That objective, together with this provision, is intended to ensure that Swainson's hawk habitat protected in reserves will not be excessively fragmented, either inside the Swainson's Hawk Zone or outside the zone, and that habitat contiguity will be a primary criteria under which upland reserve sites will be selected. However, the value of edge habitat with wetlands will be considered in reserve design.

(6) The land supports or has the potential to support other Covered Species which utilize upland habitat (see Tables I-1 and II-4).

Generally, priority for acquiring upland habitat is as follows (in descending priority order): (1) sites located within the Swainson's Hawk Zone; (2) sites that, in the judgement of TNBC and the Technical Advisory Committee, would provide specific, important benefits to other upland-associated Covered Species (e.g., tricolored blackbird nesting colonies); (3) sites supporting Swainson's hawk nests or foraging habitat outside the Swainson's Hawk Zone; (4) sites that would provide a good potential for enhancement of upland habitat values; and (5) any other site that would result in a benefit to any upland Covered Species.

5. Conservation Strategies for Vernal Pool Species as Mitigation for Urban Development

Vernal pools represent important remnants of the natural landscape of the foothills and valley floor of the Central Valley. Resulting from a combination of surface topography (shallow, closed depressions) and soil condition (low permeability), vernal pools support numerous special status species. Ten species associated with vernal pools or other seasonal wetlands are proposed for incidental take coverage under the NBHCP's incidental take permits, including three species of shrimp, five plant species and the western

spadefoot toad and the California tiger salamander. While ten species associated with vernal pool habitats are covered by the NBHCP, only two of the species, vernal pool tadpole shrimp and vernal pool fairy shrimp, have been confirmed within the Natomas Basin.

The primary purpose of listing the vernal pool associated species within the NBHCP is to provide protection to TNBC with regard to the management of future wildlife reserves. It is anticipated that the complex of wetland/upland habitat to be developed by TNBC will provide enhanced opportunities for the establishment and proliferation of these species. In the event these species do benefit from TNBC's efforts, it will be necessary to provide coverage to TNBC for activities that could result in incidental take of protected species.

As noted within this NBHCP, undisturbed areas of vernal pools within the Natomas Basin, as shown in Figures 9 - 11, Habitat Types Maps, are few and relatively small. Other vernal pools and seasonal wetlands that may support vernal pool species may occur throughout the Basin. These vernal pools and other seasonal wetlands may constitute jurisdictional wetlands under U.S. Army Corps of Engineers (Army Corps) authorities under Section 404 of the Clean Water Act. In order to ensure that vernal pools and their associated species are adequately protected on reserve lands, TNBC shall implement the following conservation strategies:

(1) TNBC shall consult with the TAC and California tiger salamander researchers and experts periodically during implementation of the Plan to determine what, if any, additional conservation opportunities for this species might exist within the Plan's proposed reserve system. Such opportunities might include, but are not limited to, establishment or creation of wetland and upland habitats suitable for tiger salamanders within the reserve system (e.g., stock ponds or "artificial" vernal pools) and, if appropriate, possible re-introduction of tiger salamanders into the Basin. Any conservation measures identified through this process, shall be incorporated, as appropriate, into the NBHCP's conservation program through its Adaptive Management provisions.

(2) TNBC shall consult with the TAC and western spadefoot toad experts periodically during implementation of the NBHCP to determine what, if any, additional conservation opportunities for this species might exist within the proposed reserve system. Any conservation measures identified through this process, shall be incorporated, as appropriate, into the NBHCP's conservation program through its Adaptive Management provisions.

(3) TNBC shall consult with the TAC and fairy shrimp and tadpole shrimp experts periodically during implementation of the NBHCP to determine what, if any, additional conservation opportunities for Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and midvalley fairy shrimp might exist within the proposed reserve system. Any conservation measures identified through this process, shall be

incorporated, as appropriate, into the NBHCP's conservation program through its Adaptive Management provisions.

(4) TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means including, but not limited to, the introduction of Bogg's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass, and legenere into the vernal pool areas or other suitable locations in the NBHCP Plan Area. Any conservation measures identified through this process, shall be incorporated, as appropriate, into the NBHCP's conservation program through its Adaptive Management provisions.

D. RESERVE MANAGEMENT/SITE SPECIFIC MANAGEMENT PLANS

All land acquired for reserves under the NBHCP, whether it is controlled through easement or purchased outright, will require preservation, management, enhancement and/or restoration, and monitoring activities.

Following the mitigation land acquisition process, Site-Specific Management Plans (SSMPs) will be prepared for each reserve unit. Within the first year following reserve site acquisition, TNBC shall complete a biological assessment of the site, and shall prepare and submit to the TAC for their review and comment. Each SSMP shall be approved by the Wildlife Agencies prior to implementation. Each SSMP shall include a Biological Monitoring Plan for the site. SSMP's can be simple or complex depending on the level of management necessary to provide or maintain habitat for the Covered Species. Each SSMP will specify: (1) management policies not otherwise prescribed by the NBHCP (see Section IV.D.1 below); (2) specific management activities, including establishment of suitable monitoring programs (see Section IV.D.2); (3) restoration and enhancement needs (see Section IV.D.3); and (4) reserve water management (see Section IV.D.4). TNBC will be responsible for preparing management plans for all reserve lands in consultation with the Technical Advisory Committee. Prior to implementation, each management plan will be submitted to the USFWS and CDFG for review, revision if appropriate, and written approval; however, formal USFWS and CDFG review of proposed management plans may be waived if all members of NBHCP's Technical Advisory Committee, including its USFWS and CDFG representatives, unanimously concur in the plan and documentation of such concurrence is placed into TNBC's administrative record. If TNBC's Board of Directors approves an action pursuant to this section in a regular, noticed meeting of the Board, then after the 60th day TNBC has notified CDFG and USFWS of the proposed action, in writing, it is approved unless denied in writing by CDFG or USFWS. See Section 3.2.4 of the Implementation Agreement for further information on the development of reserve management plans.

1. Site-Specific Management Plan Policies

Once a block or parcel of mitigation land has been acquired, general goals for the land will be established and management activities will be guided by TNBC according to the policies set forth below. Each SSMP will outline the policies under which the parcel will be managed, will describe the specific management activities that will be implemented, will specify the restoration and enhancement needs, and will define reserve water management. Management plans will be modified periodically as appropriate pursuant to NBHCP's Adaptive Management provisions to respond to changing conditions in the reserve areas and new scientific information. In cases where land purchased is added to an existing reserve area, policies or goals for the existing area may, if appropriate, be applied to the area of expansion. SSMP policy formulation will address the following issues:

a. Identification of Covered Species Present/Habitat Requirements Determination.

An existing Conditions Biological Assessment of newly acquired TNBC reserves will be conducted to determine the specific Covered Species the parcel currently supports or could potentially support. The results of this survey will be included in the SSMP for the subject Mitigation Land. The habitat type present or desired (e.g., wetlands or uplands) will also be a critical determination in establishing management policies. Management policies and activities will be oriented toward the species and habitats indicated or selected, and specific management policies established will be consistent with the needs of those species or habitats. Land parcels that are unsuitable for or are not expected to support any of the Covered Species will be eliminated from consideration through use of the mitigation site selection criteria described in Sections IV.C.2, C.3.b, and C.4.b above.

b. General Design/Management Criteria for Site Specific Management Plans

The following design and management criteria shall be considered during the preparation, review and approval of Site Specific Management Plans for TNBC reserves:

> Generally, public access to TNBC reserves shall be limited or regulated. Riparian and wetland areas are more valuable as wildlife habitat when they are located where human access is limited.
>
> TNBC will protect the Covered Species and their habitat by limiting and regulating public assess to TNBC reserves. Reserves shall be patrolled to control prohibited and incompatible activities, including, but not limited to, dumping, off-road vehicle activity and trespass.
>
> Site specific management plans shall address the habitat needs of all a maximum possible number of Covered Species, as determined feasible based upon the physical

characteristics (topography, soil types, water availability, vegetation, etc.) of the individual reserve site under consideration..

Water bodies within habitat reserve units shall vary in size, depth and edge planting to provide varied habitat opportunities.

Plantings of native trees, including valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*), and willow (*Salix goodingii*) shall generally be incorporated within each habitat reserve unit as determined feasible by TNBC and in consultation with NBHCP TAC.

c. Appropriateness of Hunting.

Management plans will identify the level of hunting allowed, if any, and will include parcel-specific restrictions to protect the Covered Species during any hunting activities. No take of Covered Species as result of hunting will be covered under the permits.

d. Controlled/Prohibited Activities.

Activities that would potentially conflict with mitigation goals or would endanger habitat resources will be described and controlled or prohibited as necessary. Examples of activities that will typically be prohibited include dumping, vandalism, unauthorized hunting and fishing, collection of plants or animals, and off-road vehicle use.

e. Avoidance of Conflicts with the Sacramento International Airport.

It is imperative that reserve lands in the vicinity of the Sacramento International Airport be managed to avoid the potential for aircraft/bird collisions and other potential conflicts with airport operation. Reserve management plans must therefore be developed with these issues in mind. Draft management plans for reserve lands in the vicinity of the Sacramento Airport must be submitted to the Airport Facilities Manager to provide a reasonable opportunity for review and comment prior to approval by TNBC, the USFWS, or CDFG. See Section III.B.5. for a discussion of potential wildlife safety hazards near the airport, and Chapter VI for further discussion of reserve management/airport safety issues.

f. Take Avoidance.

TNBC will implement take avoidance measures to minimize potential take that may occur during habitat creation, restoration, preservation, enhancement and management activities on Mitigation Lands (e.g., road kills, take during construction of managed marsh wetlands, etc.). To accomplish this, TNBC shall, where applicable, ensure that all take avoidance measures described in Chapter V (e.g., dewatering of irrigation ditches owned by TNBC) are implemented during preservation, restoration, creation,

enhancement, management, and use of reserve lands. TNBC shall ensure that all such take avoidance measures as are necessary and appropriate are included in SSMPs.

2. Management Activities

The objectives of management activities conducted on Mitigation Lands generally will be to maintain and support applicable Covered Species over the long term, and, specifically, will be to meet the goals set forth in Section IV.C.2.a above. Specific management activities will be set forth in the management plan prepared for each suitable block of reserve land. Management activities to be implemented include, but are not limited to, the following:

a. Habitat Management.

Habitat management will be a critical function within all reserves, and ensuring appropriate habitat management will be an important task of TNBC and the management plan. Habitat management activities will vary depending on the habitats found within a particular area and the degree to which they must be managed and enhanced.

Habitat management activities are discussed in Sections IV.C.3 and C.4 above with respect to giant garter snakes and Swainson's hawks, respectively. In addition, consistent with the Site-Specific Management Plan prepared for each reserve, management activities can include: (1) control of water supply and availability; (2) suitable agricultural practices (e.g., rice growing for giant garter snakes and production of other crops for Swainson's hawk foraging); (3) grazing or mowing programs to eliminate weeds or control vegetation; (4) exotic species control; (5) erosion control; (6) enhancement of native plant communities; (7) habitat enhancement activities for the Covered Species (e.g., construction of artificial burrows for giant garter snakes); (8) predator control; (9) enhanced ditch and drain management for the ditches owned by TNBC on reserve lands; and (10) coordination of any research conducted within reserves with outside species experts and other individuals and groups. Management activities will be conducted so as to limit the potential for the management activities benefitting one Covered Species to adversely affect another Covered Species. A copy of any and all research documents produced having to do specifically with NBHCP reserve lands will be obtained where possible and kept as part of the documentation and records for all TNBC lands.

b. Monitoring.

Management plans will address monitoring objectives, needs, and specific methodologies as necessary and as described in Section VI.E.

c. Patrolling.

TNBC will periodically patrol the reserves to control prohibited activities such as dumping, shooting, off-road vehicle activity, trespassing, and any other prohibited activity. Patrolling frequency needed to control prohibited activities will vary with each area and will depend on the area's location, surrounding land uses, proximity to urban areas, and historic uses of the land. The patrol function may be performed by any suitable entity approved by TNBC.

d. Rice Production Practices

Rice farming on any land under TNBC control and serving to mitigate impacts of Authorized Development shall be managed in a manner to enhance habitat values for giant garter snakes and other NBHCP Covered Species. Overall, TNBC rice production practices promote enhanced habitat values through minor to moderate adjustments in cultivation practices. The rice production practices include guidelines related to vegetation management (including weed management, treatment of crop stubble through burning and discing), and maintenance of those ditches that are owned by TNBC (time of maintenance, alternating bank maintenance on an annual basis) shall be subject to the Site Specific Management Plan prepared for each reserve. The rice production practices will be reviewed and revised as needed based on monitoring or other relevant information.

3. Restoration and Enhancement Programs

The ultimate goal of the NBHCP reserve system is to provide sustainable habitat communities capable of supporting the appropriate Covered Species, and to convert disturbed lands in the NBHCP reserve system into such sustainable communities. It is expected that many of the lands purchased for the reserve system will be disturbed to some degree or previously used for other purposes and will require restoration or enhancement. Restoration and enhancement programs will therefore play an important role in developing sustainable habitat communities on reserve lands.

The management plan for each parcel or block of reserve lands will identify specific restoration and enhancement needs and discuss the expected costs of such restoration and the timing of implementation. Some important habitat enhancement activities for the giant garter snake (e.g., construction of managed marshes) and Swainson's hawk (e.g., planting of future nest trees) are discussed in Section IV.C.3 and C.4 above. Additional restoration activities that may be implemented on NBHCP reserve lands include, but are not limited to, the following:

a. Restoring Natural Drainage Patterns/Erosion Control

Restoring the natural drainage pattern of a reserve unit, whether it is to prevent unnatural ponding, to restore natural ponding, or to channel runoff to appropriate areas, is the precursor to establishing or enhancing some native habitat communities. For example, it is important to provide drainage patterns and

moisture regimes suitable for certain native plants. In addition, the growth of exotic plant species and erosion may be deterred by the restoration of natural moisture regimes.

b. Exotic/Invasive Plant Control

If necessary, integrated pest management programs for exotic or other plants will be implemented in consultation with County Agricultural Commissioner's offices or other suitable experts (e.g., if exotic or invasive plant species threaten native plant communities) and as covered by the SSMP prepared for the reserve.

c. Domestic/Feral Animal Control.

In some portions of the Plan Area, cats are a possible threat to giant garter snakes, burrowing owls, tri-colored blackbirds and small mammals that are prey forage. If feral cats become established, control of feral cats in reserve areas may be necessary. Control programs for domestic or feral animals will also be implemented for other species as necessary.

4. Reserve Water Management

One of the primary functions of the Mitigation Lands under the NBHCP is to provide wetland habitat values through rice farming or through establishment of managed marsh. Any land to be managed as rice or marsh for the reserve system must have an adequate water supply (see Section IV.C.2.c.2 above).

a. Water Needs for TNBC Rice Cultivation

The majority of water used for rice cultivation in the Natomas Basin is diverted through a system of channels from the Sacramento River. Following the discing and leveling of the fields, water is introduced to the fields and aerial seeding is conducted, usually from mid-April to mid-May (University of California 1983). The water in the fields initially serves to stimulate rice seed germination, and thereafter assists in controlling weed growth (California Rice Promotion Board 1991).

To control the growth of undesirable aquatic vegetation, herbicides are usually applied to the majority of flooded rice fields once the rice seedlings have emerged in April or May. The water system in the Natomas Basin is a "closed system." As a closed system, it does not release flows into the River until late August or early September, and even then in controlled amounts. The area does not fully drain until October.

The total amount of water typically supplied to rice fields during a year differs from the actual net usage. The ultimate fate of water applied to rice fields can be broken into three general fractions: (1) evapotranspiration (solar evaporation and transpiration from vegetation), (2) percolation into the soil, and

(3) outflow from the rice field. Using data from various individual rice fields, Jack Williams, the Sutter County Rice Farm Advisor for the University of California Cooperative Extension, has calculated the average net water use at about 6.5 acre-feet per acre of rice (about 1.5 acre feet of this is outflow) for rice farms in Sutter County, outside of the Natomas Basin. The Rice Experimental Station in Biggs, located in southern Butte County, has estimated that between 4.8 and 6.7 acre-feet of water per acre are used in rice cultivation.

Rice growers that use a water recycling system save an average of 0.6 acre-feet of water per acre. Estimates of water reuse by districts vary from 1 to 28 percent of the applied water, depending on feasibility within the district (California Rice Promotion Board 1991).

The most significant variable between individual rice fields that affects these figures of average net water use is percolation. One reason why these lands are so well suited for rice growing is that most fields have tight clay soils which greatly restrict water loss through percolation. Most rice fields have a hydraulic conductivity (percolation) in the range of 0.32 to 0.42 inches per day. However, certain areas have rice fields with higher percolation rates because of a greater percentage of sandy soils (California Rice Promotion Board 1991). Through the removal of rice fields with high percolation rates from production, and improved water irrigation systems and cultivation practices, water use for rice cultivation has decreased significantly in the past decade. The average net water use for individual fields in the Sacramento Valley rice fields as a whole has dropped from approximately 6.5 acre-feet in the 1970's to the present level of 4.4 acre-feet per acre (California Rice Promotion Board 1991). Within the Natomas Basin, rice crop irrigation requires approximately 3.9 acre-feet per acre (Natomas Mutual 2001), a relatively low level of water demand reflecting the efficiency of the Natomas Mutual system, as well as the local soil characteristics and the carefully leveled fields of the Natomas Basin.

b. Water Needs for Managed Wetlands

Water requirements for maintaining natural and managed marsh areas are similar to those needed for rice cultivation. Until TNBC identifies specific marsh lands for acquisition, it is impossible to determine the exact water needs for maintaining these marsh areas within a given habitat reserve. It is, however, possible to predict water requirements for marsh maintenance based on data from the state-managed Gray Lodge Wildlife Management Area. Gray Lodge consists of approximately 8,375 acres. It is estimated that to achieve full use of habitat development opportunities at Gray Lodge, a firm water supply of about 44,000 acre-feet of water would be required--for an average requirement of 5.25 acre-feet of water per acre. These water requirements for Gray Lodge are likely to be higher than those for the Natomas Basin. This is because of the efficiency of the Natomas Basin recirculation system (approximately 85%) and extensive land leveling within the Natomas Basin. Nonetheless, the Gray Lodge water needs have been used to determine whether water supply would be available to create and maintain managed marsh within the Natomas Basin.

c. Available Water Supply

The most critical element required in the establishment and maintenance of wetland habitat is the continued availability of a source of good quality water. TNBC, as a landowner within Natomas Mutual's agricultural irrigation service area, will be entitled to its fair share of water entitlements on an annual basis. TNBC will look to Natomas Mutual for irrigation water for both rice cultivation and marsh management. Based upon information obtained from Natomas Mutual, TNBC is expected to receive sufficient water annually to meet its needs.

TNBC estimates that managed marsh will require somewhat less annual irrigation than rice cultivation. Additionally, some portion of each TNBC reserve will be maintained as upland habitat that would require less irrigation than the irrigated crops that dominate active and long-term agricultural lands. Therefore, it is not anticipated that TNBC reserves will result in water demands beyond the service ability of Natomas Mutual.

In determining the likelihood of adequate irrigation water supplies to support TNBC reserves, reliability of Natomas Mutual water supplies is a key factor. Natomas Mutual possesses a number of senior water rights, most of which precede the Central Valley Project. Based upon these rights, Natomas Mutual's water allocation may be reduced by up to 25 percent in critically dry years (critically dry years are defined as years when annual inflow to Shasta Lake is less than 4.2 million acre feet).

In recent years, Natomas Mutual has installed sophisticated improvements to allow substantial increases in water recirculation within the Natomas Basin. Utilizing this infrastructure, Natomas Mutual has, in recent years, been able to serve all of their water users fully during periods of drought- related water supply reductions.

If long-term water shortages occur, possibly through a complete restructuring of water rights in response to state or federal habitat restoration and/or species recovery programs, restructuring of the CVP/SWP, Calfed or other similar programs, then TNBC would be required to implement alternative water supply strategies. The most immediately available alternative irrigation source would be groundwater. Groundwater is readily available throughout the Basin and it is estimated that reliance on ground water resources would increase irrigation costs for TNBC reserve by approximately 50% to 100% (John Roberts, TNBC). While such cost increases would be significant, it is reasonable to assume that TNBC could adjust for this expense for the following reasons: 1) irrigation costs are only one of many costs associated with reserve management; 2) farmers leasing TNBC lands are obligated to pay for their agricultural water use, and the agricultural water demand is in excess of 50% of total irrigation costs for given reserve site, thereby substantially offsetting any increases in water costs; and, 3) as part of the mitigation fee, developers contribute to a contingency fund for each acre of land developed and this fund is established for expenses such as unanticipated irrigation costs. In addition to groundwater, TNBC might also seek to acquire tailwater from other water users or water providers within the Natomas Basin where

TNBC in consultation with the NBHCP TAC, determine such water is of appropriate quality for Mitigation Lands.

In response to the high level of importance associated with adequate water supplies for reserves, TNBC currently explores various water supply options prior to acquiring reserve lands. In the case of TNBC's reserve known as the BKS property, three alternative water sources were identified, including: 1) tail water from the Stolt Sea Farm; 2) ground water wells (the property has six operational wells, three in daily operation and three with no engines); and 3) Natomas Water Company which has agreed to explore water deliveries with TNBC. In order to ensure adequate water availability, TNBC will continue to seek alternative water supplies in addition to Natomas Mutual as reserve sites are acquired. If there is not an adequate water supply for the type of reserve (i.e., wetlands) or an existing reserve site looses all available water, then TNBC may consider converting that site to an upland reserve, or selling the reserve site and seeking an alternative reserve location with adequate water.

5. Avoiding Management Conflicts With the Sacramento Airport

All mitigation lands established for the NBHCP reserve system will need to be located and managed to avoid potential safety conflicts relating to collisions between aircraft and birds, and to be consistent with the May, 1997 Federal Aviation Administration Advisory Circular concerning wildlife attractants in the vicinity of airports (see Appendix E). The Advisory Circular recommends the following distances between an airport's aircraft movement areas, loading ramps, or aircraft parking areas and the wildlife attractant: (1) 5,000 feet for airports serving piston-powered aircraft; and (2) 10,000 feet for airports serving turbine-powered aircraft. In addition, the Circular recommends that a distance of five statute miles be maintained between a wildlife attractant and the airport's approach or departure airspace if the attractant may cause hazardous wildlife movement into or across the approach or departure airspace.

The primary potential conflict of reserve land management with the Sacramento International Airport would be where permanent or seasonal wetlands are managed in a way that attracts wintering waterfowl within the distances indicated above. To some extent, attracting waterfowl to reserve lands is contemplated by the Plan, since hunting revenues form a portion of the Plan's funding mechanisms (see Section VI.B). Consequently, where waterfowl hunting is to be incorporated into reserve land management, potential conflicts with the airport will need to be considered, and, if necessary, hunting (especially of waterfowl) will need to be foregone or increased in certain areas if potential conflicts with the airport cannot be adequately resolved. Hunting for upland species (e.g., pheasant), on the other hand, is unlikely to result in airport hazards unless the activity occurs in the airport's immediate vicinity.

Rice farming is also a form of mitigation land management (see Section IV.D.4) as well as a potential revenue source (Section VI.B). Rice farming is a common land use in the airport vicinity and is not typically regulated by the airport; however, some rice farming operations (e.g., winter flooding) could attract waterfowl hazardous to aircraft (see Section III.B.5). Consequently, rice farming on NBHCP

reserve lands must also be incorporated into reserve management in a way that is consistent with safe airport operation.

To address these problems, reduction or elimination of potential conflicts between reserve land management and airport operation will be a specific component of reserve management plans to be developed by the NBC, and all draft reserve management plans will be submitted to the Airport Facilities Manager for coordination and review prior to approval by TNBC and the NBHCP Technical Advisory Committee (see Section IV.D.1).

V. TAKE AVOIDANCE, MINIMIZATION AND MITIGATION

The conservation strategy contained in Chapter IV describes the acquisition and habitat management guidelines to be employed by the Natomas Basin Conservancy. In addition to TNBC programs, the Permittees will each conduct various activities and apply various operational guidelines to avoid, minimize, and mitigate the take of Covered Species resulting from Authorized Development and Water Agency O&M activities within the Natomas Basin.

The measures presented in this Chapter are organized into three categories: measures that relate to the Land Use Agencies (City of Sacramento and Sutter County); measures that relate to the TNBC as a Permittee, and measures that relate to the Water Agencies (RD 1000 and Natomas Mutual).

A. LAND USE AGENCIES' CONSERVATION MEASURES

In addition to accepting and transferring to TNBC Mitigation Fees, and possibly land dedications, as required under the NBHCP, the Land Use Agencies shall implement a variety of measures that will avoid, minimize or mitigate the take of Covered Species ("Conservation Measures"). These Conservation Measures shall be implemented or monitored by the involved Land Use Agency for development projects as conditions in Urban Development Permits, as well as for public projects sponsored by the respective Land Use Agency.

1. Pre-Construction Surveys

Not less than 30 days or more than 6 months prior to commencement of construction activities on specific Authorized Development sites in the NBHCP area, a pre-construction survey of the site shall be conducted to determine the status and presence of, and likely impacts to, all Covered Species on the site. However, pre-construction surveys for an individual species may be completed up to one year in advance if the sole period for reliable detection of that species is between May 1 and December 31. The applicant seeking to develop land will be responsible for contracting with qualified biological consultants to carry out the pre-construction surveys, and as necessary, to implement specific take minimization, and other Conservation Measures set forth in the NBHCP and approved by the Wildlife Agencies.

The results of the pre-construction surveys along with recommended take minimization measures shall be documented in a report and shall be submitted to the Land Use Agency, USFWS, CDFG and TNBC. Based upon the survey results, the Land Use Permittees will identify applicable take avoidance and other site specific Conservation Measures, consistent with this NBHCP, required to be carried out on the site. The approved pre-construction survey documents and list of Conservation Measures will be submitted by the developer of the Authorized Development project to the applicable Land Use Agency to demonstrate compliance with the NBHCP.

Reconnaissance level surveys should be conducted prior to species specific surveys to determine what habitats are present on a specific development site and what, if any, more intensive survey activities should be conducted to accurately determine the status of the Covered Species on the site. It shall be the obligation of the developer/landowner to complete July 25, 2002such surveys and the Land Use Agency Permitees's responsibility to ensure the surveys are properly completed prior to disturbance of habitat. Surveys shall be conducted by qualified personnel (e.g., persons with suitable biological, botanical, or related expertise). Note: negative species-specific survey results generally do not obviate the requirement to implement minimization measures prescribed in the revised NBHCP where a pre-construction survey indicates that habitat for a particular listed species exists onsite.

2. Preservation of the Area Adjacent to Fisherman's Lake

Fisherman's Lake and portions along both sides are and will continue to be, owned and managed by RD 1000. Also, RD 1000 has an easement on portions of the land along the east side of Fisherman's Lake. The easement was granted for flood control purposes and all uses not inconsistent with flood control were reserved to the land owner. The City shall create a buffer on the City side of Fisherman's Lake. Towards that end, the City of Sacramento approved the necessary action in June 2003 to amend the North Natomas Financing Plan to include the buffer area along Fisherman's Lake in the Land Acquisition Program (i.e., development impact fees will be increased to fund acquisition of the buffer area). The buffer area will be managed by TNBC.

According to the City's North Natomas Community Plan, the buffer area along Fisherman's Lake is a 250 foot wide land area stretching from Del Paso Road to El Centro Road on the City side of Fisherman's Lake, a portion of the West Drain. The east side of Fisherman's Lake is in the City of Sacramento and the west side is in the unincorporated portion of Sacramento County. Pursuant to the Settlement Agreement, the City has agreed to initiate a North Natomas Community Plan amendment to potentially widen the agricultural buffer along the City side of Fisherman's lake to 800 feet wide.

As of July 2002, TNBC owns 136 acres of Mitigation Land on the Sacramento County side of Fisherman's Lake, in partial compliance with the City of Sacramento's Settlement Agreement that requires acquisition of 250 acres of Mitigation Land in Zone 1.

Giant garter snakes, Swainson's hawks and other Covered Species inhabit the Fisherman's Lake area, a portion of the West Drain. According to the 2000 Annual Survey Results for the Swainson's Hawk, dated September 2000, prepared by the Swainson's Hawk Technical Advisory Committee, there are three nests along Fisherman's Lake. No data was available for the nests in 1998; 3 young were fledged from two of the nests in 1999; and two of the three nests were inactive and the third nest was active but failed to fledge any young in 2000. Also, Figure 5 in the 2000 Field Season Report for the Giant Garter Snake, dated December 21, 2000, and prepared by USGS, indicates the use of Fisherman's Lake by giant garter snakes.

3. General Measures to Minimize Take

In order to generally minimize the impacts of development on Covered Species, the City of Sacramento and Sutter County shall impose the following requirements on Authorized Development when approving Urban Development Permits within the Natomas Basin:

a. Tree Preservation: Valley oaks and other large trees should be preserved whenever possible. Preserve and restore stands of riparian trees used by Swainson's hawks and other animals for nesting, particularly adjacent to Fisherman's Lake.

b. Native Plants: Improve the wildlife value of landscaped parks, buffers, and developed areas by planting trees and shrubs which are native to the Natomas Basin and therefore are used by native animals.

c. Protect Raptor Nests: Avoid the raptor nesting season when scheduling construction near nests. Specific avoidance criteria are set forth in the species specific measures later in this chapter.

d. Protected Plant/Animal Species, also referred to as "Special Status Species": Search for protected plants species during flowering season prior to construction and protected animal species during the appropriate season.

4. Measures to Minimize Take of Vernal Pool Species

Vernal pool resources within the Natomas Basin are limited to small pools generally located in the far eastern portion of the Natomas Basin. Intact vernal pool complexes are not known to occur within the City or the Sutter County Land Use Agencies' Permit Areas. However, it is possible that isolated vernal pools exist within the Permit Areas of the City and the County and, therefore, would be subject to disturbance by Authorized Development or other Covered Activities.

Vernal pool resources within the City and the Sutter County Permit Areas shall be identified prior to disturbance through pre-construction surveys and other biological investigations. Such resources shall be discovered either through the early CEQA project review (required for general plan, specific plan, rezone, subdivision and other discretionary approvals of the Land Use Agencies) or during the pre-construction surveys required under the NBHCP. The following measures shall be implemented by the Land Use Agencies prior to issuance of Urban Development Permits when public or private development projects are proposed for areas that may support wetlands and/or vernal pool species. *(Note: The following mitigation measures do not replace or exempt an applicant from applying for and complying with Section 404 of the Clean Water Act and the related Section 7 consultations with USFWS in the event such resources are determined to be subject to Section 404. Rather, these mitigations set the standard for mitigation of vernal pool resources in the NBHCP area.)*

a. *General Biological Survey and Information Required.*

In the event a biological reconnaissance survey or the pre-construction survey identifies that vernal pool resources are on-site, a vernal pool species specific biological assessment must be provided by the developer to the Land Use Agency during the appropriate season (as established by USFWS) to determine the type and abundance of species present. The species specific biological assessment must include a USFWS-approved plant survey prepared by a qualified field biologist and shall list the methods of field analysis, condition of habitat, size and acreage of direct and indirect impact (as defined by seasonal inundation and hydric soils and other appropriate characteristics), and species present. The biological species survey shall cover all vernal pools, swales, and other seasonal wetlands capable of supporting vernal pool species within 250 feet of project activities, and shall identify both potential direct and indirect effects of the development. Standards for the survey shall be in accordance with the USFWS Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods (April 19, 1996) or the most recent approved USFWS survey guidelines for vernal pool species (Appendix L). This assessment must be submitted with the urban development permit application and prior to approval of an Urban Development Permit by the Land Use Agency.

If it is determined that wetland and/or vernal pool resources would be disturbed by a project, then take of vernal pool associated Covered Species would be covered under the NBHCP, subject to the following limitation and guidelines:

(1) Where site investigations indicate vernal pool species may occur, the developer shall notify the Land Use Agency regarding the potential for impacts to vernal pool species. Such notification shall include biological data (see Section (a) above regarding biological information required) adequate to allow the Land Use Agency, and the USFWS and CDFG to determine the potential for impacts to vernal pool species resulting from the proposed development.

(2) Following notification by the Land Use Agency, USFWS and CDFG shall identify specific measures required to avoid, minimize and mitigate impacts to vernal pool species to be implemented prior to disturbance and in accordance with adopted standards or established guidelines (e.g., the USFWS programmatic biological opinion for vernal pool species attached as Appendix G as it may be amended from time to time). If vernal pool species are found within proposed project areas, the project proponent shall coordinate with the USFWS and CDFG to ensure conservation measures are incorporated to avoid and protect the sensitive plant species. In some cases, USFWS and CDFG may require complete avoidance of vernal pool species, such as where Covered Species such as slender orcutt grass, Sacramento orcutt grass, Colusa grass and/or vernal pool tadpole shrimp are found to be present. Such measures shall be identified by USFWS and CDFG

within 30 days or as soon as possible thereafter of notification and submittal of biological data to the agencies by the Land Use Agency.

(3) The requirement by USFWS to preserve a vernal pool within development would be based on identification of an intact vernal pool with minimal disturbance where the presence of one or more of the following species is recorded: slender orcutt grass, Sacramento orcutt grass, Colusa grass, or vernal pool tadpole shrimp.

Prior to requiring on-site preservation of a vernal pool area, USFWS shall consider the suitability of the vernal pool as TNBC Mitigation Lands. No such preservation requirement shall be made unless the vernal pool is a suitable site for TNBC Mitigation Lands. Such vernal pool areas, including any required buffer land dedication, shall apply toward the Land Acquisition Fee component of the development project's NBHCP mitigation obligation.

b. Mitigation Strategies: Vernal pool resources identified through site specific investigations shall be mitigated in one of three general approaches as described below.

(1) *Avoidance and Preservation On-Site as a Means to Minimize Impacts*

In the event USFWS requires on-site preservation in accordance with Section a.3 above, on-site mitigation shall be required. In the event USFWS does not require on-site mitigation, a developer or private land owner may still propose to dedicate fee title or conservation easement for that portion of the property with vernal pool resources and an associated 250-foot buffer surrounding the vernal pool resource to the TNBC. Acceptance of the offer to dedicate shall be subject to review and approval by the Land Use Agency, TNBC Board and the Wildlife Agencies. The TNBC Board and the Wildlife Agencies shall consider the location, connections, species present, condition of the proposed site to be dedicated, and may decide to accept the dedication in lieu of payment of the Land Acquisition Fee portion of the NBHCP Mitigation Fee for the affected acreage. TNBC Board may accept or decline the offer based on the balance of habitat needs and the biological goals of the HCP. If the dedication is accepted, a reduction in the Land Acquisition Fee portion of the habitat Mitigation Fee shall be granted the developer for the portion (calculated on an acreage basis) of the site permanently preserved by easement or dedication. However, habitat Mitigation Fees, in full, must be paid on the remaining developable acreage on the site, and all fees other than Land Acquisition Fees shall be paid for all acres on the site. Additional conditions to preserve the biological integrity of the site (such as reasonable drainage conditions) may be imposed by the Land Use Agency in consultation with TNBC and the TAC.

In the event the developer does not support on-site preservation or TNBC does not accept the offer to dedicate, then one of the following mitigation approaches shall be employed.

(2) *Construction Period Avoidance and Relocation of Vernal Pool Resources.*

Relocation of vernal pool resources and commencement of Authorized Development shall be subject to the following mitigation measures will be required:

(a) No grading, development or modification of the vernal pool site or the buffer area extending 250 feet around the perimeter of the vernal pool site may occur during the vernal pool "wet" season as identified by USFWS. Protective fencing shall be established around the perimeter of the vernal pool site and the buffer area during the vernal pool wet season.

(b) In consultation with TNBC and the TAC, soils and cysts from the vernal pool may be relocated as soon as practicable during the dry season to a suitable TNBC or other reserve site provided the relocation/recreation site is approved by TNBC, and the USFWS.

If it is not practicable to relocate vernal pool resources, and/or TNBC or USFWS determine that TNBC does not have a suitable reserve site for relocation of resources, then the applicant shall follow the mitigation approach outlined in Section (3) below.

(3) *Payment Into a USFWS Approved Conservation Bank*.

In the event all of the above approaches are not appropriate for the site, the Land Use Agency shall require the developer to purchase credits from a USFWS-approved mitigation bank in accordance with the standards set forth in the following Table V-1. USFWS shall determine the type and amount of credits to be purchased based on the impacts associated with the development.

Mitigation ratios for credits dedicated in Service-approved mitigation banks or for acres of habitat outside of mitigation banks shall be as follows:

TABLE V-1
MITIGATION RATIOS

	Bank	Non-Bank
Preservation	2:1	3:1
Creation	1:1	2:1

Preservation Component: For every acre of habitat directly or indirectly affected, at least two vernal pool credits will be dedicated within a Service-approved ecosystem preservation bank, or based on Service evaluation of site-specific conservation values, three acres of vernal pool habitat may be preserved on the project site or on another non-bank site as approved by the Service.

Creation Component: For every acre of habitat directly affected, at least one vernal pool creation credit will be dedicated within a Service-approved habitat mitigation bank, or based on Service evaluation of site-specific conservation values, two acres of vernal pool habitat created and monitored on the project site or on another non-bank site as approved by the Service.

5. Measures to Reduce Take for Individual Species

Identified below are specific measures that will be imposed as conditions on Urban Development Permits or implemented for public works projects, and enforced by the Land Use Agencies to mitigate, minimize and avoid take of each NBHCP Covered Species, as related to urban development. Specific measures to avoid, minimize and mitigate take resulting from TNBC and Water Agency Covered Activities are provided in Sections V.B and V.C., respectively.

a. <u>Measures to Reduce Take of Giant Garter Snake</u>

(1) Within the Natomas Basin, all construction activity involving disturbance of habitat, such as site preparation and initial grading, is restricted to the period between May 1 and September 30. This is the active period for the giant garter snake and direct mortality is lessened, because snakes are expected to actively move and avoid danger.

(2) Pre-construction surveys for giant garter snake, as well as other NBHCP Covered Species, must be completed for all development projects by a qualified biologist approved by USFWS. If any giant garter snake habitat is found within a specific site, the following additional measures shall be implemented to minimize disturbance of habitat and harassment of giant garter snake, unless such project is specifically exempted by USFWS.

(3) Between April 15 and September 30, all irrigation ditches, canals, or other aquatic habitat should be completely dewatered, with no puddled water remaining, for at least 15 consecutive days prior to the excavation or filling in of the dewatered habitat. Make sure dewatered habitat does not continue to support giant garter snake prey, which could detain or attract snakes into the area. If a site cannot be completely dewatered, netting and salvage of prey items may be necessary. This measure removes aquatic habitat component and allows giant garter snake to leave on their own.

(4) For sites that contain giant garter snake habitat, no more than 24-hours prior to start of construction activities (site preparation and/or grading), the project area shall be surveyed for the presence of giant garter snake. If construction activities stop on the project site for a period of two weeks or more, a new giant garter snake survey shall be completed no more than 24-hours prior to the re-start of construction activities.

(5) Confine clearing to the minimal area necessary to facilitate construction activities. Flag and designate avoided giant garter snake habitat within or adjacent to the project as Environmentally Sensitive Areas. This area shall be avoided by all construction personnel.

(6) Construction personnel completing site preparation and grading operations shall receive USFWS approved environmental awareness training. This training instructs workers on how to identify giant garter snakes and their habitats, and what to do if a giant garter snake is encountered during construction activities. During this training an on-site biological monitor shall be designated.

(7) If a live giant garter snake is found during construction activities, immediately notify the USFWS and the project's biological monitor. The biological monitor, or his/her assignee, shall do the following:

(a) Stop construction in the vicinity of the snake. Monitor the snake and allow the snake to leave on its own. The monitor shall remain in the area for the remainder of the work day to make sure the snake is not harmed or if it leaves the site, does not return. Escape routes for giant garter snake should be determined in advance of construction and snakes should always be allowed to leave on their own. If a giant garter snake does not leave on its own within 1 working day, further consultation with USFWS is required.

(8) Upon locating dead, injured or sick threatened or endangered wildlife species, the Permittees or their designated agents must notify within 1 working day the Service's Division of Law Enforcement (2800 Cottage Way, Sacramento CA 95825) or the Sacramento Fish and Wildlife Office (2800 Cottage Way, Room W-2605, Sacramento, CA 95825, telephone 916 414-6600). Written notification to both offices must be made within 3 calendar days and must include the date, time, and location of the finding of a specimen and any other pertinent information.

(9) Fill or construction debris may be used by giant garter snake as an over-wintering site. Therefore, upon completion of construction activities remove any temporary fill and/or construction debris from the site. If this material is situated near undisturbed giant garter snake habitat and it is to be removed between October 1 and April 30, it shall be

inspected by a qualified biologist to assure that giant garter snake are not using it as hibernaculae.

(10) No plastic, monofilament, jute, or similar erosion control matting that could entangle snakes will be placed on a project site when working within 200 feet of snake aquatic or rice habitat. Possible substitutions include coconut coir matting, tactified hydroseeding compounds, or other material approved by the Wildlife Agencies.

(11) Fences will be constructed along the shared boundary of urban development and the North Drainage Canal and the East Drainage Canal within Sutter's Permit Area, subject to the following guidelines:

(a) A minimum of 100 feet will be provided from fence-to-fence and access to the canals shall be limited by gates

(b) A snake deterrent will be placed along the fences on the North Drainage Canal and the East Drainage Canal (i.e., fence construction that restricts snake movement or an appropriate vegetative barrier either inside or outside of the boundary fence). The design of the deterrent shall be subject to approval by the Wildlife Agencies.

(c) The specific fence/snake barrier design adjacent to a given development will be determined within Sutter County's review of the proposed development and the fence/barrier shall be installed immediately after site grading is completed.

(12) At the time of urban development along the North and East Drainage Canals, Sutter shall consult with the Wildlife Agencies to determine design strategies that would enhance conditions for giant garter snake movement through the North and East Drainage Canals. Possible strategies may include expanded buffer areas and modified canal cross sections if such measures are, in the determination of Sutter and the Water Agencies, found to be feasible.

b. Measures to Reduce Take of Swainson's Hawk

Measures to Reduce Cumulative Impacts to Foraging Habitat

(1) To maintain and promote Swainson's hawk habitat values, Sutter County will not obtain coverage under the NBHCP and incidental take permits, nor will Sutter County grant Urban Development Permit approvals, for development on land within the one-mile wide Swainson's Hawk Zone adjacent to the Sacramento River. The City of Sacramento has

limited its Permit Area within the Swainson's Hawk Zone to the approximately 252 acres located within the North Natomas Community Plan that was designated for urban development in 1994 and, likewise, will not grant development approvals within the Swainson's Hawk Zone beyond this designated 252 acres. It should be noted that of these 252 acres of land in the Swainson's Hawk Zone, about 80 acres will be a 250 foot wide agricultural buffer along the City's side of Fisherman's Lake. Should either the City or the County seek to expand NBHCP coverage for development within the Swainson's Hawk Zone beyond that described above, granting of such coverage would require an amendment to the NBHCP and permits and would be subject to review and approval by the USFWS and the CDFG in accordance with all applicable statutory and regulatory requirements.

Because the effectiveness of the NBHCP's Operating Conservation Program (OCP) adequately minimizes and mitigates the effects of take of the Swainson's hawk depends substantially on the exclusion of future urban development from the City's and Sutter County's portion of the Swainson's Hawk Zone, approval by the City of future urban development (i.e., uses not consistent with Agricultural Zoning) in the zone beyond the 170 (252 acres minus 80) acres identified above or approval by Sutter of any future urban development in the Swainson's Hawk Zone would constitute a significant departure from the Plan's OCP and would trigger a reevaluation of the City's and/or Sutter's Permits and possible suspension or revocation of the City's and/or County's permits.

Measures to Reduce Nest Disturbance

(1) Prior to the commencement of development activities at any development site within the NBHCP area, a pre-construction survey shall be completed by the respective developer to determine whether any Swainson's hawk nest trees will be removed on-site, or active Swainson's hawk nest sites occur on or within ½ mile of the development site. These surveys shall be conducted according to the Swainson's Hawk Technical Advisory Committee's (May 31, 2000) methodology or updated methodologies, as approved by the Service and CDFG, using experienced Swainson's hawk surveyors.

(2) If breeding Swainson's hawks (i.e. exhibiting nest building or nesting behavior) are identified, no new disturbances (e.g., heavy equipment operation associated with construction) will occur within ½ mile of an active nest between March 15 and September 15, or until a qualified biologist, with concurrence by CDFG, has determined that young have fledged or that the nest is no longer occupied. If the active nest site is located within 1/4 mile of existing urban development, the no new disturbance zone can be limited to the 1/4 mile versus ½ mile. Routine disturbances such as agricultural activities, commuter traffic, and routine facility maintenance activities within ½ mile of an active nest are not restricted.

(3) Where disturbance of a Swainson's hawk nest cannot be avoided, such disturbance shall be temporarily avoided (i.e., defer construction activities until after the nesting season) and then, if unavoidable, the nest tree may be destroyed during the non-nesting season. For purposes of this provision the Swainson's hawk nesting season is defined as March 15 to September 15. If a nest tree (any tree that has an active nest in the year the impact is to occur) must be removed, tree removal shall only occur between September 15 and February 1.

(4) If a Swainson's hawk nest tree is to be removed and fledglings are present, the tree may not be removed until September 15 or until the California Department of Fish and Game has determined that the young have fledged and are no longer dependent upon the nest tree.

(5) If construction or other project related activities which may cause nest abandonment or forced fledgling are proposed within the 1/4 mile buffer zone, intensive monitoring (funded by the project sponsor) by a Department of Fish and Game approved raptor biologist will be required. Exact implementation of this measure will be based on specific information at the project site.

Measures to Prevent the Loss of Nest Trees

(1) Valley oaks, tree groves, riparian habitat and other large trees will be preserved wherever possible. The City and Sutter County shall preserve and restore stands of riparian trees used by Swainson's hawks and other animals, particularly near Fisherman's Lake and elsewhere in the Plan Area where large oak groves, tree groves and riparian habitat have been identified in the Plan Area.

(2) The raptor nesting season shall be avoided when scheduling construction near nests in accordance with applicable guidelines published by the Wildlife Agencies or through consultation with the Wildlife Agencies.

Measures to Mitigate the Loss of Swainson's Hawk Nest Trees

(1) The NBHCP will require 15 trees (five gallon container size) to be planted within the habitat reserves for every Swainson's hawk nesting tree anticipated to be impacted by Authorized Development. It will be the responsibility of each Land Use Agency approving development that will impact Swainson's hawk nest trees to provide funding from the applicable developer for purchase, planting, maintenance and monitoring of trees at the time of approval of each Authorized Development project. TNBC shall determine the appropriate cost for planting, maintenance and monitoring of trees

(2) The Land Use Agency Permittee approving a project that impacts an existing Swainson's hawk nest tree shall provide funding sufficient for monitoring survival success of trees for a period of 5 years. For every tree lost during this time period, a replacement tree must be planted immediately upon the detection of failure. Trees planted to replace trees lost shall be monitored for an additional 5-year period to ensure survival until the end of the monitoring period. A 100% success rate shall be achieved. All necessary planting requirements and maintenance (i.e., fertilizing , irrigation) to ensure success shall be provided. Trees must be irrigated for a minimum of the first 5 years after planting, and then gradually weaned off the irrigation in an approximate 2-year period. If larger stock is planted, the number of years of irrigation must be increased accordingly. In addition, 10 years after planting, a survey of the trees shall be completed to assure 100% establishment success. Remediation of any dead trees shall include completion of the survival and establishment process described.

(3) Of the replacement trees planted, a variety of native tree species will be planted to provide trees with differing growth rates, maturation, and life span. This will ensure that nesting habitat will be available quickly (5-10 years in the case of cottonwoods and willows), and in the long term (i.e., valley oaks, black walnut and sycamores), and minimize the temporal losses from impacts to trees within areas scheduled for development within the 50-year permit life. Trees shall be sited on reserves in proximity to hawk foraging areas. Trees planted shall be planted in clumps of 3 trees each. Planting stock shall be a minimum of 5-gallon container stock for oak and walnut species.

(4) In order to reduce temporal impacts resulting from the loss of mature nest trees, mitigation planting shall occur within 14 months of approval of the NBHCP and ITP's. It is estimated at this time that 4 nesting trees within the City of Sacramento are most likely to be impacted by Authorized Development in the near term. Therefore, in order to reduce temporal impacts, the City of Sacramento will advance funding for 60 sapling trees of diverse, suitable species (different growing rates) to TNBC within the above referenced 14 months. It is anticipated that the City will recover costs of replacement nest trees as an additional cost to be paid by private developers at the time of approval of their development projects that impact mature nest trees.

(5) For each additional nesting tree removed by Land Use Agencies' Covered Activities, the Land Use Agency shall fund and provide for the planting of 15 native sapling trees of suitable species with differing growth rates at suitable locations on TNBC preserves. Funding for such plantings shall be provided by the applicable Permittee within 30 days of approving a Covered Activity that will impact a Swainson's hawk nesting tree.

c. Measures to Reduce Take to Valley Elderberry Longhorn Beetle (VELB)

The Land Use Agencies shall require private developers and public infrastructure projects to comply with conservation practices for the VELB set forth in the conditions of the "USFWS Compensation Guidelines for the Valley Elderberry Longhorn Beetle," dated1999, attached as Appendix C as it may be updated from time to time. This policy assumes that any elderberry bushes found within the range of the species are likely to provide beetle habitat, and any destruction or loss of such elderberry shrub habitat must be mitigated according to the Guidelines. The principle conditions of the Guidelines are summarized below; Appendix C contains the Guidelines in their entirety. These Guidelines, or any revision or successor to the Guidelines approved by the USFWS, are hereby incorporated as terms and conditions of the NBHCP.

Prior to approval of Urban Development Permit, the involved Land Use Agency shall require a pre-construction survey. If such survey determines VELB habitat is present, the Land Use Agency shall require the developer to follow the following appropriate measures to avoid take and minimize of individuals:

(1) Impacts to VELB habitat including any direct and indirect effects on VELB critical habitat will be avoided whenever possible. To the maximum extent practicable, projects will be designed to avoid stands of elderberry bushes and to avoid isolation of the plants from other nearby populations. Pre-construction surveys at the construction impact site will be conducted to assess the appropriate amount of mitigation.

(2) If elderberry plants cannot be avoided, they shall be transplanted during the dormant season (November 1 to February 15) to an area protected in perpetuity and approved by the USFWS.

(3) Replacement seedling plants will be provided at a ratio of 2 to 1 to 5 to 1 depending on the extent of beetle utilization of the plants moved or lost. An 1,800-square-foot area will be provided for each transplanted elderberry shrub or every five elderberry seedling plants.

(4) Annual monitoring of VELB habitat will be provided in the planted mitigation sites for a ten year period.

(5) Replacement elderberry shrubs will meet a 60% survival rate by the end of the ten year period and the 60% survival rate shall be required for the term of the applicable permit.

d. Measures to Reduce Take on Tricolored Blackbird

(1) Prior to approval of an Urban Development Permit, the involved Land Use Agency shall require a pre-construction survey of potential breeding and nesting habitat for presence of breeding and nesting tricolored blackbirds.

(2) If surveys determine tricolored blackbirds are present, the following measures shall be implemented in accordance with the Migratory Bird Treaty Act, to avoid disturbance to active (occupied) nesting colonies during the nesting season. A boundary shall be marked by brightly colored construction fencing that establishes a boundary 500 feet from the active nest site. No disturbance associated with Authorized Development shall occur within the 500 foot fenced area during the nesting season to July 1, or while birds are present. A qualified biologist, with concurrence of USFWS, must determine young have fledged and nest sites are no longer active before the nest site may be disturbed.

e. Measures to Reduce Take on Aleutian Canada Goose

(1) Prior to approval of an Urban Development Permit, the applicable Land Use Agency shall require a pre-construction survey. If such survey determines Aleutian Canada Goose are present, the Land Use Agency shall require the developer to consult with USFWS and CDFG to determine appropriate measures to avoid and minimize take of individuals. Such measures shall be appropriate for the use (e.g., foraging, roosting, etc.) and activity of the species, since this species is a seasonal visitor to the Basin.

f. Measures to Reduce Take on White-faced Ibis

(1) Prior to approval of an Urban Development Permit, the involved Land Use Agency shall require a pre-construction survey.

(2) If surveys determine the presence of active nest sites of White-faced ibis, disturbance by Authorized Development within 1/4 mile of nests will be avoided within the nesting season of May 15 through August 31 or until a qualified biologist, with concurrence of Wildlife Agencies, has determined that young have fledged or that the nest is no longer occupied.

g. Measures to Reduce Take on Loggerhead Shrike

(1) Prior to approval of Urban Development Permit, the involved Land Use Agency shall require a pre-construction survey.

(2) If surveys identify an active loggerhead shrike nest that will be impacted by Authorized Development, the developer shall install brightly colored construction fencing that establishes a boundary 100 feet from the active nest. No disturbance associated with Authorized Development shall occur within the 100 foot fenced area during the nesting season of March 1 through July 31. A qualified biologist, with concurrence of USFWS must determine young have fledged or that the nest is no longer occupied prior to disturbance of the nest site.

h. Measures to Reduce Take of Burrowing Owl

(1) Prior to the initiation of grading or earth disturbing activities, the applicant/developer shall hire a CDFG approved qualified biologist to perform a pre-construction survey of the site to determine if any burrowing owls are using the site for foraging or nesting. The pre-construction survey shall be submitted to the Land Use Agency with jurisdiction over the site prior to the developer's commencement of construction activities and a mitigation program shall be developed and agreed to by the Land Use Agency and developer prior to initiation of any physical disturbance on the site.

(2) Occupied burrows shall not be disturbed during nesting season (February 1 through August 31) unless a qualified biologist approved by the CDFG verifies through non-invasive measures that either: 1) the birds have not begun egg-laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

(3) If nest sites are found, the USFWS and CDFG shall be contacted regarding suitable mitigation measures, which may include a 300 foot buffer from the nest site during the breeding season (February 1 - August 31), or a relocation effort for the burrowing owls if the birds have not begun egg-laying and incubation or the juveniles from the occupied burrows are foraging independently and are capable of independent survival. If on-site avoidance is required, the location of the buffer zone will be determined by a qualified biologist. The developer shall mark the limit of the buffer zone with yellow caution tape, stakes, or temporary fencing. The buffer will be maintained throughout the construction period.

(4) If relocation of the owls is approved for the site by USFWS and CDFG, the developer shall hire a qualified biologist to prepare a plan for relocating the owls to a suitable site. The relocation plan must include: (a) the location of the nest and owls proposed for relocation; (b) the location of the proposed relocation site; (c) the number of owls involved and the time of year when the relocation is proposed to take place; (d) the name and credentials of the biologist who will be retained to supervise the relocation; (e) the proposed method of capture and transport for the owls to the new site; (f) a description of the site preparations at the relocation site (e.g., enhancement of existing burrows, creation of artificial burrows, one-time or long-term vegetation control, etc.); and (g) a description of efforts and funding support proposed to monitor the relocation.

Relocation options may include passive relocation to another area of the site not subject to disturbance through one way doors on burrow openings, or construction of artificial burrows in accordance with the CDFG's October 17, 1995, Staff Report on Burrowing Owls Mitigation (see Appendix D).

(5) Where on-site avoidance is not possible, disturbance and/or destruction of burrows shall be offset through development of suitable habitat on TNBC upland reserves. Such habitat shall include creation of new burrows with adequate foraging area (a minimum of 6.5 acres) or 300 feet radii around the newly created burrows. Additional habitat design and mitigation measures are described in the CDFG's October 17, 1995, Staff Report on Burrowing Owl Mitigation (see Appendix D).

i. Measures to Reduce Take on Bank Swallow

(1) Disturbance to bank swallows nesting colonies will be avoided within the nesting season of May 1 through August 31 (or until a qualified biologist, with concurrence of USFWS and CDFG, has determined that young have fledged or that the nest is no longer occupied) during all Authorized Development activities conducted in the Permit Areas.

(2) If surveys identify an active bank swallow nesting colony that will be impacted by Authorized Development, the developer shall install brightly colored construction fencing that establishes a boundary 250 feet from the active nesting colony. No disturbance associated with Authorized Development shall occur within the 250 foot fenced area during the nesting season of May 1 through August 31. Additionally, disturbance within ½ mile upstream or downstream of the colony will be avoided if the colony is located upon a natural waterway.

j. Measures to Reduce Take on Northwestern Pond Turtle

(1) Take of the northwestern pond turtle as a result of habitat destruction during construction activities, including the removal of irrigation ditches and drains, and during ditch and drain maintenance, will be minimized by the dewatering requirement described above for giant garter snake (see Section 5.a.(3)).

k. Measures to Reduce Take on California Tiger Salamander

(1) Prior to approval of an Urban Development Permit, the involved Land Use Agency shall require a pre-construction survey. If a future survey determine the presence of California tiger salamander, the Land Use Agency shall require the developer to consult with USFWS and CDFG to determine appropriate measures to avoid and minimize take of individuals.

l. Measures to Reduce Take on Western Spadefoot Toad

(1) Prior to approval of an Urban Development Permit, the involved Land Use Agency shall require a pre-construction survey. If such survey determines western spadefoot toad are

present, the Land Use Agency shall require the developer to consult with CDFG and USFWS to determine appropriate measures to avoid and minimize take of individuals.

m. Measures to Reduce Take of Vernal Pool Fairy Shrimp, Vernal Pool Tadpole Shrimp, and Midvalley Fairy Shrimp

(1) Prior to approval of an Urban Development Permit, the involved Land Use Agency shall require a pre-construction survey. If such survey determine vernal pool fairy shrimp, vernal pool tadpole shrimp, and midvalley fairy shrimp are present, the Land Use Agency shall require the developer to consult with USFWS to determine appropriate measures to avoid and minimize take of individuals. Procedures for reviewing projects that could affect vernal pools and vernal pool species are discussed under Section V.A.4 above.

n. Measures to Reduce Take of Delta Tule Pea

(1) If Delta tule pea plants are identified through a pre-construction survey, the involved Land Use Agency shall provide notice to USFWS, CDFG and the California Native Plan Society. Under such circumstances, the development proponent shall allow the transplantation of plants prior to site disturbance.

o. Measures to Reduce Take on Sanford's Arrowhead

(1) If Sanford's arrowhead plants are identified through a pre-construction survey, the involved Land Use Agency shall provide notice to USFWS, CDFG and the California Native Plant Society. Under such circumstances, the development proponent shall allow the transplantation of plants prior to site disturbance.

p. Measures to Reduce Take on Boggs Lake Hedge-Hyssop, Sacramento Orcutt Grass, Slender Orcutt Grass, Colusa Grass, and Legenere

(1) Prior to approval of an Urban Development Permit, the involved Land Use Agency shall require a pre-construction survey. If such survey determines Boggs Lake hedge-hyssop, Sacramento orcutt grass, Slender orcutt grass, Colusa grass, or legenere are present, the Land Use Agency shall require the developer to consult with USFWS to determine appropriate measures to avoid and minimize loss of individuals. If Authorized Development is proposed for areas containing vernal pools, the applicant will be required to complete additional review, permitting and mitigation as described under Section V.A.4.

B. THE NATOMAS BASIN CONSERVANCY'S (TNBC) CONSERVATION MEASURES

As a Permittee, TNBC shall employ a number of measures to avoid, minimize and mitigate take of Covered Species during the undertaking of the TNBC's Covered Activities. The TNBC's Covered Activities include the acquisition and management of habitat reserves including where approved through site specific management plans, development activities necessary to create suitable supportive habitat for the Covered Species. Chapter IV, the Conservation Plan, outlines a number of actions which the TNBC will use to avoid take in the acquisition and management of habitat reserves. In addition to those measures specified in Chapter IV, the TNBC shall also employ the following measures.

1. General Conservation Strategies

The Existing Conditions Biological Assessment, as described in Section IV.D.1.a, shall document the types of habitat present on newly acquired reserves and the Covered Species that might be present on the site. The data collected through the Existing Conditions Biological Assessment shall be utilized to identify general strategies to avoid take of Covered Species during the acquisition, development and management phases of reserve operations. Not less than 30 days prior to commencement of major construction activities on specific reserve sites, TNBC shall conduct a formal pre-construction survey of the site to determine the status and presence of, and likely impacts to, all Covered Species on the site. For purpose of TNBC, major construction shall include site grading or contouring, dredging or filling of ditches or drainage systems, construction of reserve access roads or other structures. Actions involving substantial vegetation removal or the removal shall also be subject to pre-construction survey, which may be more focused to identify the presence of nests of Covered Species, other likely species impacts. TNBC will utilize qualified biological consultants to carry out the pre-construction surveys, and as necessary, to implement specific take minimization measures set forth in the NBHCP and approved by the Wildlife Agencies.

2. Conservation Strategies for Wetland Species and Reserves

The TNBC shall employ the wetland conservation acquisition and management strategies included in Chapter IV.

3. Conservation Strategies for Upland Species and Reserves

The TNBC shall employ the upland conservation acquisition and management strategies included in Chapter IV.

4. Conservation Strategies for Individual Species

a. *Giant Garter Snake*

1. All construction activity involving disturbance of habitat, such as site preparation and initial grading, will be restricted to the snake's active period (May 1 - September 30).

2. Avoid construction activities within 200 feet from banks of giant garter snake aquatic habitat and confine movement of heavy equipment to existing roadways to minimize habitat disturbance to the extent feasible.

3. No plastic, monofilament, jute, or similar erosion control matting that could entangle snakes will be placed on a project site when working within 200 feet of snake aquatic or rice habitat. Possible substitutions include coconut coir matting, tactified hydroseeding compounds, or other material approved by the Wildlife Agencies.

4. Pre-construction surveys for the snake, as well as other Covered Species, will be completed for all development projects by a qualified biologist who has been approved by the Service. If snake habitat is found within a specific site, the following additional measures shall be implemented to minimize disturbance of habitat and harassment of the snake, unless that project is specifically exempted by the Service:

   (a) Between April 15 and September 30, all irrigation ditches, canals, or other aquatic habitat will be completely dewatered, with no puddled water remaining, for at least 15 consecutive days prior to the excavation or filling in of the dewatered habitat. The dewatered habitat will be observed to ensure that it does not continue to support snake prey, which could attract snakes to the project site. If a site cannot be completely dewatered, snake prey items will be removed using netting or other salvage methods.

   (b) No more than 24-hours prior to the start of construction activities (site preparation and/or grading), the project area shall be surveyed for snakes. If construction activities stop on the project site for a period of two weeks or more, a new snake survey shall be completed no more than 24-hours prior to the re-start of construction activities.

   (c) Clearing will be confined to the minimal area necessary to facilitate construction activities. Snake habitat within or adjacent to the project will be flagged for avoidance. The avoidance area shall be avoided by all construction personnel.

   (d) Construction personnel completing site preparation and grading operations shall receive Service-approved environmental awareness training. This training instructs workers on how to identify the snake and its habitats and what to do if a snake is encountered during

construction activities. An on-site biological monitor will be designated during the training.

(e) If a live snake is found during construction activities, the Service and the project's biological monitor will be immediately notified. The biological monitor, or his/her assignee, shall halt construction in the vicinity of the snake. The snake will be monitored and allowed to leave the area on its own. The monitor shall remain in the area for the remainder of the work day to make sure the snake is not harmed or, if it leaves the site, does not return. Escape routes for the snake should be determined in advance of construction and snakes should always be allowed to leave on their own. If a snake does not leave on its own within one working day, further consultation with the Service will be conducted.

(f) Upon locating dead, injured or sick Covered Species, the Conservancy or its designated agents shall notify, within one working day, the Service's Division of Law Enforcement (2800 Cottage Way, Sacramento CA 95825) or the Sacramento Fish and Wildlife Office (2800 Cottage Way, Room W-2605, Sacramento, CA 95825, telephone 916 414-6600). Written notification to both offices will be made within three calendar days and will include the date, time, and location of the finding of a specimen and any other pertinent information.

(g) Fill or construction debris may be used by the snake as an over-wintering site. Therefore, upon completion of construction activities, any temporary fill and/or construction debris will be removed from the site. If the material is located near undisturbed snake habitat and will be removed between October 1 and April 30, it shall be inspected by a qualified biologist to ensure that snakes are not using it as hibernaculae.

b. *Swainson's Hawk*

TNBC shall implement the following measures to further enhance habitat and to reduce the potential for take of upland Covered Species during improvement, operation and maintenance of TNBC reserves:

(1) TNBC, in conjunction with the Land Use Agencies, will monitor proposed development in the Swainson's Hawk Zone, where the majority of known Swainson's hawk nest sites are currently located and, hence, much of the Swainson's hawk nesting and foraging in the Basin occurs. Based on existing general plans and the City's and Sutter County's NBHCP Permit Areas, development in this zone is expected to be limited over the life of the Plan. However, if the NBHCP is amended and such development does occur, Mitigation Lands established for such development shall, likewise, be located within the Swainson's Hawk Zone. In addition, TNBC shall set as a top priority the acquisition of upland reserve sites in the Swainson's Hawk Zone (via easement or land purchase. Further, any reserve lands established in the Swainson's Hawk Zone shall, to the maximum extent possible, be

managed to benefit all upland-associated Covered Species, though any management in this zone must be fully consistent with Swainson's hawk biology and needs.

(2) To enhance the success of the species, TNBC reserves shall include tree plantings of valley oaks (*quercus lobata*), cottonwoods (*populus fremontii*), various willow including black willow or other suitable species to recreate suitable nesting sites for the Swainson's hawk over the life of the Plan. Such tree planting shall be in reasonable proximity to upland foraging areas covered by the conservation plan including agricultural areas managed by TNBC.

(3) For rice fields operated by TNBC, rice production practices to increase habitat for Swainson's hawk shall be incorporated. This includes allowing at least 10% of rice fields to fallow each year as well as allowing foraging before and after rice flooding. It is estimated that during the time hawks are present in the Basin, drained or flooded rice fields provide foraging habitat for an average of 2 months every year. Additionally, it is expected, that wildlife friendly agricultural practices (organic farming, providing crop residual for rodent production, similar to those used at the nearby Cosumnes River Preserve), will greatly increase the habitat value of ricelands to the hawk and other Covered Species.

(4) Where possible develop or restore upland components of wetland reserves such that upland Covered Species, including the Swainson's hawk also benefit from the habitat. Thus, wetland reserves, along with the upland reserves described above, will help offset habitat losses affecting the Swainson's hawk within the NBHCP Plan Area. Also, the upland component of wetland reserves will benefit some of the upland Covered Species, especially those that also have wetland habitat needs (e.g., the tricolored blackbird).

(5) Utilize best management practices to ensure availability of food sources for Swainson's hawk including meadow mice (*Microtus californicus*) and insects. In the Central Valley, meadow mice and insects make up a significant portion of the Swainson's hawk's diet. In the management of nearby similarly designed preserves (e.g., Beach Lake Mitigation Bank, Stones Lakes National Wildlife Refuge), the increased availability of water in previously dry grasslands has increased *Microtus* abundance (Caltrans, 1991). This would be expected given the biological requirement of *Microtus* for green food. This species has been found to increase its reproductive rate nearly ten-fold in the presence of persistent green food over dry grasses (Batzli, 1986; Bowen, 1987; Gill, 1976). Those green plant species generally preferred by *Microtus* (bent grass, chickweed, bedstraw, sorrel, plantain and bromus) are tolerant of limited inundation and will do well in a seasonally wetland environment, as well as those ruderal habitats associated with agricultural and water conveyance systems (Ostfeld and Klosterman, 1986). It is expected that the Water Agencies' Covered Activities on nearly 250 miles of canals, improved agricultural practices timing of water management (floodup and drawdown) on reserve lands, and the increase

in edge or ecotone between upland and wetland habitats will greatly enhance upland habitat values for Swainson's hawk.

(6) Specific plans for acquisition of upland habitat reserve lands will be determined by TNBC in consultation with the Technical Advisory Committee, by applying the objectives and criteria described above, and consistent with the requirements described in Chapter IV. Specific management plans for reserve sites providing Swainson's hawk habitat will be developed as described in Chapter IV.

(7) Upland reserves will initially be designed to maintain existing Swainson's hawk populations and, where possible, to increase such populations through the tree planting program. However, such reserves will be re-designed, as necessary, to meet Swainson's hawk recovery plan goals, once a Swainson's Hawk Recovery Plan is prepared and approved by CDFG.

(8) Reserve design will use wildlife friendly agricultural practices. For health and safety reasons rodent control measures will be limited to that necessary to maintain structurally sound flood control levees within the Basin.

Measures to Reduce Swainson's Hawk Nest Disturbance

(1) Prior to the commencement of development activities at any reserve site within the NBHCP area, a pre-construction survey shall be completed by TNBC to determine whether any Swainson's hawk nest trees will be removed on-site or active Swainson's hawk nest sites occur on or within ½ mile of the development site. These surveys shall be conducted according to the Swainson's Hawk Technical Advisory Committee's (May 31, 2000) methodology or updated methodologies, as approved by the site specific management plan for the reserve site.

(2) If an active Swainson's hawk nest is identified, no new disturbances (e.g., heavy equipment operation associated with construction) will occur within ½ mile of an active nest site between March 15 and September 15. If the active site is located within 1/4 mile of existing urban development the no new disturbance zone can be limited to the 1/4 mile versus ½ mile. Routine disturbances such as agricultural activities, commuter traffic and routine facility maintenance activities within ½ mile of an active nest site are not restricted.

(3) If practicable, disturbance or destruction of Swainson's hawk nest sites shall be entirely avoided by designing the project (including construction activities) to maintain the year-round integrity of the nest site.

(4) If practicable, disturbance or destruction of Swainson's hawk nest sites shall be avoided during the active nesting season through seasonal use or other restrictions that apply annually or as needed.

(5) Where disturbance of a Swainson's hawk nest cannot be avoided, such disturbance shall be temporarily avoided (i.e., defer construction activities until after the nesting season) and then if unavoidable, the nest tree may by destroyed during the non-nesting season. For purposes of this provision the Swainson's hawk nesting season is defined as March 15 to September 15. If any tree must be removed that has an active nest in the year the impact is to occur, the tree removal should only occur between September 15 and February 1.

(6) Disturbance should be avoided within ½ mile of an active nest between March 15 through August 15, or until fledglings are no longer dependent on nest tree habitat (which could be as late as September 15).

(7) If a Swainson's hawk nest tree is to be removed and fledglings are present the tree may not be removed until September 15 or until the CDFG has determined that the young have fledged and are no longer dependent upon the nest tree.

Measures to Prevent the Loss of Swainson's Hawk Nest Trees

As part of the Urban Development Permit process, the Land Use Agencies will seek to preserve valley oaks, tree groves, riparian habitat and other large trees wherever and whenever possible on publicly owned or controlled lands..

Measures to Mitigate the Loss of Swainson's Hawk Nest Trees

TNBC shall plant replacement trees in upland reserve areas and where appropriate on the edges of wetland reserves. These trees may be contributed to the reserve as part of the Land Use Agencies' tree mitigation program or may be determined to be important to the habitat enhancement of objectives of the site. The replacement mitigation trees shall include a variety of native tree species with differing growth rates, maturation and life span. This will ensure that nesting habitat will be available quickly (5 to 10 years in the case of cottonwoods and willows) and in the long term (i.e., valley oaks, black walnut and sycamores). Trees shall be sited on reserves in proximity to hawk foraging areas.

c. *Tricolored Blackbird (Foraging)*

(1) As part of baseline species survey for each reserve and as part of the annual survey of reserves, any colonization by tricolored blackbirds shall be recorded by location and if possible, with a population estimate and activity description.

(2) Where tricolored blackbirds have been observed in colonies (active nesting and foraging), the nesting area and a reasonable foraging area adjacent to the nesting area within the reserve shall be identified and incorporated into the site specific plan, or if necessary accommodated through adaptive management of an existing developed reserve.

(3) In order to enhance wetland to upland edges of reserves to attract tricolored blackbirds, plantings of wild rose, tule and cattails shall be incorporated in habitat reserve units where biologically appropriate.

(4) During the nesting season, disturbance of foraging areas adjacent to active nest sites or previously active nest sites on reserve lands shall be avoided to the maximum extent possible. If nests are occupied, a reasonable buffer of foraging lands adjacent to the nest shall be marked and protected on reserve lands.

Tricolored Blackbird (Nesting)

(1) Disturbance to tricolored blackbird nesting colonies will be strictly avoided within the nesting season (April 1 to July 1 or while birds are present) during TNBC development and management activities undertaken on TNBC property in wetland and upland reserve areas unless approved by the Wildlife Agencies. In accordance with the Migratory Bird Treaty Act, disturbance to active (occupied) nesting colonies will be avoided during the nesting season. A boundary shall be established (through a method determined by TNBC and in consultation with the TAC) to establish a boundary 500 feet from the active nest site on reserve lands. No disturbance associated with TNBC reserve construction, such as major grading operations, shall occur within the designated 500 foot buffer of the reserve during the nesting season of April 1 through July 1 or while birds are present, unless a qualified biologist, with concurrence of USFWS and CDFG, determines young have fledged and nest sites are no longer active. Routine disturbances such as agricultural activities and TNBC reserve management within 500 feet of an active nest site are not restricted so long as no physical disturbance to the nest site occurs.

(2) During the nesting season, disturbance of foraging areas adjacent to active nest sites or previously active nest sites on reserve lands shall be avoided to the maximum extent possible. If nests are occupied, a reasonable buffer of foraging lands adjacent to the nest shall be marked and protected on reserve lands if construction or major grading operations are occurring on the Reserve.

(3) Plantings of wild rose, tule and cattails shall be incorporated in habitat reserve units where biologically appropriate to enhance tricolored blackbird nesting habitat.

d. *Loggerhead Shrike*

(1) TNBC shall encourage and maintain loggerhead shrike perching and nesting sites to the maximum extent practicable on all Conservancy lands.

(2) TNBC shall avoid disturbance to loggerhead shrike nest sites and disturbance of the loggerhead shrike during nesting season during reserve management and enhancement activities to the maximum extent practicable unless otherwise approved by TNBC and in consultation with the TAC.

(3) If the loggerhead shrike nests on a TNBC reserve, TNBC shall identify and mark (through a method determined appropriate by TNBC and in consultation with the TAC) a buffer extending 100 feet from the active nest on reserve lands. No disturbance associated with TNBC reserve construction, such as major grading activities, shall occur within the 100 foot marked area during the nesting season of March 1 through July 31, unless a qualified biologist, with concurrence of the Wildlife Agencies, determines young have fledged or that the nest is no longer occupied. Routine disturbances such as agricultural activities and TNBC reserve management within 100 feet of an active nest site are not restricted so long as no physical disturbance to the nest site occurs.

e. *Burrowing Owl*

(1) TNBC will avoid disturbance to active burrowing owl nesting burrows during reserve management activities to the maximum extent practicable. Disturbance to burrowing owl nesting colonies will be strictly avoided within the nesting season (February 1 through August 31) or while birds are present unless otherwise approved by the Wildlife Agencies The Guidelines for Burrowing Owl Mitigation (Appendix D) shall be utilized to the extent practicable to avoid active nests during reserve construction and management activities.

(2) TNBC shall utilize applicable Service or CDFG approved burrowing owl recovery or management plans, and the Adaptive Management provisions described in Section VI.F of this document to implement any additional conservation measures deemed appropriate should use of the Plan Area by this species appreciably increase at any time in the future.

(3) In upland reserve areas, TNBC may be asked to create new burrowing owl habitat by creating new burrows or restoring old burrows, based on avoidance, minimization and mitigation measures applied by the Land Use Agency Permittees to proponents of Authorized Development (see Section V.A.5.h). New habitat shall include adequate foraging area around the burrow, and burrow design shall be done in consultation with qualified biologists. Additional habitat design and mitigation measures are described in the CDFG's October 17, 1995, Staff Report on Burrowing Owl Mitigation (see Appendix D).

f. *Bank Swallow*

(1) TNBC will avoid disturbance to active bank swallow nesting burrows during reserve management activities to the maximum extent practicable.

(2) TNBC shall utilize applicable Service or CDFG approved bank swallow recovery or management plans, and the Adaptive Management provisions described in Section VI.F of this document to implement any additional conservation measures deemed appropriate should use of the Plan Area by this species appreciably increase at any time in the future.

(3) Disturbance to bank swallow nesting colonies will be strictly avoided within the nesting season (May 1 through August 31 or until a qualified biologist, with concurrence of USFWS and CDFG, has determined that young have fledged or that the nest is no longer occupied) during TNBC reserve development and management activities unless otherwise approved by the Wildlife Agencies.

(4) If surveys identify an active bank swallow nesting colony that will be impacted by TNBC activities, TNBC shall identify and mark (through a method to be determined by TNBC in consultation with the TAC) a boundary 250 feet from the active nesting colony on reserve lands. No disturbance associated with TNBC activities shall occur within the 250 foot marked area of the reserve during the nesting season of May 1 through August 31. Additionally, disturbance within ½ mile upstream or downstream of the colony on reserve lands will be avoided if the colony is located upon a natural waterway. Routine disturbances such as agricultural activities and TNBC reserve management within 250 feet of an active nesting colony or within ½ mile upstream or downstream of an active nesting colony are not restricted so long as no physical disturbance to the nest site occurs.

g. *Aleutian Canada Goose*

TNBC shall utilize applicable Service approved Aleutian Canada goose recovery or management plans, and the Adaptive Management provisions described in this document, to implement any additional conservation measures deemed appropriate should use of the Plan Area by this species appreciably increase at any time in the future.

h. *White-faced Ibis*

(1) TNBC shall utilize applicable Service approved white-faced ibis recovery or management plans, and the Adaptive Management provisions described in this document, to implement any additional conservation measures deemed appropriate should use of the Plan Area by this species appreciably increase at any time in the future.

(2) Disturbance to white-faced ibis nesting colonies by TNBC reserve construction activities will be strictly avoided within the nesting season (May 15 to August 31 or while birds are present, or until a qualified biologist, with concurrence of the Wildlife Agencies, has determined that young have fledged or that the nest is no longer occupied). During the nesting season, a foraging buffer 1/4 mile in width shall be identified around any active nest site to ensure minimal disturbance to the nest and nearby foraging areas on reserve lands. Routine disturbances such as agricultural activities and TNBC reserve management within 250 feet of an active nesting colony are not restricted so long as no physical disturbance to the nest site occurs.

i. *Northwestern Pond Turtle*

TNBC shall consult with northwestern pond turtle researchers and experts periodically during implementation of the NBHCP to determine what, if any, conservation opportunities for this species might exist within TNBC's reserve system. TNBC shall implement such conservation measures through the Plan's Adaptive Management provisions as appropriate. Such opportunities might include, but are not limited to, provision of suitable upland habitat for nesting (e.g., unshaded slopes), plentiful basking sites (e.g., floating snags), and shallow water with dense emergent and submergent vegetation for juveniles.

j. *Valley Elderberry Longhorn Beetle (VELB)*

(1) During reserve development activities, impacts to VELB habitat will be avoided whenever possible. Projects will be designed to avoid stands of elderberry bushes and to avoid isolation of the plants from other nearby populations to the maximum extent practicable. Pre-construction surveys at the construction impact site will be conducted to assess the appropriate amount of mitigation.

(2) If elderberry plants cannot be avoided, they should be transplanted during the dormant season (November 1 to February 15) to an area protected in perpetuity and approved by the USFWS.

(3) Replacement seedling plants will be provided at a ratio of 2 to 1 through 5 to 1 depending on the extent of beetle utilization of the plants moved or lost. An 1,800-square foot area will be provided for each transplanted elderberry shrub or every five elderberry seedling plants.

k. *California Tiger Salamander*

TNBC shall consult with the TAC and California tiger salamander researchers and experts periodically during implementation of the Plan to determine what, if any, additional conservation

opportunities for this species might exist within the Plan's proposed reserve system. TNBC shall implement such conservation measures through the Plan's Adaptive Management and the Site Specific Management Plans prepared for reserve sites as appropriate. Such opportunities might include, but are not limited to, establishment or creation of wetland and upland habitats suitable for tiger salamanders within the reserve system (e.g., stock ponds or "artificial" vernal pools with nearby natural materials for cover such as logs or large rocks). Possible relocation and re-introduction of tiger salamanders into the TNBC reserve system may be considered if preconstruction surveys or other NBHCP monitoring show the species is impacted by Authorized Development.

l. *Western Spadefoot Toad*

TNBC shall consult with the TAC and western spadefoot toad experts periodically during implementation of the NBHCP to determine what, if any, additional conservation opportunities for this species might exist within the Plan's proposed reserve system. TNBC shall implement such conservation measures through the Plan's Adaptive Management provisions and through the Site Specific Management Plans prepared for each reserve site as appropriate. In the event preconstruction surveys or other scientific evidence show that the western spadefoot toad is impacted by authorized development, TNBC shall consider creating habitat within reserve sites that is conducive to western spadefoot toads, such as areas of slow-moving waters such as pools and plunge pools of small creeks, and short grasses with sandy or gravelly soils, and other grassy areas.

m. *Vernal Pool Fairy Shrimp, Vernal Pool Tadpole Shrimp and Midvalley Fairy Shrimp*

TNBC shall consult with the TAC, and fairy shrimp and tadpole shrimp experts periodically during implementation of the NBHCP to determine what, if any, additional conservation opportunities for vernal pool fairy shrimp, vernal pool tadpole shrimp and midvalley fairy shrimp might exist within the proposed reserve system. In the event preconstruction surveys or other scientific information document impacts to these species from authorized development, TNBC shall implement such conservation measures through the Plan's Adaptive Management provisions and Site Specific Management Plan prepared for each reserve site as appropriate.

n. *Delta Tule Pea*

(1) TNBC shall evaluate the potential for, and as appropriate, implement measures to further the conservation of Delta tule pea within the NBHCP's reserve system through appropriate means,. In the event preconstruction surveys or other scientific documentation indicate impacts to the Delta Tule Pea as a result of authorized development, the TNBC's adaptive management program and Site Specific Management Plan process shall be used to further the conservation of the species including but not limited to, introduction of the plant into suitable locations on TNBC reserve sites.

(2) TNBC shall monitor any known populations of plant Covered Species within the NBHCP area.

o. *Sanford's Arrowhead*

(1) TNBC shall evaluate the potential for, and as appropriate, implement measures to further the conservation of Sanford's arrowhead within the NBHCP's reserve system through appropriate means,. In the event preconstruction surveys or other scientific documentation indicate impacts to the Delta Tule Peas as a result of authorized development, the TNBC's adaptive management program and Site Specific Management Plan process shall be used to further the conservation of the species including but not limited to, introduction of the plant into suitable locations on TNBC reserve sites.

(2) TNBC shall monitor any known populations of plant Covered Species within the NBHCP area.

p. *Other Covered Plant Species*

TNBC shall evaluate the potential for, and as appropriate, implement measures to further the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means,. In the event preconstruction surveys or other scientific documentation indicate impacts to Bogg's Lake hedge-hyssop, Sacramento orcutt grass, Slender orcutt grass, Colusa grass and/or legenere as a result of authorized development, the TNBC's adaptive management program and Site Specific Management Plan process shall be used to further the conservation of the species including but not limited to, introduction of the impacted plant species into suitable locations on TNBC reserve sites. Bogg's Lake hedge-hyssop, Sacramento orcutt grass, Slender orcutt grass, Colusa grass and legenere into vernal pool areas or other suitable locations in the NBHCP area.

C. WATER AGENCIES' CONSERVATION MEASURES

The following provisions were developed through preliminary consultations between the NBHCP Permittees, the Water Agencies and the Wildlife Agencies. At such time as the Water Agencies seek Incidental Take Permits through this NBHCP, the following covered activities and conservation measures will be reviewed and revised as determined necessary by the Wildlife Agencies.

The Water Agencies (RD 1000 and Natomas Mutual collectively) shall employ various conservation measures to avoid and minimize take of Covered Species during the Water Agencies' operations and maintenance. Described below are the Water Agencies' Covered Activities and specific measures to be employed by the Water Agencies to avoid, minimize and mitigate take of Covered Species.

1. Water Agencies' Covered Activities

The Water Agencies' respective Section 10(a)(I)(B) and Section 2081 permits shall provide incidental take coverage for the following Operations and Maintenance (O&M) activities undertaken by the Water Agencies or their authorized agents, as noted in Section I.N.2 and restated here:

(1) De-silting
(2) Excavation and re-sloping of ditches and channels
(3) Deposition of ditch and canal spoils materials on adjacent property
(4) Placement of fill material
(5) Control of vegetation in and around canals, ditches, and drains by mowing and other measures to provide necessary operation and maintenance of canals as needed which would be presented to the Wildlife Agencies on a three year basis for review and approval.
(6) Construction and improvement with no significant increase to the existing footprint, of flood control and water conveyance facilities, water ditches, canals, pumphouses or maintenance facilities, and other ancillary facilities that are owned or operated by RD 1000 or Natomas Mutual

2. Water Agencies' Facilities

The water conveyance systems of RD 1000 and Natomas Mutual consist of over 247 miles of ditches and canals that provide habitat for the giant garter snake and other Covered Species. The Water Agencies' existing water delivery and drainage system is depicted in Figure 3. One component of the conveyance system consists of a series of drains that are owned and maintained by RD 1000. RD 1000 is charged by California law to maintain its drainage in its service area. Another component of the conveyance system consists of irrigation canals that are owned, operated and maintained by Natomas Mutual a non-profit mutual company. In many areas of the Basin, however, Natomas Mutual utilizes portions of the RD 1000 system to convey surface water to its customers. Operation and maintenance of the existing water conveyance system in the Natomas Basin is critical for the Water Agencies to fulfill their obligations in their respective areas.

Maintenance by the Water Agencies of the conveyance system in the Natomas Basin is, and has been, limited historically by practical considerations, including economic and physical constraints. Natomas Mutual is a non-profit company, and funding for RD 1000 comes from property owner assessments within RD 1000's service area. Staff at both agencies who are available for operations and maintenance are limited in number. As a practical matter, these constraints tend to prevent intensive maintenance of large portions of the water conveyance system in Natomas Basin during any given year. Thus while maintenance of canals, ditches and drains in the Natomas Basin is an important function for both RD 1000 and Natomas Mutual, intensive maintenance by the Water Agencies to maximize agricultural irrigation and flood control services throughout the Basin each year is not always feasible. In light of these constraints, the Water Agencies' primary operations and maintenance efforts during any given year focus on keeping the water

conveyance systems functioning in a manner that ensures timely movement of irrigation water for agricultural purposes, and drainage of agricultural water and urban flows from lands within the Basin.

Although operations will vary from year to year, RD 1000's and Natomas Mutual's operations and maintenance activities in prior years underscore the limited extent of such activities during any given year. For instance, in 1999, RD 1000 worked on a total of 26.5 miles of drains, canals, and channels, of which RD 1000 desilted 19 miles of the system, and resloped 11.5 miles. In 2000, RD 1000 worked on a total of 28.25 miles of drains, canals, and channels, which RD 1000 desilted 12.75 miles and resloped 14.5 miles. In both 1999 and 2000, RD. 1000 controlled weed growth on 75% of the drains with herbicide to control weed growth and mowed approximately 50% of the drains to a height of six inches or higher.

Records maintained by Natomas Mutual regarding operations and maintenance activities during prior years underscore the same point. In 1999, for example, Natomas Mutual replaced service gates, replaced or repaired canal gates and weirs, repaired pumps, as well as excavated and resloped portions of fourteen canals and ditches. In addition, Natomas Mutual purchased a gasoline tank for the headquarters yard. Natomas Mutual also rebuilt 2.2 miles of canals, and cleaned or sloped 5.4 miles of canals, affecting less than 3% of the Natomas Basin ditch system operated by Natomas Mutual and RD1000 . Finally, in any given year, Natomas Mutual generally limits its use of herbicides primarily to maintenance roads. (Note: use of herbicides, rodenticides and pesticides is not a Covered Activity of the Water Agencies for purposes of the NBHCP and related incidental take permits.) Although activities vary from year to year, the activities described above are typical of RD 1000's and Natomas Mutual's operation and maintenance activities.

Minimizing and avoiding impacts associated with maintenance activities, to the extent feasible, is the continuing goal of the Water Agencies, as well as of the Plan itself. Current operations and maintenance activities by the Water Agencies are the result of previous efforts by various affected stakeholders to establish guidelines or "best management practices" ("BMPs") for water users in the Sacramento Valley. These efforts culminated in 1996, with the release of a report prepared by Sacramento Valley water users, USFWS, and CDFG entitled "Operation and Maintenance Guidelines for Sacramento Valley Water Users Having Verified Giant Garter Snake Populations" ("Guidelines Report"). The Guidelines Report describes BMPs to minimize the impacts of operating and maintaining water conveyance systems in the Sacramento Valley on giant garter snakes inhabiting these systems. RD 1000 and Natomas Mutual participated in the development of the BMPs in the Guidelines Report.

In 1997, the Water Agencies proactively adopted the Guidelines Report BMPs as standard procedure for operations and maintenance activities within their respective service areas. 1996 Guidelines Report BMPs have been adapted for purposes of the Plan. At such time as one or both of the Water Agencies seeks Incidental Take Permits through the NBHCP, the Water Agencies' operational guidelines and conservation measures described within this NBHCP will be reviewed and modified as necessary prior to issuance of their respective Section l0(a)(1)(B) and Section 2081 permits. RD 1000, Natomas Mutual, USFWS, and CDFG recognize that the Water Agencies, in adhering to and implementing the BMPs and

conservation measures described within a NBHCP, are obligated by statute to provide services in a manner consistent with public health, safety and welfare. Pursuant to that charge, in certain limited circumstances, particularly those involving flood-related events, RD 1000, Natomas Mutual, USFWS and CDFG recognize that public health and safety considerations may prevent compliance with the prescribed BMPs on a short-term, interim basis. Such temporary deviations are anticipated to have at most short term adverse impacts on the Covered Species.

3. Water Agencies' Conservation Measures for Giant Garter Snake

In addition to the Water Agencies' avoidance, minimization, and mitigation measures described herein and as modified prior to issuance of Incidental Take Permits, the Water Agencies shall comply with all other applicable Federal, State and local regulations that pertain to the proposed Covered Activities.

a. Conservation Objectives for the Giant Garter Snake

The Plan's conservation objectives for giant garter snake and other Covered Species dependent on similar habitat are set forth in Section I.C.1. and TNBC Conservation Strategy for giant garter snake and other wetland associated species is discussed in Section IV.C.3. With respect to the Water Agencies specifically, these objectives are designed: (a) to ensure and maintain the long-term integrity of the Natomas Basin giant garter snake population and other Covered Species dependent on similar habitat; and (b) to avoid, minimize and mitigate impacts on the giant garter snake and other Covered Species caused by the Water Agencies' Covered Activities. Consistent with their respective 10(a)(I)(B) and 2081 permits, the Water Agencies will, among other things, coordinate as appropriate with the other Permittees to achieve the biological goals and objectives of the Plan [Section I.C] for giant garter snake and other Covered Species dependent on similar habitat.

b. Canal and Ditch Maintenance

(1) Location of Ditch and Canal Maintenance Operations

RD 1000 and Natomas Mutual shall limit canal and ditch maintenance activities (activities involving excavation, desilting and/or resloping of channels) during any calendar year to not more than ten percent (10%) of the total miles of canals and ditches within each Water Agencies' respective service area. Where giant garter snakes are known to exist, the timing of these activities shall be restricted to after May 1 and before October 1 in any calendar year. Consistent with this limitation, re-sloping of canals and ditches by RD 1000, Natomas Mutual, and agents under the direct control and acting on behalf of the Water Agencies, within the Water Agencies' respective service areas, shall be restricted to one side of the canal or ditch during any calendar year, unless otherwise necessary to ensure adequate water conveyance.

(2) De-Watering and Filling of Ditches and Canals

From May 1 to September 30 of any calendar year, before RD 1000, Natomas Mutual and agents acting on behalf of the Water Agencies, fill or caused to be filled any ditch or canal within the Water Agencies' respective service areas, the Water Agencies and agents under the direct control and acting on behalf of the Water Agencies, shall de-water or cause to be de-watered any existing canal or ditch prior to filling such canal or ditch with soil or other fill material. After de-watering any such canal or ditch, RD 1000, Natomas Mutual, and agents under the direct control and acting on behalf of the Water Agencies, and water users within the Water Agencies' respective service areas, shall wait a period of fifteen(15) days prior to filling such a de-watered canal or ditch.

(3) Vegetation Control

The measures set forth below shall govern activities by RD 1000, Natomas Mutual, and agents acting on behalf of the Water Agencies, within the Water Agencies' respective service areas, to control vegetation in and on canals ditches and drains within existing service areas of RD 1000 and Natomas Mutual as shown in Figure 3. RD 1000, Natomas Mutual, USFWS and CDFG recognize that the vegetation control measures set forth below may be used separately or in combination by RD 1000, Natomas Mutual, and agents acting on behalf of the Water Agencies within the Water Agencies' respective service areas. Likewise, because RD 1000, Natomas Mutual, and agents acting on behalf of the Water Agencies, within the Water Agencies' respective service areas currently utilize many different types of vegetation control on canals, ditches and drains, the list of vegetation control measures set forth below is not intended to be exclusive.

(a) General Forage and Cover Preservation Strategies

Best management practices as delineated below, for the nearly 250 miles of canals within the Basin will seek to preserve vegetative cover which will provide food and protection for a productive prey base. This prey base will disperse onto adjacent habitats where it will be available as Swainson's hawk forage and forage for other species.

(b) Mowing

For any mowing activity by RD 1000, Natomas Mutual, and agents under the direct control and acting on behalf of the Water Agencies, within the Water Agencies' respective service areas to control terrestrial vegetative cover on top of, and inside, canal banks to the water line, the remaining vegetation shall be not less than 6 inches in height measured from the ground.

(c) Burning

Burning by RD 1000, Natomas Mutual, and agents under the direct control and acting on behalf of the Water Agencies, within the Water Agencies' respective service areas to control vegetation on ditches and canals shall be conducted only between October 1 and April 30. Any such burning activities shall be subject to any and all laws regarding burning activities.

(d) Detailed Management Plans

Recognizing that management and maintenance activities to be conducted by RD 1000 and Natomas Mutual may be modified over time, the Water Agencies shall submit detailed Channel Management Plans for review and approval by the Wildlife Agencies. Such Management Plans shall address the control of vegetation in and around canals, ditches, and drains by mowing and other measures to provide necessary operation and maintenance of canals as. The Water Agencies' Management Plans shall be reviewed and approved by the Wildlife Agencies on a three year basis.

(e) Education Program

RD 1000 and Natomas Mutual, with the assistance and cooperation of USFWS and CDFG, shall develop and implement a giant garter snake education and awareness program. The program shall be designed to educate RD 1000, Natomas Mutual, and agents under the direct control and acting on behalf of the Water Agencies within the Water Agencies' respective service areas regarding how best to avoid adverse impacts to the giant garter snake and its habitat that could result from canal and ditch maintenance activities, vegetation control, vehicle traffic, ditch and canal fill-in procedures, emergency operations, and chemical applications for rodent control. With the participation of USFWS and CDFG, training shall also include information on the recognition of and the basic life history requirements or critical habitat criteria for the Covered Species. The education program shall also address other aquatic and upland associated Covered Species and their habitats including but not limited to information on how to distinguish burrowing owl versus rodent dens and avoidance measures for brooding, nesting and fledgling periods for bird species which utilize emergent aquatic vegetation. The education program shall be incorporated into new employee training programs and provided annually to regular operations and maintenance staff. RD 1000 and Natomas Mutual, with the cooperation of USFWS and CDFG, shall use their best efforts to implement the education program required by this section.

(f) Traffic

RD 1000, Natomas Mutual, and agents under the direct control and acting on behalf of the Water Agencies, within the Water Agencies' respective service areas, shall minimize unauthorized traffic on canal and ditch bank roads through gate closures. RD 1000 and Natomas Mutual shall encourage water users within their respective service areas to minimize unauthorized use of canal and ditch bank roads.

(4) Erosion Control

No plastic, monofilament, jute, or similar erosion control matting that could entangle snakes will be placed on a project site when working within 200 feet of snake aquatic or rice habitat. Possible substitutions include coconut coir matting, tactified hydroseeding compounds, or other material approved by the Wildlife Agencies.

c. Emergency Operations

As noted above, RD 1000 and Natomas Mutual are obligated by statute to provide services within their respective service areas in a manner consistent with public health, safety and welfare. Accordingly, during an emergency, as defined below, public health and safety considerations may supersede compliance with the conservation measures set forth above. Such an emergency, in turn, may require alternative canal management practices by RD 1000, Natomas Mutual, and agents under the direct control and acting on behalf of the Water Agencies, within the Water Agencies' respective service areas, that are different, and/or more extensive, than those set forth above. For purposes of the Water Agencies' respective Permits, activities by RD 1000, Natomas Mutual, and agents under the direct control and acting on behalf of the Water Agencies, within the Water Agencies' respective service areas during an emergency shall be deemed "emergency operations."

For purposes of the Plan, and the Water Agencies' respective Permits, emergency operations by RD 1000, Natomas Mutual, and agents under the direct control and acting on behalf of the Water Agencies, within the Water Agencies' respective service areas, shall constitute a Covered Activity under the Plan and take associated with such emergency operations shall be authorized as follows:

(1) Declaration and Notice of Emergency

Emergency operations by RD 1000, Natomas Mutual, and agents under the direct control and acting on behalf of the Water Agencies within the Water Agencies' respective service areas, shall be authorized only where RD 1000 or Natomas Mutual declare the existence of, and notify USFWS and CDFG of, an emergency. RD 1000 or Natomas Mutual shall notify the USFWS and CDFG of an emergency requiring emergency operations as soon as possible, but no later than five (5) business days after RD 1000 or Natomas Mutual declare the existence of an emergency.

(2) Emergency Defined

An emergency shall mean a sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, or property (including but not limited to crops), or essential public services. An emergency shall not include long-term projects undertaken by RD 1000, Natomas Mutual, agents under the direct control and acting on behalf of the

Water Agencies, within the Water Agencies' respective service areas, for the purpose of preventing or mitigating a situation that has a low probability of occurrence in the short-term.

(3) Emergency Operations Defined

Emergency operations activities by RD 1000, Natomas Mutual, agents under the direct control and acting on behalf of the Water Agencies, within the Water Agencies' respective service areas, shall mean and shall be limited to activities and repairs to water conveyance facilities owned by RD 1000 or Natomas Mutual depicted in Figure 3 that are necessary in the short-term to restore or maintain services essential to the public health, safety or welfare within the Water Agencies' respective service areas, and to the prevention or mitigation of loss of, or damage to, life, health, property (including crops) or essential public services. This definition includes all post-flood repairs necessary to achieve pre-flood service levels.

(4) Duration of Emergency Requiring Emergency Operations

Emergency operations activities by RD 1000, Natomas Mutual, agents under the direct control and acting on behalf of the Water Agencies, within the Water Agencies' respective service areas, shall only be authorized as long as the emergency requiring the need for such activities persists. The duration or continued existence of an emergency requiring emergency operations by RD 1000, Natomas Mutual, agents under the direct control and acting on behalf of the Water Agencies, and water users within the Water Agencies' respective service areas, shall be determined by the party declaring the existence of an emergency.

(5) Emergency Operations and Avoidance and Minimization of Adverse Impacts

RD 1000, Natomas Mutual, agents acting on behalf of the Water Agencies, within the Water Agencies' respective service areas, shall devise and implement emergency operations activities to avoid or minimize adverse impacts to giant garter snake and other Covered Species to the extent, and at the time, feasible.

(6) Notice and Commencement of Emergency Operations

RD 1000 and Natomas Mutual shall notify USFWS and CDFG of the commencement of emergency operations within five (5) business days of the commencement of such activities. Such notification shall include a description of the emergency activities or repair work and an estimate of how long the emergency and activities and repair work responding to such emergency are expected to last. RD 1000 and Natomas Mutual shall notify USFWS and CDFG within five (5) business days when the emergency is over.

4. Reporting Requirements for Covered Activities

RD 1000 and Natomas Mutual shall provide to TNBC at the beginning of each calendar year all the following information: (1) a summary of Covered Activities conducted in the previous year; (2) deviations from the measures described above, if any, and the reasons for such deviations; (3) an annual summary accounting of the taking of any individual giant garter snakes or other Covered Species, if known, resulting from Covered Activities by RD 1000 or Natomas Mutual during the previous year; and (4) any other information deemed relevant by the Water Agencies. RD 1000 and Natomas Mutual shall also submit copies of their respective annual reports to the USFWS and CDFG.

5. Covered Activities and Adaptive Management

For purposes of the Plan, and the Water Agencies respective Section 10(a)(1)(B) and Section 2081 permits, RD 1000, Natomas Mutual, USFWS and CDFG recognize that the conservation measures and reporting requirements set forth above may need to be revised periodically to reflect ongoing giant garter snake research or management principles pursuant to the Plan's Adaptive Management Program as set forth in Section VI.F. Consistent with the Plan's Adaptive Management Program, RD 1000, Natomas Mutual, USFWS and CDFG agree to cooperate in implementing any such revisions.

Any revisions to the reporting requirements or conservation measures for Covered Activities shall be guided by the work of qualified wildlife biologists and shall take into consideration the Water Agencies' obligations to provide services to water users, land owners, and members of the public within their respective service areas in the Natomas Basin. In addition, any revisions to the Water Agencies' reporting requirements or conservation measures for Covered Activities shall have, as their specific purpose, the further avoidance or minimization of take of giant garter snakes or other Covered Species that use or rely on the water conveyance systems in Natomas Basin that are owned or operated by RD 1000 or Natomas Mutual.

6. Federal Provision of Construction Incentives for Water Districts and Users

The Draft Giant Garter Snake Recovery Plan states that financial incentives should be developed and made available to water districts and users for the following types of activities (see Draft Recovery Plan at pp. 70-71.):

(1) Funding for limited amounts of rock rip-rap along banks of levees, ditches, and canals that benefit giant garter snakes.

(2) Funding for the purchase and installation of gates and warning signs on country roads to control unauthorized vehicular traffic.

(3) Funding for security. The Water Agencies have problems with trespassers using their property to dump urban waste, which can harm giant garter snakes.

(4) Funding for water district employee training in methods of identifying and appropriately managing habitat for the giant garter snake.

For purposes of the Plan, and the Water Agencies' respective Section 10(a)(1)(B) and Section 2081 permits, RD 1000 and Natomas Mutual shall participate in the above programs if and when such programs become available and, in the opinion of RD 1000 or Natomas Mutual, are feasible.

VI. PLAN IMPLEMENTATION

Described below are general guidelines related to the NBHCP and specific obligations that will be undertaken by the Plan Operator and the Permittees during the implementation of the NBHCP. The participants who may become Permittees through participation in this HCP include:

City of Sacramento (Land Use Agency or Land Use Permittee)
Sutter County (Land Use Agency or Land Use Permittee)
RD 1000 (Water Agency or Water Agency Permittee)
Natomas Mutual Water Company (Water Agency or Water Agency Permittee)
The Natomas Basin Conservancy (TNBC, Plan Operator and TNBC Permittee)

A. TERM OF PERMIT

The Section 10(a)(1)(B) and Section 2081 permits are requested for and will be in effect for fifty years for each Permittee unless terminated earlier in accordance with the provisions of the Plan or governing law. The term of the permits commences on the date the permits are issued. The permits may be renewed if continuing activity in the Natomas Basin so requires, in accordance with all regulatory or statutory requirements then in effect.

B. FUNDING

1. The Mitigation Fee

With the exception of funding for the planting of trees to mitigate for loss or disturbance of nest trees identified in Chapter V, which is a separate obligation of the Land Use Agencies, Mitigation Land acquisition, enhancement, management, and monitoring activities under the NBHCP will be funded by a one-time, up-front fee (the "Mitigation Fee") to be levied upon an Authorized Development site (in acres) that is subject to mitigation based upon a ratio of 0.5 acres of mitigation land for every 1.0 gross acre of development (the "Mitigation Ratio"). The number of acres of the Authorized Development site will be described in the Urban Development Permit (i.e., a grading permit, notice to proceed, or authorization to commence grading). The Urban Development Permit shall clearly delineate the boundary identifying the parcels to be disturbed by the Authorized Development project. Each gross acre of Authorized Development will pay a Mitigation Fee that funds a half acre of mitigation land acquisition and associated habitat enhancement, management, endowment, administration, monitoring, etc. Table IV-1 below describes the components of the Mitigation Fee and the estimated cost established by the firm Economic Planning Systems (EPS) through its October 2002 fee study prepared for this NBHCP. Mitigation Fees shall be paid on the total gross acres of a development site excluding acres that are either: (1) previously developed land as shown on each local Land Use Agency's "Baseline Map" (see paragraph below); or (2) protected as habitat through conveyance of a conservation easement or fee title to TNBC pursuant to

mitigation option #2 as described in this Section (see also Section 4.3 and Section 5.7.4 of the Implementation Agreement).

To ensure the fee is not charged to previously developed areas, the NBHCP Implementation Agreement for the City and the County include detailed maps showing which land parcels are subject to the fee and which parcels are exempt from the fee due to prior development of the site.

Open space remaining within developed areas will count as areas requiring mitigation, unless the USFWS and CDFG approve the use of such areas as suitable for mitigation and such land is transferred in fee to TNBC or is encumbered by a conservation easement in favor of TNBC.

Optionally, individual landowners may donate land to TNBC in lieu of payment of some or all of the acquisition component of the Mitigation Fee. In such cases, TNBC, USFWS and CDFG will determine which lands are acceptable, based upon reserve acquisition criteria noted in Section IV.C.2 of this NBHCP. If the amount of land transferred to TNBC is less than the mitigation land required for the public or private development project, the landowner is obligated to pay the outstanding balance of the Land Acquisition Fee component of the Mitigation Fee. If the amount of land transferred to TNBC is greater than the Mitigation Land required for the public or private development project, the landowner may choose one of the following credit options: 1) receive credit for the excess amount of land toward required Mitigation Land under the NBHCP for future Authorized Development of property(ies) owned by the landowner and covered by an Urban Development Permit; or 2) transfer credit to another specific landowner to satisfy all or a portion of the Land Acquisition Fee component of the required Mitigation Fee obligation for future Authorized Development of property(ies) owned by that landowner and covered by an Urban Development Permit. If either credit option is chosen, prior to the transfer of Mitigation Land being finalized, the landowner shall inform the appropriate Land Use Agency and TNBC in writing of their choice to receive or transfer credit and to whom they want to transfer such credit. The credit shall be calculated based on number of acres of land being transferred and not on the cost of the land. If the owner chooses to transfer land to TNBC in lieu of fees, the owner is obligated to pay the non-land acquisition components of the Mitigation Fees. All land proposed to be transferred in lieu of payment of the land acquisition component of the mitigation fees must be approved by the Wildlife Agencies prior to acceptance by TNBC.

Related to assurance of adequate funding for operations and maintenance in perpetuity, the NBHCP shall institute the following requirement: a Supplemental Endowment component of the Mitigation Fee shall be collected prior to issuance of an Urban Development Permit in an amount sufficient to fully fund the operation and maintenance, adaptive management, monitoring and changed circumstances obligations for Mitigation Lands in perpetuity, even after Authorized Development is fully built-out. All Authorized Development that has not been issued an Urban Development Permit by September 30, 2000, shall pay this fee. The catch-up fee ordinance shall also include this fee component. This Supplemental Endowment fee will be collected from all development authorized under the NBHCP as applicable and will be used to fund operations and maintenance, adaptive management, monitoring and changed circumstances

for the system of reserve lands in perpetuity, particularly after development has occurred and additional fees are no longer being paid.

2. Mitigation Fee Amount/Adjustments

Historically, TNBC has contracted with EPS to complete analysis of the NBHCP fee. Such analysis was the basis for the initial Mitigation Fee under the City of Sacramento 1997 Natomas Basin HCP and for subsequent fee increases under that plan. EPS has now completed a fee analysis update of the implementation costs of this 2003 NBHCP.

EPS has developed a proforma financial model that analyzes the projected revenues and expenditures of the TNBC dependent on a forecast of development of the Natomas Basin and the corresponding habitat mitigation required. Based on various assumptions, the financial modes calculates the Mitigation Fee that would be required of new development. The financial model is currently composed of five component funds as described below:

Land Acquisition (LA) Fee Component provides funding for habitat Mitigation Lands acquired by the Natomas Basin Conservancy (TNCB). The costs associated with land acquisition are the costs to acquire the land and transaction costs including legal costs. The fund also provides for a contingency in case land costs spike in any given year prior to updating the fee. Once all land is acquired in order to meet mitigation requirements, this fund will no longer be necessary.

Restoration and Enhancement (RE) Fee Component provides funding for restoring and enhancing Mitigation Lands acquired by TNBC. For example, the creation of managed marsh would be provided for by the revenues generated in the Restoration and Enhancement Fund. Once all land is acquired and subsequent restoration and enhancement occurs, this fund will no longer by necessary.

Administration and Operations & Maintenance (O&M) provides for the on-going operation and maintenance of the Mitigation Lands, including the costs to administer the funds collected from the Mitigation Fees. Revenues for this fund are comprised of Mitigation Fees (until all grading permits are issued), farming income, and hunting revenues. This fund is projected to exist in perpetuity. After year 45, as the finance model is currently structured, the Admin./O&M revenues are supplemented by interest earnings from the O&M Endowment Fund.

O&M Endowment Fund is structured as an endowment, such that fee revenue is accumulated as principal that will earn interest income over time. The interest income is utilized to subsidize funding for the Admin./O&M account after year 45.

Supplemental Endowment Fund is the newest account included in the financial model of the NBHCP. This fund was established to accumulate revenue to allow TNBC to purchase up to 200 acres of land in advance of all fees being paid or to supplement annual purchases in the case that land prices spike

dramatically in any given year. The financial model is intended to be a dynamic, fluid analysis of each of these funds and allows for interaction between the funds (excluding the O&M Endowment Fund principal). For example, funds can be transferred to the O&M account into the land acquisition account to provide short term financing of land acquisition. Typically, it assumes that the transfer of funds will be repaid in a subsequent time period.

On-going Operation and Maintenance of the Mitigation Lands in Perpetuity. The interest earnings on the Endowment Fund, not the principal, will be used to funds on-going operations and maintenance of the Mitigation Lands. A nominal interest rate of 3 percent is assumed in the analysis.

TABLE VI- 1
COMPONENTS OF PROPOSED (2003) MITIGATION FEE PER ACRE DEVELOPED[1]

Land Acquisition	$3,775
Restoration/Enhancement/Monitoring	893
Administration O & M	2,850
O & M Endowment Fund	1,900
Supplemental Endowment Fund	408
Fee Collection Administration	201
Base Mitigation Fee/Developed Acre (20032$)	**$10,027**

[1] *For funds available to support management of each acre of* mitigation *land, multiply these figures by two.*

Following adoption of the revised NBHCP, the newly established Mitigation Fee that addresses implementation of this NBHCP will be reviewed at least annually on or before March 1 of each calendar year the NBHCP is in effect. The Mitigation Fee shall be adjusted as necessary by the Land Use Agency Permittees to account for inflation or deflation using the Consumer Price Index (CPI) or another suitable index. The Mitigation Fee also will be reviewed at least annually on or before March 1 of each calendar year the NBHCP is in effect and adjusted as necessary to reflect actual operation and land costs in the Basin. Fee adjustments will typically originate with a recommendation from TNBC to the Land Use Permittees, although any party may recommend such an adjustment. All adjustments to the Mitigation Fee within a particular local jurisdiction or jurisdictions must be approved by that affected jurisdiction or jurisdictions. Adjustments to the Mitigation Fee to account for inflation or deflation, or as necessary to maintain the 0.5-to-1 Mitigation Ratio and to meet ongoing management and monitoring costs, are provided for as part of the Plan's Operating Conservation Program and therefore do not require amendment of the NBHCP or permits. (Each change in any element of the Mitigation Fees shall be documented in the TNBC Annual Report.)

It is acknowledged by the City and Sutter County that TNBC will acquire and manage Mitigation Lands based on the total amount of fees collected, and acres approved for Authorized Development by both Land Use Agency Permittees. Therefore, the failure of either jurisdiction to raise Mitigation Fees in a timely manner and in an amount sufficient to fully implement the NBHCP, including acquisition and management of Mitigation Lands, may result in the inability of TNBC to acquire and manage Mitigation Lands for all Authorized Development approved under the NBHCP. In that event, any shortfall in acquisition of Mitigation Lands or shortfall in funds available to cover the management and other plan implementation costs, shall be attributed solely to the Land Use Agency Permittee which has failed to adjust its Mitigation Fees as necessary to fully implement the NBHCP and may result in suspension or revocation of that jurisdiction's permits. The City and Sutter County further acknowledge that notwithstanding the revocation of their individual federal permits, each remains obligated pursuant to 50 C.F.R. 17.22(b)(8) and 17.32(b)(8) to complete its mitigation obligations with respect to all Authorized Development approved by the jurisdiction prior to the revocation or other termination of its permits.

The Mitigation Fee is based on the funds necessary to assure the establishment of reserve blocks with 25% managed marsh habitat. The Mitigation Fee may also be adjusted periodically at the request of USFWS, CDFG or TNBC to account for NBHCP revisions, including revisions that (1) increase up to a total of 75 percent, the percentage of Mitigation Lands converted to managed marsh, or (2) result from ongoing monitoring program results in the Plan Area, determined at the Mid-Point and Overall Program Reviews, or any future USFWS Giant Garter Snake Recovery Plan or CDFG Swainson's Hawk Recovery Plan (see Section VI.H below), or (3) based upon peer-reviewed scientific information provided such adjustments meet the requirements of Sections VI.E., Section VI.F. and Section VI.H. The fee shall also be increased as necessary to maintain land acquisitions at the 0.5-to-1 Mitigation Ratio and implement associated management (including restoration and enhancement), including changes identified through the Plan's Adaptive Management Program, as appropriate to ensure the effectiveness of the operating conservation program.

Because the Mitigation Fee consists of individual components (e.g., land acquisition, restoration/enhancement/monitoring, etc.), the fee may need to be raised with respect to specific fee components periodically found to be deficient over the term of the permits. In other words, all components of the Mitigation Fee as described in Table VI-1 are subject to fee increases as necessary to ensure that the requirements of each individual component of the NBHCP are met.

The Land Use Agencies shall adjust the fee as necessary for all additional monetary obligations that may be required to fully implement the land acquisition, ongoing or permanent management (including restoration and enhancement), monitoring, database maintenance, Adaptive Management, program adaptation due to recovery plan adoption, Changed Circumstances and any other requirements of the NBHCP and IA, subject to the limitations described in Sections VI.E, VI.F., VI.H., and VI.K.1. Such fee increases are provided for under the Plan's Operating Conservation Program and therefore do not trigger amendment of the Plan or permits. Table VI.3 below describes the fee adjustments approved through the history of the 1997 NBHCP.

TABLE VI - 2
HISTORY OF FEE

Date Adopted	Fee Amount Per Acre of Development
October 31, 1995 - Original Interim Fee	$2,240
September 2, 1997	$2,656
August 17, 1999	$3,292
September 12, 2000	$3,941
June 12, 2001 Mitigation Fee Premium Fee (Settlement Agreement) Total	 $5,993 $4,028 $10,021
May 21, 2002[1] Mitigation Fee Premium Fee (Settlement Agreement) Total	 $7,934 $4,028 $11,962
October 2003, EPS Estimated Fee for 2003 NBHCP	$10,027

[1] *The Settlement Agreement referenced in the above table was a limited term agreement that applied to specified development projects within the City of Sacramento. The Settlement Agreement Premium Fee does not apply to development authorized under this 2003 NBHCP.*

3. Catch-Up Fee Ordinance

The City of Sacramento and Sutter County will each adopt ordinances that require developers to pay a "catch-up" mitigation fee in the event that a developer pays the Mitigation Fee prior to issuance of an Urban Development Permit (i.e., grading permit, notice to proceed or building permit) and the fee is increased prior to actual disturbance of the land. The City of Sacramento adopted such an ordinance on April 3, 2001 (Ord. No. 2001-013).

4. Endowment Fund / Other Revenues

The Endowment Fund provides for on-going administration and operations and maintenance expenses in the future years of the HCP, after all fee revenues have been collected and expended and also for permanent management of the Mitigation Lands following expiration of the permits. There is no change in the level of fee allocated to the Endowment Fund. The Conservancy carefully stewards its Endowment Fund, which as of the year 2001 holds in excess of $450,000.00. As urban development occurs, landowners pay an endowment fund fee, currently $1,500.00 per gross acre of development, as part of the total Mitigation Fee in order to supplement revenue available for ongoing management once all fees

have been collected. The revenue from this fund is maintained in a separate account to accumulate earnings so that the interest earnings may be used to supplement operating revenues. The $1,500.00 per acre fee is based on projected interest earnings needed to fund approximately 13 percent of the projected operating costs at the end of the 50-year permit period. The fund balance at the end of the 50-year permit period is estimated to be approximately $6.7 million. Assuming an annual interest rate of 3 percent on the majority of funds (a 4 percent interest rate is assumed on $500,000), interest earnings at the end of the period are approximately $200,000 per year. The O&M fund is estimated to require approximately $137,000 of these endowment interest earnings per year to supplement O&M revenues beginning in year 2033. Therefore, annual interest earnings on the Endowment Fund are greater than the annual drawdown for the O&M fund. The principal balance on the Endowment Fund will remain intact and allows the fund to be maintained in perpetuity so the mitigation lands can be managed in perpetuity.

Other Revenues

TNBC shall seek out additional revenues to augment the cost of managing the reserve system in perpetuity. Such revenues may include hunting, farm subsidies, cell tower revenues, etc.

5. Public/Private Partnerships

Within the conservation efforts directed by the NBHCP, there may also be efforts by the NBHCP Permittees to secure additional revenues from federal, state and other sources to supplement TNBC's efforts within the Natomas Basin. The Permittees may prepare grant applications or seek federal or state funds to fund the incorporation into the NBHCP of future recovery measures or other conservation strategies identified in future recovery plans or new scientific information.

C. PHASING OF MITIGATION WITH RESPECT TO DEVELOPMENT

Described below are phasing obligations associated with the timing of TNBC reserve acquisitions and reserve habitat improvements. The NBHCP provides that to the maximum extent practicable, TNBC will complete habitat acquisition in advance of habitat conversion resulting from Authorized Development in the Natomas Basin in accordance with the following provisions:

(1) 200 Acres in Advance:

To assure adequate funding for land acquisition, the NBHCP has instituted the following requirements: Acquisition of Mitigation Land to mitigate development impacts of a particular property is desired prior to or concurrently with issuance of an Urban Development Permit (i.e., grading permit or notice to proceed) for that property. To ensure that Mitigation Lands sufficient to meet the mitigation obligation which attaches to all Authorized Development under the NBHCP, TNBC shall establish and maintain a 200 acre cushion of Mitigation Lands prior to the approval of any new Authorized

Development by the City of Sutter County in the following manner. No Urban Development Permits for Authorized Development shall be issued after September 30 of each calendar year until TNBC has acquired Mitigation Lands which equal the number of acres necessary to cover the mitigation obligation attached to all prior Authorized Development under the NBHCP *plus* an additional 200 acres of Mitigation Lands. For example, if Urban Development Permits have been issued on a total of 4,000 acres of land by September 30th in a given year (the beginning of grading restrictions), then 2,200 acres of Mitigation Land (one-half of 4,000 acres plus 200 acres) must be in place before any additional Authorized Development may be approved and any additional Urban Development Permits may be granted by the City or Sutter County. Funding for the initial purchase of 200 acres in advance of the issuance of Urban Development Permits may come from NBHCP Mitigation Fees, State or Federal grant money, or other sources of revenue available to TNBC. However, State and Federal grant money may not be used to offset the Mitigation Fee for Authorized Development.

(2) Managed Marsh:

Under the 1997 HCP, TNBC was directed to acquire an initial 400 acres of reserve land. This obligation was completed on May 17, 1999. A provision under the 1997 HCP, and carried forward to this NBHCP, requires that not later than five (5) years after acquisition of these lands, the entirety of the 400 acres, or equivalent acreage, must be converted to or be in managed marsh, unless otherwise approved by the USFWS and CDFG. The 400-acre managed marsh requirement shall be satisfied irrespective of how many of the local Land Use Agencies ultimately obtain permits. In other words, if only a single jurisdiction has obtained a permit and wishes to proceed with development authorizations within its permit area, that Land Use Agency shall be responsible for satisfying the initial 400-acre managed marsh requirement within the Plan Area.

(3) Following satisfaction of the requirement to convert the initial 400 acres of managed marsh, TNBC shall continue to convert a portion of all Mitigation Lands to managed marsh consistent with the following guidelines. The proportion of managed marsh within Mitigation Lands shall be based on total sites, and not necessarily on individual units of Mitigation Land. Following acquisition of Mitigation Land, TNBC is allowed one year to complete a Site Specific Management Plan (SSMP) for the site. Within three years of SSMP approval, TNBC shall complete site improvements, including managed marsh conversion as appropriate.

D. ACCOUNTING OF MITIGATION LAND

Each Land Use Agency shall collect Mitigation Fees prior to issuance of an Urban Development Permit (i.e., grading permit or notice to proceed) and promptly transfer the fees to TNBC, identifying by

name, location and acreage, each project for which fees have been collected. TNBC shall record collection of fees from Land Use Agencies in chronological order, crediting the oldest project to have paid all required components of the Mitigation Fees with the Mitigation Lands TNBC acquired. Compliance with Phasing of Mitigation with Respect to Development (Section VI.C above) must be satisfied with respect to the entire Plan Area and not for individual Land Use Agency's Permit Areas. If TNBC falls behind on acquiring Mitigation Land, then TNBC must notify all Land Use Agencies and TNBC may not accept additional Mitigation Fees until acquisition of Mitigation Land is in compliance with Section VI.C. The Land Use Agencies shall not allow any development to proceed under the Incidental Take Permits where TNBC has not accepted Mitigation Fees or Mitigation Lands for the development project. Development of lands for which Mitigation Fees have been accepted by TNBC, and which has met all other requirements of the NBHCP would be allowed to proceed under the Incidental Take Permits.

Percentage of Managed Marsh:

A key NBHCP requirement is that at least 25 % of habitat Mitigation Lands be established as managed marsh, unless the USFWS requires otherwise based on its future Giant Garter Snake Recovery Plan, ongoing monitoring results, or other new peer-reviewed scientific information. Thus, TNBC will, in its annual report (see Section VI.G below), specify the acreage, location, and type of reserve land (i.e., rice land versus marsh), and the percentage of each with respect to the total lands acquired to date. The 25% managed marsh requirement applies to the entire Natomas Basin collectively (i.e., to all Land Use Agency jurisdictions and Permit Areas), not to each Permit Area individually.

Out of Basin Mitigation Land:

The NBHCP allows for a maximum of 20 percent of the Mitigation Lands to be acquired in Area B outside of the Natomas Basin under certain conditions defined in Chapter IV.2.b, with approval of USFWS and CDFG. TNBC shall account for all acreage acquired in Area B to ensure that the total amount of such lands does not exceed 20 percent of the total Mitigation Lands.

Metro Air Park:

While Metro Air Park (MAP) is not a Permittee under this NBHCP, there is an accounting relationship that must be considered. Under a separate HCP, and subject to the provisions of that HCP, MAP will utilize TNBC for acquisition and management of habitat reserves. MAP will rely on the County of Sacramento to collect Mitigation Fees, and the County will convey these fees to TNBC. Additionally, TNBC will include information on MAP's urban development and associated habitat mitigation within the TNBC Annual Report. Fees collected by TNBC on behalf of Planned Development in the MAP HCP shall be credited along with fees collected by both Land Use Permittees in chronological order, with the first project among MAP or either Land Use Permittee to have paid Mitigation Fees credited with the habitat Mitigation Lands acquired by TNBC and credited to MAP's mitigation obligation.

Land in Lieu of Fees:

With respect to each project proponent who elects to transfer Mitigation Lands in lieu of the Mitigation Land acquisition fee component of the Mitigation Fees, once TNBC, USFWS and CDFG have approved transfer of the lands, and the other Mitigation Fees have been paid by the project proponent, the project may proceed. TNBC will keep a record of the name, location, and acreage of the project and the Mitigation Lands transferred to TNBC on behalf of the project. That information will be presented in the TNBC annual report.

The findings of the annual accounting shall be published within the TNBC Annual Report described within Section VI.G. Additional data to be included within the Annual Report are described in Section VI.F.

E. MONITORING OF THE NBHCP

Monitoring is an essential element of all HCP's that is designed and implemented to provide the information necessary to assess compliance and project impacts, and verify progress toward the biological goals and objectives for the Plan's Covered Species and habitats. Monitoring efforts must be designed to adequately direct the results of the adaptive management strategy. Integrating the results of NBHCP's monitoring program into the adaptive management strategy is essential. The monitoring efforts play an essential role in determining whether the chosen management strategy(s) is providing the desired outcome (i.e., achieving the biological goals of the HCP). Monitoring shall be performed for the duration of the permit and in perpetuity per the terms of the Plan.

An effective monitoring program provides information to: (1) evaluate compliance; (2) determine if biological goals and objectives are being met; and (3) provide feedback information, including assessing changed circumstances, for adaptive management. The monitoring program will reflect the measurable goals and objectives of the NBHCP, and be flexible enough to allow modifications, if necessary, to obtain the appropriate information.

However, much like adaptive management, it is necessary to make a distinction between the obligations of the NBHCP to provide and fund monitoring of the success of its mitigation efforts and the broader statutory obligations of the Wildlife Agencies with respect to recovery plans for the Covered Species. The NBHCP and its monitoring provisions are not to be confused with the collection of scientific data needed for a recovery plan and are not intended to be a replacement for the broad spectrum monitoring that may be contained in recovery plans which address a much larger geographic area and have a broader focus. Consequently, while the NBHCP monitoring will coincidentally assist with the recovery of the Covered Species by monitoring the Covered Species within the Mitigation Lands and those lands within the Natomas Basin to provide a baseline, the NBHCP monitoring provisions will not and are ~~is~~ not intended to provide all the necessary monitoring measures for broader recovery plan purposes.

Two related but separate types of monitoring programs are required under the NBHCP. First, Compliance Monitoring documents Permittee activities and ensures that NBHCP Permittees complete obligations as specified within the NBHCP. These obligations vary between Permittees, based upon their specific obligations. This NBHCP, within the following section, specifies the Compliance Monitoring obligations of the Permittees. Second, a Biological Effectiveness Monitoring Plan measures the biological success of the NBHCP Operating Conservation Program. The Biological Effectiveness Monitoring Plan provides the biological data necessary to guide and direct the NBHCP Operating Conservation Program. This NBHCP, within the following sections, provides guidelines for preparation of the Biological Monitoring Plan that will be completed after NBHCP adoption.

1. Compliance Monitoring

Compliance monitoring is verifying that the Permittees are carrying out the terms of the NBHCP, the IA and the associated permits. TNBC will be the primary entity responsible for compiling, retaining and making available to the Wildlife Agencies data on compliance with the provisions and obligations contained within the NBHCP and the associated IA. The Land Use Agency and Water Agency Permittees shall conduct Compliance Monitoring and report to TNBC on their compliance and the compliance of parties operating under their control and their Permits with regard to the Permittees obligations under the NBHCP, including implementation of NBHCP take avoidance, minimization and mitigation measures. Compliance Monitoring will include the status of the implementation of the NBHCP terms and conditions (e.g., financial responsibilities and obligations, management responsibilities, and other aspects of the incidental take permits, HCP and the IA). Within the Implementation Annual Meeting, TNBC will report to the other Permittees, USFWS and CDFG on the progress of the HCP conservation strategy. TNBC, the Land Use Agencies' and the Water Agencies' compliance with the NBHCP obligations will be reported within the TNBC Annual Report.

Described below are provisions related to Compliance Monitoring that will apply to the noted parties if and when Incidental Take Permits are issued to the individual party. For instance, Compliance Monitoring data for Water Agencies' activities shall not be required until such time as the Water Agencies apply for and receive permits. Until that time, TNBC will annually contact the Water Agencies and request information on the Water Agencies' canal and ditch maintenance activities. Such information, as provided voluntarily by the Water Agencies, shall be published annually by TNBC.

a. The compliance monitoring accounting by TNBC of Mitigation Lands shall quantify:

(1) Annual acquisitions:

a. Acreage (annual incremental and cumulative)

b. Location (e.g., within Swainson's hawk zone, within the Basin)

c. Land use type/Condition (e.g., vegetation type, vernal pool, Swainson's hawk potential nest habitat, rice land, alfalfa).

(2) Take of Covered Species and impacts to habitat *(note: no take of habitat; however, habitat disturbance results in take)* resulting from implementation of the TNBC Site Specific Management Plans or Covered Activities (including any specimens taken for scientific purposes).

(3) Implementation of Incidental Take avoidance measures:
- a. Preconstruction surveys and avoidance measures used pre- and post ground-disturbing activities within Mitigation Lands
- b. Take avoidance implemented during maintenance and management
- c. Success or failure in implementing take avoidance measures
- d. Recommendations for changing or improving take avoidance measures.

(4) Annual financial status
- a. The amount and source of funds collected
- b. Funds expended or committed for acquisition
- c. Funds held by TNBC in reserve
- d. Summary of expenditures for and revenues from Mitigation Land management
- e. An accounting of the long-term endowment account
- f. Funds allocated by TNBC to an entity other than TNBC for monitoring or management
- g. An accounting of and determination of adequacy of funding for implementing the Operating Conservation Program (e.g.; acquisition, enhancement, land management activities, monitoring and database management).

(5) Status of Mitigation Lands within TNBC reserves, including:
- a. In-Basin:
  - i. Lands managed as marsh
  - ii. Lands managed as rice, including associated fallow land
  - iii. Lands managed as upland reserves
- b. Out-of-Basin in "Area B"
- c. Mitigation for vernal pools, as appropriate.

(6) Status and condition of the Plan GIS and other databases; status and adequacy of SSMPs and monitoring plans, and any recommendations for revisions.

b. The compliance monitoring accounting to be completed by each Permittee (City of Sacramento, Sutter County, RD1000, Natomas Mutual) shall quantify:

(1) The amount and location, in written and GIS mapping formats of all lands approved for Authorized Development by private parties for which Mitigation Fees were paid to TNBC in the preceding year including the following information:
- a. Acreage (annual incremental and cumulative)
- b. Location (e.g., within Swainson's hawk zone, within HCP area)
- c. Type (e.g., vegetation type, vernal pool, Swainson's hawk potential nest habitat).

(2) The amount and location of all lands approved for Authorized Development by public agencies (e.g.; public works projects) for which Mitigation Fees were paid to TNBC in the preceding year.

(3) An accounting of the taking of any individual giant garter snakes, Swainson's hawks, or other Covered Species, if known, as a result of Covered Activities in the Permit Areas in the preceding year, including any specimens taken for scientific purposes.

(4) Implementation of Incidental Take avoidance measures:

a. Preconstruction surveys and avoidance measures used pre- and post ground-disturbing activities

b. Success or failure in implementing take avoidance measures

c. Recommendations for changing or improving take avoidance measures.

(5) Water Agencies' shall provide an annual report of Covered Activities and implementation of conservation measures (see Section V.B.4 for additional reporting requirements).

c. The Land Use Agencies shall prepare a pre-construction survey form that will be provided to biologists completing pre-construction surveys as required in Sections V.A.1 and VI.E.1 of this NBHCP. Within one year of issuance of permits in conjunction with this NBHCP, the Land Use Agencies shall, in consultation with the NBHCP TAC, prepare template forms for Pre-Construction Surveys. Following approval of survey forms by the Wildlife Agencies, these forms shall be utilized by biologists conducting pre-construction surveys for TNBC or for Authorized Development conducted under the Land Use Agencies' take permits. Biological resource information developed in the course of CEQA documentation may help the Land Use Agencies determine which pre-construction surveys are appropriate. The following specific informational items are anticipated to be included within the pre-construction template form and shall serve as guidelines for pre-construction surveys for individual development projects completed prior to approval of the ultimate template form:

(1) Site description: Possible sub-items include: (1) current and historical land uses/habitats; (2) current and historical adjacent land uses/habitats; and (3) any vernal pools and seasonal wetlands located on or adjacent (within 250 feet) to the project site.

(2) Recorded Covered Species occurences. Consult CNDDB, TNBC, records published in the NBHCP, etc. to document records of Covered Species on and near the project sit

(3) Prior biological resources analysis. Summarize findings of prior biological resource analyses conducted on site pursuant to specific development project's CEQA evaluation.

(4) Results of botanical surveys. Possible sub-items include: (1) dates botanical inventories were conducted; (2) plant communities on site; (3) whether habitat for any Covered plant species occur on the site; and, (4) demonstration of compliance with any additional

preconstruction surveys as required through prior review and/or environmental analysis conducted for the subject project.

(5) Results of reconnaissance surveys. Any species observed on site should be described and noted. Surveys should be appropriately timed so that they may detect Covered Species for which habitat is found on the subject site. For example, surveys for legenere should be conducted between April and June because that is when the species blooms. Surveys conducted at other times of the year may not be capable of detecting the species. Other examples of appropriate timing of Covered Species surveys include, but are not limited to: (1) if any trees are on or in the vicinity of the project site, surveys must be timed to detect SH nesting; and (2) if burrows are present, surveys need to be timed to detect burrowing owl nesting. In cases where the timing of surveys affects their outcome, the surveys may be conducted the year prior to construction activities. However, nesting birds must be surveyed for in the year that construction activities occur, where potential nesting habitat exists on the project site.

(6) Conclusions of surveys and research. Report Covered Species that do occur or may potentially occur on site (potential occurrence should be based upon habitat on or adjacent to the site and proximity of known localities or occurrences of the species).

(7) Project activities that could affect Covered Species. Examples include, but are not limited to: (1) dewatering; (2) filling or relocating a canal; (3) removal of a nest tree; (4) work within ½ mile of a nest tree; (5) removal of burrows used by owls, (6) work near burrows; (7) any work near other nesting bird species; (8) fill of wetlands, (9) work near a wetland that could change the wetland's hydrology or water quality.

(8) Recommendations. The biologist should recommend appropriate avoidance and minimization measures based upon the habitats that occur on or adjacent to the project site, the species that may occur on or adjacent to the project site, and the types of activities that could affect Covered Species. Measures to avoid and minimize take of Covered Species associated with Authorized Development to be permitted by the Land Use Agencies are identified in Section V.A. of this NBHCP and measures to avoid and minimize take of Covered Species by TNBC activities are identified in Section V.B of this NBHCP and shall be included in the biologists' report.

2. Biological Effectiveness Monitoring

Biological Effectiveness Monitoring evaluates the effects of Authorized Development and other Covered Activities and determines whether the effectiveness of the Operating Conservation Program of the NBHCP is consistent with the assumptions and predictions made when the NBHCP was developed and approved; in other words, is the NBHCP achieving the biological goals and objectives. TNBC will

be the responsible party for completing the effectiveness monitoring program described herein and the results of these monitoring efforts shall be published in the TNBC Annual Report. In order to ensure consistent application of monitoring techniques both upon TNBC reserves and throughout the Natomas Basin, TNBC shall prepare a comprehensive Biological Effectiveness Monitoring Plan.

In order to measure the effectiveness of meeting the biological goals and objectives, the Biological Effectiveness Monitoring Plan shall be designed to track population trends of the Covered Species and to evaluate the effectiveness of the Mitigation Land design, restoration and management in providing habitat and supporting the Covered Species. The monitoring plan shall track population trends on TNBC Mitigation Lands as well as at some selected non-reserve sites within the Natomas Basin. Non-reserve sites will serve as controls to compare success of Mitigation Land design and management in supporting and increasing the abundance of Covered Species. Monitoring of non-reserve sites also may provide information to guide future acquisitions and to determine presence and/or use of corridors between reserves. Selection of non-reserve sites to be monitored will be determined during preparation of the monitoring plan and may differ for the various Covered Species, depending on the management and information needs for those species.

The Biological Effectiveness Monitoring Plan is divided into two primary components. An overall NBHCP Biological Monitoring Program evaluates the overall success of Covered Species within the Natomas Basin. This program will include limited monitoring of Covered Species at locations outside of TNBC Mitigation Lands, as well as periodic evaluations of Covered Species within TNBC Mitigation Lands. Site Specific Biological Monitoring Programs will be developed for each block of contiguous TNBC Mitigation Lands. The Site Specific Biological Monitoring Programs will be developed in conjunction with, and included within, the TNBC Site Specific Management Plans. In combination, the NBHCP Biological Monitoring Program and the Site Specific Biological Monitoring Programs constitute the NBHCP Biological Effectiveness Monitoring Plan.

a. <u>NBHCP Biological Effectiveness Monitoring Program</u>

Within two (2) years of issuance of Permits under this NBHCP, TNBC shall prepare a detailed NBHCP Biological Effectiveness Monitoring Program, consistent with the NBHCP's monitoring requirements. This Monitoring Program will be developed in consultation with the NBHCP TAC. Development of the Biological Effectiveness Monitoring Program shall include peer and public review. TNBC shall begin implementing the Monitoring Program upon approval of the program by the Wildlife Agencies. The NBHCP Monitoring Program shall include, but is not limited to, the following components and guidelines for monitoring activities:

(1) Annual surveys of the TNBC Permit Area (including TNBC reserves and selected non-reserve area accessible to TNBC) to determine the status of the Swainson's hawk, including presence, density, and reproductive success.

(2) Annual assessment of the status of giant garter snake populations within the Natomas Basin. Annual updates of information of locations of giant garter snakes within the Basin as well as other Covered Species.

(3) Density and distribution sampling of Covered Species on TNBC reserve lands every five years. The first five year sampling of Covered Species shall be completed within one year of issuance of Permits under this NBHCP, and subsequently every five years thereafter. Once a Covered Species is found to occupy a TNBC reserve, yearly monitoring of that Covered Species on the reserve it occupies and any adjacent reserves, as appropriate, will be implemented.

(4) The NBHCP Biological Monitoring Program shall specify the number of control locations within the Basin but outside of NBHCP Mitigation Lands that shall be monitored. These sites shall be monitored every year for Swainson's hawk and giant garter snake, and every five years to satisfy monitoring of species throughout the TNBC Permit Area other than Swainson's hawk and giant garter snake. Such sites shall be limited to a set of locations that, to the extent that such sites exist in the Basin and are physically accessible, collectively provide suitable habitat to support all Covered Species and shall allow the following:

(a) Determination of the comparative success of Covered Species on non-reserve sites versus on reserve sites.

(b) General documentation of Covered Species presence.

(c) Determination of whether the Mitigation Lands are supporting the general populations of Covered Species found within the Basin.

(5) Annual assessment and identification of canals and ditches which provide GGS habitat connectivity within and between reserves. This assessment shall be coordinated with the Water Agencies and the Wildlife Agencies. Additionally, the Wildlife Agencies and the Land Use Agencies will notify TNBC of any known applications under the ESA or Section 404 of the Clean Water Act affecting canals. (See also connectivity discussion included in Chapter IV, Section d).

(6) Evaluations of the Operating Conservation Program and its progress toward its intended biological goals.

(7) The Monitoring Program shall provide specific details on the following subjects:

(a) Monitoring methodologies and protocols to be implemented

(b) Timing of monitoring efforts, including frequency and duration of monitoring efforts

(c) Locations of monitoring, and methodology used to select locations

(d) Personnel required

(e) Effort required and methods of documenting and determining monitoring effort

(f) Methods of analyses of monitoring data

(g) Information expected to be gained from monitoring

(h) Thresholds at which management must be modified to assure success of the conservation plan.

(8) The Biological Effectiveness Monitoring Program shall establish a standardized format for annual monitoring and five-year monitoring conducted on behalf of TNBC.

b. Site Specific Biological Monitoring Programs

TNBC shall include within each Site Specific Management Plan (SSMP) a Biological Monitoring Program that guides monitoring activities within each TNBC Mitigation Lands reserve. The SSMP Biological Monitoring Programs will include specific provisions to address monitoring needs which, in the judgement of TNBC and the Wildlife Agencies are necessary to fully evaluate and understand the efficacy of any specific management action. Each Site Specific Biological Monitoring Program shall be tailored to the individual resources of the subject Mitigation Lands and shall supplement monitoring guidelines provided in the NBHCP Biological Monitoring Program.

The SSMP Biological Monitoring Programs shall be prepared following the Wildlife Agency's approval of the NBHCP Biological Effectiveness Monitoring Plan. SSMP Biological Monitoring Programs for new reserve acquisitions shall be prepared within the reserve's SSMP and shall be subject to the same requirement for timing of completion as the SSMP.

When Mitigation Land is acquired directly adjacent to an existing TNBC reserve, the SSMP Biological Monitoring Program for the existing reserve will be reviewed to determine whether it is applicable and appropriate for the new acquisition. Upon acquisition of new Mitigation Lands directly adjacent to a TNBC reserve with an approved SSMP and Biological Monitoring Program, the NBHCP shall determine either: 1) the existing Biological Monitoring Program is applicable to the newly acquired Mitigation Land as is; 2) the existing Biological Monitoring Plan requires modification to address the newly acquired Mitigation Land; or 3) a new Biological Monitoring Program for the newly acquired Mitigation Land is required due to substantial differences between existing reserve and the newly acquired Mitigation Lands.

Each SSMP Monitoring Program will be reviewed and approved by TNBC in consultation with the TAC prior to implementation. In addition, TNBC shall, where possible, consult with appropriate species experts in the development of monitoring plans, including USFWS, CDFG, academic and U.S. Geological Survey, Biological Resources Division (BRD) staff. In cases where TNBC has acquired Mitigation Lands prior to adoption of this NBHCP, TNBC shall complete Site Specific Biological Monitoring Programs for such lands within two years of issuance of permits under this NBHCP. Guidelines to be included within the SSMP Monitoring Plans include, but are not limited to:

(1) The Covered Species or management action for which monitoring is needed.
(2) Specific monitoring goals and/or objectives.
(3) Requirement to complete Covered Species and habitat baseline inventory, using approved species appropriate sampling protocol, of each Reserve within the first year following acquisition and prior to any implementation of SSMP provisions.
(4) Annual assessment of habitat conditions on TNBC reserve lands, including an assessment of Covered Species habitats, a qualitative description of habitat condition, and identification and estimated cover or numbers of invasive species.

(5) Specific monitoring protocols and statistically supportable data analysis methodology to be used, based on the considerations and instructions discussed in this section.

3. Design of Biological Effectiveness Monitoring Programs

a. General Guidelines

The task of designing or coordinating the design of Biological Effectiveness Monitoring Programs, both overall NBHCP and Site Specific, will be the responsibility of TNBC, in consultation with the TAC and qualified species experts. Management objectives for the reserve system or other objectives determined by TNBC, in consultation with the TAC, will determine whether qualitative or quantitative monitoring methods will be employed and what level of confidence in the results is required. The following questions apply to the development of both the NBHCP Biological Monitoring Program and SSMP Biological Monitoring Programs and will be considered by TNBC as a framework for ensuring that realistic and reasonable monitoring decisions will be made: (1) what kind and quality of information can be gathered with the time and resources available?; (2) what are the possible outcomes and answers such an investigation might reveal?; (3) what decisions will be triggered by different outcomes and answers?; (4) how are these decisions different than those that would be made with existing information?; and (5) what effect will continuing the *status quo* have on species status and on options for future action? (CDFG 1993). Therefore, all monitoring plans must explicitly address the levels of variation and uncertainty that are associated with the survey method and how this will influence decision making.

As described above, sometimes a consideration of qualitative survey and inventory results will be sufficient, providing TNBC with confidence to either pursue additional information or proceed with specific actions, including adjustments under the Plan's Adaptive Management provisions, on the basis of information they already have. At other times, a more formal analysis of quantitative survey results may be needed. In either case, monitoring decisions under the Plan must be made after answering the questions listed above in the context of the particular management objective. For example, the monitoring interval for focused monitoring efforts would be determined by the longevity and generation time of the Covered Species of interest, or the expected periodicity of specific biological or climatic events or other interactions in which the species may be involved. Monitoring programs might also consider the conditions of the habitat being monitored and the habitat necessary for species dispersal.

Biological Effectiveness Monitoring shall be conducted by TNBC and the results of such monitoring will be published in conjunction with TNBC's Annual Report. The Biological Effectiveness of the NBHCP will be analyzed through the review and analysis of Annual Biological Monitoring reports and Five-Year Monitoring reports, and through the comparison of these surveys with the Baseline Surveys conducted for each TNBC reserve. In compiling and publishing Biological Monitoring data, TNBC shall produce single reports that address all covered species as determined appropriate, rather than producing an individual report for each of the Covered Species. Such comprehensive reports may include as attachments additional studies such as basinwide evaluations of giant garter snake and Swainson's hawk.

Due to the lack of documented occurrences of numerous Covered Species within the Natomas Basin and in Area B, Biological Monitoring efforts shall vary in depth and detail. For instance, Rarely Occurring Species such as Delta tule pea are not known to exist within the Plan Area. Until such time as Delta tule pea or other Rarely Occurring Covered Species are found in the Basin, surveys for such species shall be cursory and discussions within various monitoring reports shall be brief. If such a species becomes established or is later discovered in the Basin, future surveys would focus on locations with identified populations.

All Biological Effectiveness Monitoring Programs will include thresholds, at which Mitigation Land management must be modified through the Adaptive Management Process to assure success of the Operating Conservation Program. These points will be broad enough to assure that actions are not taken unnecessarily, but specific enough to prevent catastrophic effects to the Covered Species or other aspects of the Plan.

The NBHCP does not identify the specific activities to be conducted within the Biological Effectiveness Monitoring Programs. However, the criteria and guidelines provided in the following sections provide direction for developing suitable NBHCP Biological Effectiveness Monitoring Programs.

b. Utilization of Existing Data Sources and Monitoring Protocols

TNBC shall utilize all existing information, including information on the numbers, distribution, occurrence, or abundance of the other Covered Species that may be available in documenting baseline species presence. In addition, survey protocols for Covered Species shall be incorporated within and shall guide preparation of the NBHCP Biological Monitoring Programs. Information sources could include USGS surveys (in addition to USGS giant garter snake survey information), Species status reviews, Breeding Bird Survey, Audubon Christmas Bird Counts, etc. Other sources of information also may include working groups and species experts, such as the Interagency Western Pond Turtle Working Group, Swainson's Hawk Technical Advisory Committee, etc.

c. Available Monitoring Methods

Described below is a suite of monitoring methods that may be incorporated within TNBC Biological Monitoring Programs. This list of methods is neither comprehensive nor mandatory. Rather, these methods shall be considered as TNBC, the TAC and the Wildlife Agencies prepare the Biological Monitoring Programs.

Standard Inventory Methods

Several standard techniques are available for monitoring the status of the NBHCP's Covered Species across the reserve system through time. While the Plan does not require the adoption of a particular method or suite of methods, it strongly recommends that TNBC employ standard methods such

as the ones listed below. Most of these techniques are widely used and have been tested in the field for years. They tend to require a relatively high time investment but, generally, can be conducted at a low cost with a minimum commitment of personnel.

(1) Visual encounter surveys (determines species richness, relative abundance). The time required depends on the number of Covered Species inventoried.
(2) Calling bird censussing along strip transects (determines relative abundance). Personnel need to be familiar with the vocalizations.
(3) Replicated quadrant, transect, or patch sampling (determines density). The commitment of time and personnel with this method is relatively high because sampling is thorough.
(4) Drift fences and trapping (determines relative abundance). These methods also have a relatively high cost and commitment of personnel.
(5) Surveys at breeding or nesting sites (determines nesting status, nesting success, and relative abundance). This is a cost effective inventory method.
(6) Mark-Recapture Studies. This technique is one of the main methods used by ecologists to estimate population size. Compared to most other monitoring methods described above, commonly employed mark-recapture methods are labor intensive and time consuming. This method should be used where it is essential to monitor a specific NBHCP objective or is the only reliable method for acquiring the necessary information (for example, mark-recapture is currently the best method for monitoring giant garter snake populations). However, mark recapture studies may provide little data for widely dispersed or rarely occurring species where recapture probabilities are low. TNBC should take these factors into consideration before applying this to Covered Species other than giant garter snakes.

Supplemental Inventory Methods

The methods described below are less traditional monitoring methods. The literature on these methods, their strengths and weaknesses, and their underlying assumptions are less well developed than for the methods described in the section above. Therefore, these approaches may yield ambiguous results. However, some or all of these methods may provide information augmenting the more standardized techniques discussed above and may be considered in designing NBHCP Biological Monitoring Programs. However, TNBC in consultation with the TAC, should seriously consider the relative strengths and weaknesses of these approaches prior to employing them, and should periodically check the status of these methodologies in the scientific literature.

(1) Night driving/spotlighting (determines relative abundance, species richness). This method is low in cost and requires little training. Animals recently killed on roads can be collected as voucher specimens and for use in life history and population genetics studies.
(2) Group activities and field trips (can determine relative abundance, species richness). This is also a low-cost method but requires a data coordinator. There is an added benefit of

public outreach. Natural history classes from local universities, the National Audubon Society or other natural history societies could participate.

d. Monitoring Guidelines for Individual Species or Types of Species

Described in this section are guidelines for monitoring individual Covered Species or types of species covered under the NBHCP. These guidelines shall be considered by TNBC, the TAC and the Wildlife Agencies during the preparation of the NBHCP Biological Effectiveness Monitoring Program and the Site Specific Biological Effectiveness Monitoring Programs.

Giant Garter Snake Monitoring

Methods similar to those currently being used by USGS-BRD may be used to accomplish monitoring goals for giant garter snakes. These methods include trapping surveys along with mark-recapture studies and habitat assessments. Trapping in conjunction with mark-recapture techniques can document presence of GGS and establish indices of relative abundance, as well as document the size/age distribution and provide data necessary to estimate survival and recruitment within populations (measures of population health and trends). Habitat assessments conducted in conjunction with survey efforts will assist in determining which habitat factors and types of restoration and management affect the presence and abundance of GGS. Finally, mark-recapture studies may provide valuable information on dispersal of individuals and document movement among reserves and other surveyed areas. Because effective GGS monitoring requires time and labor intensive trapping and survey efforts, basin wide surveys are not feasible. However, sampling of multiple locations throughout the basin can be used to develop an abundance index of giant garter snakes. Methods for monitoring giant garter snake should include the following:

(1) Establish transects to be surveyed through use of modified floating minnow traps (Casazza, *et al*. 2000), supplemented with visual searching on foot. Locations of transects will be determined in development of the monitoring plan but will include:
   - (a) Permanent transects on TNBC reserve lands trapped in every year.
   - (b) Permanent transects on non-reserve lands trapped in every year (transects should be established in each of the following areas: (north of I-80 and east of I-5/SR99; north of I-5 and west of SR99; and south of I-5 and west of I-5/SR99).
   - (c) Additional non-reserve survey transects trapped on a rotating basis at least once every five years. These transects would be chosen to fill in gaps in GGS distribution information, to assess use of corridors between reserves, and increase detections of giant garter snakes necessary to determine population status and to detect dispersal, or to obtain specific information as information needs arise.
   - (d) GGS monitoring outside of TNBC reserves shall be limited to locations where TNBC is granted access by the affected property owner(s) for purposes of species monitoring.

(e) All giant garter snakes captured and of appropriate size will be individually marked using PIT tags. All individual snakes also will be examined and measured according to current USGS protocols.

(f) Habitat assessments will be carried out for all transects trapped in a given year according to current USGS protocols.

(g) Out-of-basin reserves must be surveyed yearly when/if added, along with appropriate off-reserve out-of-basin transects. The off reserve out-of-basin transects would serve as the basis for comparison of the success of the out-of-basin reserve habitat restoration and/or management.

Swainson's Hawk Monitoring

Surveys to determine the status of the Swainson's hawk, shall document presence, density, and reproductive rate of the species. Swainson's Hawk survey shall be conducted annually and shall address Mitigation Lands, as well as undeveloped land in the Natomas Basin. Monitoring for Swainson's hawk outside of TNBC reserves shall be limited to sites within the Plan Area that can be visually observed from locations where TNBC or its authorized representatives are granted access by the affected property owner.

Avian Species Monitoring

The NBHCP covers six other bird species: Aleutian Canada goose, white-faced ibis, bank swallow, tricolored blackbird, loggerhead shrike, and burrowing owl. Because some of these species may be difficult to detect due to their transitory occurrence in the Natomas Basin, it may be necessary to monitor habitat characteristics as a surrogate to determine whether the conservation strategy is successfully providing habitat for these species. Additional surveys should also be carried out in order to attempt to detect actual presence of the species in the Basin both on and off Mitigation Lands, but because of sporadic occurrence of these species, may not provide enough data to statistically determine population trends. Monitoring Programs for these bird species should include:

(1) Annual surveys of Covered bird species for wintering birds and for breeding birds on all reserve lands and at selected non-reserve locations. The monitoring plan will specify the locations of surveys and appropriate timing to increase chances of detecting the covered bird species based on their likely occurrence in the Basin. However these surveys are not intended to be exhaustive given the low probability of detecting some species regardless of effort. Rather, they are intended to indicate presence in the Basin or on reserve lands. The monitoring plan will specify the number of days per year surveys will be conducted (currently, this is expected to require 7-14 days per year, but may be revised as determined by TNBC in consultation with the TAC and other species experts).

(2) Determine habitat characteristics needed to meet goals and objectives of providing habitat for the covered bird species and develop monitoring protocols to measure and monitor these characteristics.

(3) Where breeding colonies of the covered bird species have become established on reserve lands, TNBC will annually estimate the colony size and nesting success.

Vernal Pool Species Monitoring

If any Mitigation Lands have existing seasonal wetlands, those wetlands should be surveyed for presence of vernal pool crustaceans according to Service guidelines. These surveys should be completed on Mitigation Lands prior to any restoration activities that would fill or alter the wetland habitats on Mitigation Lands. Results of surveys for vernal pool crustaceans should be used to assist in preparation of restoration and management plans. Thereafter, any vernal pools on reserve lands, whether preserved or restored, should be monitored for the covered vernal pool species. Monitoring of vernal pool areas within the Mitigation Lands should include the following:

(1) Periodic surveys will be conducted for presence of listed or covered crustacean species according to Service protocols. Surveys will also be conducted for presence of any covered vernal pool plant species and amphibians. The monitoring plan will determine and specify the frequency of surveys necessary to monitor both preserved and restored pools.

(2) Monitoring Programs will specify monitoring protocols to measure and monitor vernal pool habitat characteristics to determine the effects of management activities (such as grazing intensity, frequency, and duration) on the vernal pools.

Covered Plant Species Monitoring

The NBHCP covers a number of plant species not currently known to occur in the Natomas Basin. Monitoring for these species will consist of the following:

(1) Within the first year after acquisition of a reserve, TNBC shall conduct a botanical inventory. The inventories should be conducted at the appropriate times of year when the target Covered Species are present and identifiable. Results of the inventory should identify areas on reserve lands that may support the covered plant species and should be the subject of future monitoring efforts. The result may provide habitat and plant community information that may be used in developing SSMPs.

(2) Botanical inventories will be conducted periodically at intervals determined and specified in the Site Specific Biological Monitoring Programs. These inventories should target areas known to support covered plant species or previously identified to have the habitat

characteristics likely to support the covered plant species, or areas restored or managed such that they are likely to support the Covered Species.

Rarely Occurring Species

It is expected that some Covered Species may occur very rarely in the Natomas Basin or may be very difficult to detect. Rarely occurring species include all plant Covered Species, all Covered Species associated with vernal pools, Bank swallow, California tiger salamander, Western spadefoot toad and Valley elderberry longhorn beetle. These species are considered rarely occurring due to the very limited vernal pool habitat found within the Basin and/or the lack of known occurences of these species within the Basin. For these species, direct abundance estimates of population sizes or relative abundance may not be possible because of low detection rates. In these cases, the Biological Monitoring Programs should include: 1) efforts to actually detect the species on reserve lands or locations within the Basin that have known populations of these species and for which TNBC is granted access to monitor; and, 2) a methodology for estimating the amount and suitability of habitat available and trends in those habitat characteristics. Because efforts to actually detect rarely occurring species may not yield any detections, extensive or exhaustive efforts may not be the best use of monitoring resources. Therefore, the monitoring plan will specify the relative amount of effort spent in actual detection effort versus effort in documenting and monitoring the amount and suitability of the habitat provided. In addition to overall biological monitoring conducted by TNBC, preconstruction surveys conducted by proponents of Authorized Development and TNBC will investigate the presence of rarely occurring species prior to disturbance of land for urban development or habitat reserve construction.

4. Review and Revision of the Biological Monitoring Programs

The Biological Effectiveness Monitoring Programs may require periodic revisions as new methods become available or if monitoring methods are not yielding the expected information. Therefore, the Monitoring Programs and their effectiveness in measuring the success of the NBHCP's Operating Conservation Program also will be reviewed at each Midpoint Review. TNBC will revise the Monitoring Programs whenever review indicates revision is necessary to effectively monitor success in achieving the biological goals and objectives.

5. Monitor Summary Table

Provided below is a summary table that lists the various monitoring obligations to be conducted under the NBHCP. Generally, these obligations shall apply to TNBC, although any proponent of Authorized Development will be required to complete Pre-Construction Surveys prior to disturbance.

TABLE VI-3
SUMMARY OF TNBC MONITORING OBLIGATIONS

One Time Monitoring Efforts Related to Reserve Acquisition and Development		
Pre- Acquisition Survey	**Existing Conditions Assessment**	**Pre-construction Survey and Monitoring**
Pre-acquisition field reconnaissance of site to determine suitability of site as habitat for covered species and the type of habitat, and associated species that may be present on site. This is a relatively simple overview assessment and not a full biological assessment. The purpose of the reconnaissance is to determine the potential or limiting factors for establishment of habitat to support covered species. See Section IV.C.2.d	Within Year 1 following acquisition, an **Existing Conditions Biological Assessment.** This Assessment shall focus on habitat types present upon the site. Information on observed species (including botanical species) shall be noted. This assessment shall be a part of the SSMP. It will identify habitat present on the site, recommended additional habitat preservation and enhancement opportunities. Specific attention shall be paid to the **suitability** and appropriateness of the site for creation of habitat **for re-introduced species,** specifically: California Tiger Salamander Spadefoot Toad Western Pond Turtle Vernal Pool Plants Sanford Arrowhead Delta Tule Pea and other covered plants. See Section IV.D.1.a	Not less than 30 days prior to commencement of construction, a **pre-construction survey** shall be conducted to determine the status and presence, and likely impacts to Covered Species. Specific **avoidance measures** as necessary to address identified impacts (such as nesting birds) shall be developed and **monitored for effectiveness during construction**. (See species specific avoidance measures in the HCP). See Sections V.B

Annual Monitoring Programs		
General	**Reserve Specific Annual Monitoring**	**Basin Wide**
Connectivity Assessment. Through periodic coordination with the Water Agencies, monitor any changes or actions related to the canal system and report such changes to the TNBC Board and TAC for assessment of impacts, and identification of adaptive management efforts if required. **Annual Report.** A consolidated Annual Report will be published summarizing significant monitoring	Annual Surveys of TNBC Reserves shall include: Nesting Birds Survey Wintering Birds Survey Habitat Establishment Invasive Species Assessment Covered Species Assessment If Covered Species of plants, Vernal Pool Covered Species or Rarely Occurring Covered Species are observed within a TNBC Reserve, then subsequent annual surveys of that	Annual surveys within the TNBC Permit Area shall include: Giant Garter Snake Survey Swainson's Hawk Survey See Sections VI.E.2.a and VI.E.3.d

findings. All other monitoring reports shall be retained as administrative records of compliance, however, it is not necessary to separately publish each monitoring report. See Sections VI.E.1 and VI.E.2.a	Reserve and any contiguous TNBC Reserves shall include the identified Covered Species population. See Sections VI.E.2.a, VI.E.2.b and VI.E.3.d	
Periodic or Five Year Monitoring		
General	**Reserve Monitoring**	**Outside TNBC Reserves**
Five year monitoring efforts shall include typical annual monitoring efforts plus additional monitoring at specific control sites within the Basin, but outside TNBC Reserves.	Summary of density and distribution of Covered Species upon TNBC Reserves. Section VI.E.2.a(3)	Control sites (within the Natomas Basin but outside TNBC Reserve) shall be identified and monitored to compare and evaluate the biological viability of the TNBC Reserves as compared to non-reserve habitat for the Covered Species. See Section VI.E.2.a

F. ADAPTIVE MANAGEMENT

1. General Information

Adaptive Management is a process that allows the NBHCP's Operating Conservation Program to be adjusted during the life of the permit to ensure that the most up-to-date information is being utilized, and that the Plan's biological goals and objectives are being achieved. The strategy will define the feedback process and incorporate feedback loops that link implementation and monitoring to a decision-making process. Incorporating new monitoring information is necessary to effect changes in management to achieve the Plan's biological goals and objectives. Where monitoring methods do not yet exist, research must be conducted to develop means to assess the effectiveness of the NBHCP. This section explains the Plan's significant uncertainties and questions, potential strategies to address these uncertainties, how the Plan's Adaptive Management process provisions will work, and how revisions under the Adaptive Management program will be made.

Future NBHCP modifications, through the Adaptive Management process, may be needed as a result of the following significant uncertainties:

(1) new information resulting from monitoring of Mitigation Lands or other lands in the Natomas Basin and ongoing research on the giant garter snake (See Section II.C.2), Swainson's hawk, or other Covered Species;

(2) recovery strategies under the future USFWS Giant Garter Snake Recovery Plan, CDFG Swainson's Hawk Recovery Plan, or newly listed Covered Species recovery plans, that could differ from the measures currently described in the NBHCP (see below, Section VI.H);

(3) minimization and mitigation measures described in the NBHCP that may need to be revised based on new information or the Plan's monitoring data (e.g., marsh configuration and design; etc.);

(4) the 2,500-acre and 400-acre minimum habitat block size requirements for reserves may need to be revised;

(5) significant land use changes outside of the reserve system but in close proximity to a TNBC reserve that result in a direct impact upon the reserve; and

(6) uncertainties associated with the Plan implementation.

Each of these situations could result in new information, new approaches, new recovery or conservation standards that would need to be incorporated into the NBHCP.

Adaptive Management changes to the NBHCP management actions, monitoring, and research needs may be implemented in many ways. For the purposes of the NBHCP, the following three approaches will be used;

(1) regularly scheduled periodic evaluations of the NBHCP monitoring data, other new peer-reviewed scientific information or future recovery plan recommendations by TNBC and/or the NBHCP TAC and a determination by the TNBC Board linking the information to the Plan's success in implementation and achieving the biological goals and objectives; and

(2) identifying significant measurable threshold limits for each of the Adaptive Management objectives that will trigger proposals and solutions requiring a management change; and

(3) conducting a review at the Independent Mid-Point Reviews for Land Use Agencies (see Section VI.J.) and the Overall Program Review at 9,000 acres of development (see Section VI.I.).

These approaches will be used to evaluate the effectiveness of the established habitats on reserve lands and to implement adjustments to the operating conservation program, as necessary, in order to achieve the biological goals and objectives of the Plan, including to address the mitigation requirements for Covered Species.

TNBC will use the annual reporting process to review the compliance and effectiveness monitoring in the Adaptive Management process. The TNBC report will include a summary of findings with specific management recommendations and direction if applicable. The Adaptive Management Process for the NBHCP will use scientific research and the Plan's monitoring program to establish a baseline inventory and population density and distribution data for many of the Covered Species for which data is currently missing. New data and input from the scientific community will be necessary, throughout the life of the Plan, to adjust the threshold limits as appropriate.

Management threshold limits are needed that will trigger proposals and potential solutions for changes in the Plan. The management thresholds, in addition to the periodic evaluations are key decision making processes in determining the Plan's implementation status and success in achieving the conservation goals and objectives. The NBHCP Biological Monitoring Program, to be completed within two years of issuances of permits under the NBHCP, will consider and refine management thresholds. Until the Wildlife Agencies approve the NBHCP Biological Monitoring Program, the following management thresholds shall be applied to trigger modifications to the Operating System Conservation Plan through the Adaptive Management program:

(1) new information resulting from monitoring of Mitigation Lands or other scientific studies documenting new or substantially more severe potential threats to Covered Species that are not adequately addressed by the NBHCP;
(2) new scientific information separate and distinct from the information identified in item (1) that identifies the need for adjustments to management practices under the Operating Conservation Plan in order to measurably increase the value of habitat for Covered Species without substantially increasing the management obligations of TNBC;
(3) documentation of presence of a Covered Species within the Natomas Basin not previously found to exist within the Natomas Basin;
(4) year-to-year declines in the documented presence of Covered Species populations within Mitigation Lands that are determined to be significant by the Wildlife Agencies; and
(5) substantial modifications to land uses within 800 feet of a Mitigation Lands reserve that have the potential to adversely affect the habitat and/or Covered Species in the reserve; and
(6) reduction in foraging opportunities, as identified in Table IV-2, without adequate provisions to maintain foraging habitat, such that the effectiveness of the NBHCP operating conservation program is potentially compromised.

2. Adaptive Management Revisions to the NBHCP

Revisions to the NBHCP resulting from the Adaptive Management provisions shall be accomplished consistent with Section VI.L.3, Amendments and Revisions. Under the Adaptive Management provisions, the NBHCP can be modified if necessary to enasure that the most up to date information is being used under the Operating Conservation Plan. However, adaptive management modifications to benefit one species will not occur at the biological expense of another Covered Species. Changes to the NBHCP that are substantial in scope, and are beyond the scope of the Adaptive Management Program will require the amendment of the Incidental Take Permits, and additional review and approval under the ESA, CESA, CEQA and NEPA.

TNBC shall keep a complete administrative record of all NBHCP revisions resulting from the Plan's Adaptive Management program. For minor revisions, this may be satisfied by TNBC meeting records or other records of an appropriate nature, (see Section VI.L.4).

3. NBHCP Database and Scientific Authority

Quality information is important and necessary for effective implementation of the NBHCP and to ensure that management decisions are based on current Covered Species distribution and occurrence records, land use, and financial data. Annual data entry, updates and management of the databases by TNBC is also necessary for the annual reporting to the Wildlife Agencies (e.g., status of the databases, annual status of

Covered Species and habitats, monitoring and implementation compliance, land use changes, and reserve acreage and condition). The data will be used to assist in estimating Incidental Take Levels; to assist in identifying potential lands for reserves; and will be used by TNBC in determining when and if Incidental Take Avoidance Measures and/or pre-construction surveys are required for individual projects. The continuing maintenance of these databases is essential to the NBHCP success.

TNBC will serve as the database manager for the NBHCP and shall be the central data repository of all scientific data collected through the NBHCP for the life of the permits. In this role, TNBC will be responsible for maintenance, management, analysis and distribution of data collected through NBHCP monitoring efforts, as well as serving as a repository for related work conducted by other entities within the Basin. will annually consider the adequacy of the database and a discussion of the validity and reliability of the database will be included each year in the Annual Implementation Report. In addition to monitoring data collected by TNBC and the other NBHCP Permittees, the database will include documents and reports on new species occurrence records from environmental documents, California Natural Diversity Database (CNDDB) entries and other sources as provided to TNBC TNBC shall complete and submit CNDDB data forms to CDFG for all new species occurrences identified through NBHCP monitoring efforts. Additional TNBC services related to the data repository will include data security, compatibility with State and Federal database software applications, data standardization for data collected through NBHCP monitoring, and submittal of annual CNDDB data forms for new species occurrence records in the Plan Area identified through NBHCP monitoring efforts. As the database manager, TNBC will maintain the datbase in perpetuity (including the geographic information system). The central data repository will provide access to NBHCP data to all participants of the NBHCP using established appropriate technologies (CD-ROM, printed copy, or other media as available and as approved by the TNBC Board of Directors). TNBC may, at its discretion, require reimbursement for reasonable costs associated with disseminating monitoring information to entities other than CDFG, USFWS and the NBHCP Permittees.

TNBC shall maintain the database in a form that allows the determination of success of the NBHCP in achieving the biological goals and objectives of the Operating Conservation Program. At a minimum, the database will document in tabular form in a standard spreadsheet program the following data: the numbers and specific locations (UTM NAD 83 Zone 10 is preferred) of each species occurrence within each contiguous block of Mitigation Land; Basinwide data documented on Swainson's hawk and giant garter snake such as population densities, reproductive successes, etc. collected through annual surveys, 5-year surveys, and other observational data; and, Covered Species data for each identified monitoring control site located outside of the Mitigation Lands. Exact data needs of the Biological Effectiveness Monitoring Program required to evaluate the success of the Operating Conservation Plan in meeting the NBHCP biological goals and objectives will be decided by TNBC in consultation with the Service, CDFG, and the TAC. Maps identifying monitoring sites and the specific locations of species occurences shall be maintained to document the locations of monitoring efforts and the locations for data collected through the NBHCP monitoring efforts. Mapping of monitoring data shall be of adequate detail to evaluate the success of restoration efforts within TNBC reserves and shall allow comparison of year-to-year monitoring results and five-year monitoring results. Additionally, TNBC shall retain mapped information identifying the locations of all Mitigation Lands and all data reported by the Land Use Agency Permittees related to the location of development authorized under the NBHCP, thereby documenting development lands for which NBHCP fees and other mitigation measures have been satisfied.

In addition to providing data in a form adequate to meet the above noted biological monitoring obligations of TNBC, biologists conducting monitoring for TNBC shall provide results of their investigations in a spreadsheet suitable for incorporation into a GIS database. Monitoring data shall be maintained in a spatial data system to allow for the evaluation of NBHCP Biological Goals and Objectives and reporting of results to the Wildlife Agencies and the public. In order to allow for consistency in data collection, organization, and presentation, TNBC shall require consulting biologists to use a species-specific template to provide results of monitoring efforts. The template shall be developed contemporaneous to the Biological Effectiveness Monitoring Program by TNBC, in consultation with the Service, CDFG, and the TAC.

The use of Mitigation Fees by TNBC to support GIS mapping and database systems shall be limited to: 1) documenting the point locations of Covered Species occurrences identified through TNBC monitoring within TNBC reserves; 2) Covered Species occurrences identified at limited NBHCP control locations outside Reserves but within the Basin; 3) point locations of occurrences of annual Swainson's hawk and Giant garter snake identified through annual surveys within the Basin; 4) point locations of Covered Species occurrences identified through Preconstruction Surveys within Authorized Development; and, 5) ultimate habitat types within TNBC reserves as described within Site Specific Management Plans

If the Wildlife Agencies and the Permittees determine that GIS data other than that described herein are required to analyze the success of the Operating Conservation Plan in meeting the goals and objectives of the NBHCP, the GIS data may be modified so long as the cost of GIS database management does not exceed an annual cost of $10,000 in 2003 dollars. Funding for GIS data management shall be included in the TNBC annual budget as a component of the TNBC administrative budget and the maximum $10,000 available for GIS activities shall increase three (3) percent each year through the life of the NBHCP permits. The three (3) percent cost escalation is consistent with the cost escalation for monitoring activities utilized within the fee study prepared for the 2003 NBHCP. Limitations on TNBC's obligations related to GIS does not preclude TNBC, other Permittees, or the Wildlife Agencies from pursuing grants or alternate funding for the expanded data sets within the GIS system such as mapping of land cover types outside of TNBC reserves or other informational components that would enhance the functionality of the GIS system.

G. ANNUAL REPORT

On behalf of the Permittees, TNBC shall compile and submit an annual report to the USFWS and CDFG detailing Authorized Development activities, Water Agencies' activities and habitat acquisition, management, and compliance and effectiveness monitoring activities throughout the Plan Area for the preceding year. Specific monitoring data collected and compiled by TNBC and the Permittees, as described under Section VI.E, will be documented in the Annual Report. The report will be due 120 calendar days from the last day of each calendar year, or portion of a calendar year, during which the permit is in effect. Each Permittee will be responsible for providing TNBC with information in their possession necessary for compiling the Annual Report.

H. PROGRAM ADAPTATION FOR RECOVERY PLANS

1. Changes Due to Future Recovery Plans Other than Changes to Managed Marsh Component

The NBHCP has incorporated, and is consistent with the provisions of the Draft Recovery Plan for the Giant Garter Snake, U.S. Department of the Interior, Fish and Wildlife Service, Pacific Region, 1999. The

USFWS currently is developing a recovery plan that will address the recovery needs of vernal pool species -- the Vernal Pool Multi-Species Recovery Plan. Other USFWS recovery plans not now in preparation also may be developed over the life of the NBHCP and are expected to address federally-listed species and NBHCP Covered Species which may become listed in the future. The CDFG also may prepare recovery plans for state-listed species, such as the Swainson's Hawk and species which become listed in the future. Other Recovery Plans may be developed for species other than the NBHCP Covered Species which may occupy the same ecosystem as the NBHCP Covered Species and which may benefit from recovery actions for these species.

The NBHCP Adaptive Management provisions allow for revisions to management strategies to incorporate new or modified management strategies, such as those which may be included in recovery plans or in response to monitoring results in the Plan Area or to new peer-reviewed scientific information. However, it is necessary to define the scope of any such revisions with respect to the NBHCP's original purpose and goals. The specific purpose of the NBHCP is to establish a conservation program to minimize and mitigate for the effects of Covered Activities within the NBHCP Plan Area on the NBHCP Covered Species, and to meet the statutory requirements for issuance of federal and state Incidental Take Permits under the ESA and CESA, respectively.

With respect to the recovery of the NBHCP Covered Species, it is the intent of the NBHCP to contribute to such recovery, consistent with the Plan's other goals and purposes. Thus, it is necessary to strike a balance between the obligations of the NBHCP to fund and provide mitigation and the obligations of the Wildlife Agencies with respect to recovery plans for Covered Species. Adaptive Management allows the NBHCP Operating Conservation Program to be adjusted and modified to improve its effectiveness as mitigation for the impacts of Authorized Development on Covered Species. As such, certain changes suggested by recovery plans may be incorporated into the NBHCP Operating Conservation Program in order to improve the mitigation being provided and as a result, coincidentally contribute to the recovery of species. However, the NBHCP and its Adaptive Management provisions are not to be confused with a recovery plan and are not intended to be a replacement for the specific measures contained in recovery plans which have a much broader purpose. Accordingly, funding of recovery plans is not intended to be provided through TNBC by way of the NBHCP and its Adaptive Management provisions.

The NBHCP will incorporate recommendations made pursuant to future recovery plans, monitoring results from the Plan Area, or new scientific information, and when such recommendations:

A. Relate to the physical management of Mitigation Lands.

B. Would improve the effectiveness of the NBHCP's Operating Conservation Program by identifying relevant new information, approaches, techniques, or species protection needs;

C. Can be implemented within the NBHCP Plan Area;

D. Fit within the overall intent, framework, are consistent with the NBHCP's biological goals and objectives and would not exceed the established Mitigation Ratio of the Plan; and

E. Will not substantially sacrifice habitat values for Covered Species that are not addressed by the Recovery Plan.

2. Changes to Managed Marsh Component

The greatest potential shift in conservation strategies anticipated to result from a future Giant Garter Snake Recovery Plan is a transition from rice cultivation to managed marsh. The managed marsh environment, in addition to enhancing giant garter snake habitat, would provide greater opportunities for TNBC to pursue restoration of Covered Species plants through the Site Specific Management Plan process and the subsequent managed marsh restoration efforts.

The NBHCP establishes an initial habitat enhancement obligation for giant garter snakes and allows adjustments to be made based on the adopted Giant Garter Snake Recovery Plan, as amended, monitoring conducted in the Plan Area or in response to new scientific information.

Currently the Operating Conservation Program provides that 50% of the Mitigation Land is to be in rice production while 25% is to be enhanced to managed marsh (the balance of the Mitigation Land (25%) will be managed as upland habitat). Thus, 75% of the Mitigation Land will provide habitat for wetland associated species. Upon adoption of a future Giant Garter Snake Recovery Plan, if an adjustment in managed marsh is warranted as specified below, the USFWS will provide written notification to the Permittees, requesting that these percentages be modified within the ranges identified in Table VI-4 and applied prospectively to future Mitigation Land acquired after the availability of such information. Mitigation lands acquired after such written notification may be required to be managed and enhanced with a higher proportion of managed marsh, if the recovery plan, supported by monitoring results or scientific information indicates a higher proportion of managed marsh 1) will improve the effectiveness of the NBHCP's Operating Conservation Program to meet its biological goals and objectives, 2) is beneficial to the snake, and 3) will not adversely affect any other listed Covered Species.

TABLE VI - 4
PROPORTION OF MANAGED MARSH HABITAT

NBHCP Condition	Minimum-- Levels which apply at the start of the NBHCP.	Maximum -- Levels which may apply to future Mitigation Land acquisitions[1]
Proportion of mitigation land as Managed Marsh	25%	75%

[1] *The maximum levels would apply to future TNBC Reserve Land (including Mitigation Land) acquisitions which occur after written notification from USFWS indicating the results of monitring in the Plan Area, in response to new scientific information, or Giant Garter Snake Recovery Plan adoption so warrants the shift in level.*

Thus, the NBHCP may be adapted to require TNBC to increase the proportion of managed marsh enhanced on Mitigation Lands which are acquired by TNBC after Recovery Plan adoption, if such changes are supported by monitoring results from the Plan Area or new scientific information. Should a Giant Garter Snake Recovery Plan, monitoring results from the Plan Area or new scientific information precipitate such a conversion, and should USFWS provide written notification supported by evidence and technical

analysis, then future Mitigation Lands acquired after such USFWS notice may be enhanced and managed by the TNBC to provide up to 75% managed marsh on the balance of such Mitigation Lands.

Modifications to the NBHCP based upon information within a future adopted Giant Garter Snake Recovery Plan or by other future recovery plans approved for listed Covered Species, are considered a part of the Plan's Adaptive Management Program, consistent with the limitations and requirements of Sections VI.F, VI.H, VI.K and VI.L. Information collected through the NBHCP Biological Monitoring Programs and the presence within the Natomas Basin of the Covered Species addressed by the Recovery Plan shall be considered in determining specific revisions to the NBHCP in response to recovery plan recommendations.

3. Swainson's Hawk Recovery Plan

Results of any future adopted CDFG Swainson's Hawk Recovery Plan may also suggest or result in the need for NBHCP modifications to management practices upon Mitigation Lands. Although such modifications are unlikely to be as potentially significant or extensive as those that might be made for the giant garter snake, the NBHCP nevertheless allows for appropriate revision to the Swainson's hawk conservation strategy based on any such plan. Modifications to the NBHCP based on information within a Swainson's Hawk Recovery Plan are considered a part of the Plan's Adaptive Management Program consistent with the limitations and requirements of Sections VI.F., IV.H., VI.K., and VI.L. Information collected through the NBHCP Biological Monitoring Programs shall be considered in determining specific revisions to the NBHCP in response to recovery plan recommendations.

I. NBHCP Overall Program Review at 9,000 Acres of Development

The NBHCP recognizes that a variety of uncertainties exist in the Plan, including: (1) the levels of development that will actually occur in the Basin, especially in southern Sutter County; (2) program adaptations that may be necessitated by the future Giant Garter Snake Recovery Plan; (3) possible development of a state (or federal) Swainson's Hawk Recovery Plan, and the possible need for program revisions as a result of such a plan; and (4) the precise extent, location, and effectiveness of the habitat reserve system as it is developed under the Plan. The NBHCP's Adaptive Management provisions are designed to address many of these uncertainties. In addition, the NBHCP establishes a comprehensive Overall Program Review designed to evaluate the performance and effectiveness of the Plan, to be conducted when and if Authorized Development within the Basin allowed by the ITPs for the City and County reaches a total of 9,000 acres (the "Overall Program Review.").

This Overall Program Review will be triggered at the point Urban Development Permits covering a total of 9,000 acres of development in the Natomas Basin have been issued by the Land Use Permittees and by Sacramento County for the Metro Air Park. During the review, up to but not more than, an additional 3,000 acres of additional urban development may be approved. In other words, no more than

a total of 12,000 acres of urban development shall be approved prior to completion of the Overall Program Review.

The Overall Program Review shall specifically address the following factors: (1) status and population trends of the giant garter snake, Swainson's hawk, and all other Covered Species within the NBHCP area, especially with respect to those biological factors that are directly affected by Covered Activities under the Plan; (2) status and effectiveness of the Plan's habitat reserve system, including its buffer and setback requirements; (3) the Plan's success in meeting the 2,500-acre and 400-acre minimum habitat block size requirements; (4) the status and effectiveness of the Plan's funding mechanisms; and (5) the relative status and distribution of developed lands and reserve lands within each of the Land Use Agency jurisdictions (the City of Sacramento, Sutter County and MAP); and (6) the success of the 25% managed marsh/50% rice/25% upland for supporting giant garter snake, Swainson's hawk, and other Covered Species; and (7) compliance of the Water Agencies (RD1000 and Natomas Mutual) with approved canal and ditch maintenance practices.

The purpose of the Overall Program Review is to evaluate the NBHCP's status as described above, its effectiveness, and its equitableness with respect to the relative responsibilities of the Plan borne by each of its Permittees, in light of the Plan's original intent and expectations. It is not to introduce significant new goals or objectives into the NBHCP not contemplated or intended by the Permittees as described in this HCP, unless any such new objectives are jointly agreed to by the Permittees and the Wildlife Agencies. If the findings of the Overall Program Review, monitoring results from the Plan Area, new scientific data or an adopted Giant Garter Snake Recovery Plan indicate, the managed marsh component of Mitigation Lands may be increased to 75% within sites acquired subsequent to such review, results, determination or Recovery Plan adoption. Such increase would only be made following written notice from USFWS, supported by documentation and technical analysis, supporting the need for an increased percentage of managed marsh.

The review shall be conducted through consultation among all affected Permittees, TNBC, the USFWS, and the CDFG, which shall be known collectively as the NBHCP Review Board. TNBC shall inform the other parties, in writing, when the 9,000-acre trigger for the Overall Program Review has been reached and shall initiate and coordinate the review.

Results of the review shall consist of a written report presenting the conclusions of the Review Board. These conclusions shall address each of the factors described above. The report shall also present recommendations consisting of the following or of a combination thereof: (1) a recommendation that the NBHCP is functioning as intended and that no revisions to the Plan's measures, in addition to those originally set forth, are necessary; (2) a recommendation that the NBHCP is significantly in need of correction and the specific corrective measures that are needed; and (3) a recommendation as to whether such corrections should be treated as an NBHCP revision under the Plan's Adaptive Management provisions, or whether the corrections exceed the scope or intent of the Adaptive Management process and should be treated as an amendment of the Plan's associated Section 10(a)(1)(B) and Section 2081

permits. Upon completion of the review, the USFWS and CDFG shall, depending on the results, either document in writing that the NBHCP is functioning as intended and that no Plan revisions or permit amendments are necessary, or assist the Permittees in revising the NBHCP and, if necessary amending their respective permits, as needed. The Review Board's report shall be made available to the public for review and comment before written findings are made by USFWS and CDFG. If it is determined that substantial revisions to the NBHCP need to be made through amendment of the permits, all statutory and regulatory requirements including those regarding public notice and review under ESA, CESA, NEPA and CEQA shall be completed.

J. INDEPENDENT MID-POINT REVIEWS FOR LAND USE AGENCIES

In addition to the NBHCP Overall Program Review once 9,000 acres of Authorized Development has been approved, both the City of Sacramento and Sutter County will conduct Independent Mid-Point Reviews as development occurs within each Land Use Agency's Permit Area. Thus, up to three program reviews (one overall and two independent reviews) may be completed, depending on the timing of development within the City and Sutter. Independent Mid-Point Reviews provide greater assurances that NBHCP objectives are being achieved in the event that (i) development occurs more rapidly than projected within the Permit Area of one of the Land Use Permittees or, (ii) one of the agencies should cease to participate in the NBHCP. The Independent Mid-Point Reviews conducted by the City of Sacramento and Sutter County shall address each of the factors noted for the 9,000 acre Overall Program Review above, as well as the expanded evaluation of progress on the 2,500 acre preserve, and minimum preserve size described in Section IV.C.1.e above.

If the findings of any of the Independent Mid-Point Reviews, ongoing monitoring results, new scientific data or an adopted Giant Garter Snake Recovery Plan so dictate, the managed marsh component of Mitigation Lands may be increased to 75% within sites acquired subsequent to such review, results, determination or Recovery Plan adoption. Such increase would only be made following written notice from USFWS, supported by documentation and technical analysis, supporting the need for an increased percentage of managed marsh.

The City Independent Mid-Point Review will begin once Urban Development Permits for 4,000 acres of Authorized Development have been approved within the City's Permit Area and the review will be completed before the City has approved Urban Development Permits for 5,500 acres of development under the NBHCP. Sutter County will begin its Independent Mid-Point Review once the County has approved Urban Development Permits for 3,500 acres of Authorized Development permits and will complete the Independent Mid-Point Review before the County approves Urban Development Permits for 5,000 acres of development under the NBHCP.

Should the timing of the City of Sacramento's Independent Mid-Point Review, Sutter County's Independent Mid-Point Review and/or the overall 9,000 acre program review coincide, then the affected Land Use Permittee(s) may request the program reviews be combined under a single evaluation. Such

request shall be made to USFWS and CDFG and may be granted at the discretion of the USFWS and CDFG. Any revisions to the NBHCP made as a result of either Independent Mid-Point Review shall apply to both Land Use Agencies (and MAP POA) unless the change affects only a particular Permittee.

K. UNFORESEEN CIRCUMSTANCES/"NO SURPRISES"/CHANGED CIRCUMSTANCES

"Unforeseen circumstances" is defined at 50 C.F.R. 17.3 as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the USFWS at the time of the NBHCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species.

On February 28, 1998, the U.S. Fish and Wildlife Service published a final rule codifying its "No Surprises" policy into federal regulation (63 FR 8859). The "No Surprises" Rule states, in part, that:

> "In negotiating unforeseen circumstances, the [Service] will not require the commitment of additional land, water or financial compensation or other natural resources beyond the level otherwise agreed upon for the species covered by the conservation plan without the consent of the permittee.
>
> If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the [Service] may require additional measures of the Permittee where the conservation plan is being properly implemented, but only if such measures are limited to modifications within conserved habitat areas, if any, or to the conservation plan's operating conservation program for the affected species, and maintain the original terms of the conservation plan to the maximum extent possible. Additional conservation and mitigation measures will not involve the commitment of additional land, water or financial compensation or restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the conservation plan, without the consent of the Permittee." (50 C.F.R. Sections 17.22(b)(5)(iii) and 17.32(b)(5)(iii).)

The assurances contained in the No Surprises rule apply only "where the conservation plan is being properly implemented, and apply only with respect to species adequately covered by the conservation plan."

For purposes of the No Surprises assurances, the term "operating conservation program" shall mean the specific conservation, mitigation, and management measures provided under the NBHCP to minimize and mitigate the impacts of incidental take of the Covered Species.

a. Relevant Factors

Pursuant to the No Surprises Rule, in determining whether Unforeseen Circumstances exist, the USFWS shall consider, but not be limited to, the following factors: (1) the size of the current range of the affected species; (2) percentage of range of Covered Species adversely affected by the NBHCP; (3)

percentage of range for affected Covered Species conserved by the NBHCP; (4) ecological significance of the portion of the range affected by the NBHCP; (5) level of knowledge about the affected species and the degree of specificity of the Covered Species' conservation program under the NBHCP; and (6) whether the failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected Covered Species in the wild. (50 C.F.R. §§ 17.22(b)(5)(C) and 17.32(b)(5)(C).)

b. Burden and Documentation

Pursuant to the No Surprises Rule, the USFWS shall have the burden of demonstrating that Unforeseen Circumstances exist based upon the best scientific and commercial data available. The USFWS must clearly document its findings and base its findings on reliable technical information regarding the status and habitat requirements of the affected species. (50 C.F.R. §§ 17.22(b)(5)(C) and 17.32(b)(5)(C).)

c. Advance Notice

Except where there is a substantial threat of imminent, significant adverse impacts to a Covered Species, the USFWS shall provide at least sixty (60) calendar days notice of a proposed finding of Unforeseen Circumstances, during which time the USFWS shall meet with the Permittees to discuss the proposed finding and to provide the Permittees with an opportunity to submit information to rebut the proposed finding.

d. Limits on Additional Conservation Measures

Pursuant to the No Surprises Rule, if the USFWS makes a finding of Unforeseen Circumstances in accordance with the procedures described in this section, and determines that additional conservation measures are warranted, such additional conservation measures shall conform to the maximum extent possible to the original terms of the NBHCP, and shall not involve the commitment of additional land, water or financial compensation or additional restrictions on the use of the land, water or other natural resources beyond the level otherwise agreed upon in the NBHCP for the Covered Species without the Permittees' consent.

1. Applicability of the "No Surprises" Protections

In light of the NBHCP Adaptive Management provisions (see Section VI.F), program adaptations for recovery plans (see Section VI.H), Overall Program Review (see Section VI.I), and individual Land Use Agency's Independent Mid-Point Review (see Section VI.J), which allow certain changes to occur throughout the term of the plan, it is necessary to identify aspects of the NBHCP Operating Conservation Program that are subject to the "No Surprises" rule and for which the USFWS may not require additional mitigation for an unforeseen circumstances finding without the consent of the Permittees. The NBHCP

Adaptive Management provisions allow the NBHCP to be revised as a result of new recovery plans, new research into the Covered Species, and ongoing monitoring programs. As a result, revisions may be made to the NBHCP's Operating Conservation Program, including reserve land management and enhancement, and monitoring of the Covered Species pursuant to the Plan's Adaptive Management provisions, that may result in additional mitigation provided such revisions meet the requirements of Section VI.E and VI.F. Because such revisions and changes are provided for under the Plan, they are not subject to the restrictions on additional mitigation contained in the No Surprises Rule.

The following elements of the plan are not subject to revision as part of the NBHCP's Adaptive Management provisions or as a result of the overall or individual jurisdiction reviews: (1) the 0.5-to-1 mitigation ratio; (2) the 20 percent limit on the amount of reserve lands that may be potentially acquired out of Basin in Area B; (3) the 75 percent limit on the amount of reserve lands to be converted to managed marsh; (4) any other change not currently described in or provided for under the Adaptive Management program, Changed Circumstances, or other elements of the NBHCP's Operating Conservation Program that would significantly increase the Plan's costs or restrictions on land otherwise available, including any such changes resulting from the 9,000-acre review Overall Review process or Independent Mid-Point Reviews; and (5) any other change not currently described or provided for under the Adaptive Management provisions or other elements of the NBHCP that would significantly affect the Water Agencies' costs or place additional restrictions on the ability of the Water Agencies to provide flood control and irrigation services.

2. Changed Circumstances

Another category of circumstances under the federal "No Surprises" rule is "changed circumstances." This term is defined under the rule as "changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the [USFWS] and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events.)" 50 C.F.R. 17.3. Changed circumstances will be addressed through the Adaptive Management provisions (Section VI.F) or as described below.

a. Listing of New Species

If currently unlisted species that are addressed in the NBHCP as Covered Species are listed subsequent to issuance of the NBHCP's associated Section 10(a)(1)(B) permit, no action is required of the Permittees under ESA. This is because all Covered Species are named on the federal permit and, under the terms of the permit, permit coverage for any unlisted Covered Species will become effective upon the final listing of any such species under the ESA.

Under CESA, a covered species which becomes listed would be subject to separate confirmation by CDFG that substantial evidence demonstrates that the Section 2081 Permit will continue to meet the standards in California Fish and Game Code Section 2081 (b) and Title 14 of the California Code of

Regulations, Section 783.4 for the Additional State Protected Species. (See also Section 6.2.4 of the Implementation Agreement).

However, currently unlisted species that are not addressed as Covered Species in the NBHCP will not be included in the permit and will not be so treated in the event of listing. To the extent the USFWS or Permittees determine that any such species would likely be taken, jeopardized, or the critical habitat, if any, of such species adversely modified or destroyed, as a result of the Covered Activities, the Permittees will implement the "no jeopardy/no take/no adverse modification" measures identified by USFWS until such time as the Permittee's federal permit is amended to obtain permit coverage for these species or until the USFWS notifies the Permittee that such measures are no longer needed to avoid jeopardy to, take of, or adverse modification of the critical habitat of, the non-Covered Species.

Unforeseen Circumstances: There are no unforeseen circumstances associated with the listing of new species under the ESA.

b. Availability of New Scientific Information

Because the Adaptive Management provisions of this document, Section VI.F provide for the accumulation and integration of new scientific information and the results of monitoring in the Plan Area into the NBHCP's operating conservation program over the life of new permits, the information is not considered a changed circumstance under the NBHCP.

c. Approval of New Recovery Plans

Section H of this Chapter, Program Adaptation for Recovery Plans, provides during the life of the permits for the integration of peer reviewed new scientific and other information from future adopted recovery plans into the NBHCP's Operating Conservation Program, including recommendations in a future giant garter snake recovery plan requiring adjustments in the amount of managed marsh on habitat reserve lands. The integration of such peer-reviewed new scientific and other information is not considered a changed circumstance. Funding for such adjustments will be provided through adjustments to the Mitigation Fees and in addition, if TNBC determines through appropriate economic analysis that management in perpetuity of the Mitigation Lands will not require all interest generated from the O&M Endowment component of the Mitigation Fees, funds may also be may be provided by the adopted O&M Endowment Fund.

d. Problems in Implementing the HCP

Certain types of issues may develop during implementation of the NBHCP. These could include funding deficiencies, possible lack of effectiveness in some of the Plan's mitigation approaches and lands, deficiencies in certain aspects of the Plan's monitoring program, and problems in coordinating the activities of the Permittees and in distributing the location of mitigation lands equitably among the several jurisdictions.

The NBHCP Permittees, Service and CDFG have planned for these types of circumstances and have addressed the potential for such occurrences in the NBHCP. The NBHCP's Overall Program Review, individual Land Use Agencies' Independent Mid-Point Reviews, regular TNBC Board or NBHCP TAC meetings, and the year end meeting between the Wildlife Agencies and Permittees are designed as mechanisms to address these circumstances. Therefore they are not considered changed circumstances.

Unforeseen Circumstances: There are no unforeseen circumstances associated with the implementation problems of the NBHCP, as described above.

e. Fire or Flood

Natural phenomena such as wildfires and floods can result in significant adverse consequences to the NBHCP's Covered Species and their habitats. The likelihood of such occurrences depends to a large extent on the location of the HCP and the history of such events in a given region. In the NBHCP Plan Area, the risk of wildfire affecting Covered Species habitats or mitigation lands is low. This is because the land use types in the area--primarily intensively managed agriculture, would not typically support uncontrolled or extensive wildfire events, compared to chaparral, forest, or similar habitats.

However, there is a significant risk of flood events in Sacramento County, to judge by extensive flooding that occurred in the area in 1986, 1997, and other years.

The effects of floods on the NBHCP's Covered Species and on mitigation lands established under the Plan would depend on several factors, including the severity of the flood event, its duration, and the type of habitat affected. Overall, the adverse effects of flood events on the NBHCP's Covered Species and mitigation lands, if they occur, are expected to be relatively minor. This is because habitat mitigation lands established under the NBHCP, croplands, riparian corridors, wetlands, and some grasslands and woodlands, naturally experience periodic flooding and are capable of absorbing the effects of flooding with minimal or transient damage. It is also because many of the Plan's Covered Species are either adapted to flooding (e.g., the giant garter snake and northwestern pond turtle), would likely not be present or nesting during winter flood events (e.g., Swainson's hawk, and burrowing owl), or are capable of fleeing the harm of such events (e.g., white-faced ibis, bank swallow, and tricolored blackbird).

However, in some cases flood damage to NBHCP mitigation lands could be significant, and could include crop damage, sedimentation, downed trees and shrubs, and deposits of debris. Therefore, the following conditions shall apply should flooding occur in the NBHCP Plan Area during the term of the permits:

(1) If such flooding affects any NBHCP mitigation lands, TNBC, in consultation with the Wildlife Agencies' representatives on the Technical Advisory Committee (TAC), shall assess the extent of the damage. TNBC shall submit a report summarizing the nature and extent of such damage to the Wildlife Agencies within 60 days of the cessation of the flood.

The report shall address any damage to protected habitats on the mitigation lands and any known or suspected impacts to Covered Species occupying such lands.

(2) If damage to mitigation lands is such that corrective action is determined to be needed, as assessed by TNBC and with concurrence of the Wildlife Agencies' representatives on the TAC, TNBC shall, within 30 days of submission of the report described above, consult with the Wildlife Agencies. Together, TNBC and the Wildlife Agencies shall develop a plan for implementing any necessary measures to correct for flood damage, which measures shall include, but not be limited to, the removal of sediment or debris, land recontouring, replanting vegetation, and any other measures determined by TNBC and the Wildlife Agencies to be necessary to maintain the affected area's habitat values. The plan shall also address any additional funding beyond the management funds already identified under the Plan needed to implement such measures. TNBC will implement the approved plan. Funding for restoration following flooding shall be provided through TNBC, with funds provided as described in Section VI.B above, unless funded by another source.

Unforeseen Circumstances - Flooding: A flood event greater than the 200-year event has not occurred in the last 100 years for the Sacramento or American Rivers in the vicinity of the Natomas Basin. The potential damage from such an event is not foreseeable, nor predictable. Therefore, a flood and the damage resulting from an event greater than a 200-year event shall be considered an Unforeseen Circumstance.

f. Invasion of Non-Native Species both Plant and Animal

It is possible that the habitat reserves may become infested with non-native plant and/or animal species which could impact the quality of the wetland and upland habitat, although the management plans developed for the habitat reserves are required to include measures to prevent such infestations and thus the establishment of a major infestation should be low. A major infestation of fast growing weed species such as giant reed, Johnson grass, etc., can severely restrict water movement in wetlands and reduce habitat quality. The invasion of yellow star thistle in uplands can render fields useless for foraging animals. Large infestations of weedy species can become extremely expensive to control and could heavily tax the mitigation fund. Similarly there may be an invasion of non-native animals species which either prey on Covered Species or degrade habitat quality. A control program to eliminate the problem species can also be expensive.

If a pest plant/animal infestation results in substantial impacts to habitat reserves, as assessed by TNBC, with the concurrence of the Wildlife Agencies, such that it cannot be adequately handled under the existing operating budget, TNBC shall prepare a report which describes the extent of the problem, identifies a range of remedial actions, and includes a cost analysis for funding a control program. The report shall be submitted to the Wildlife Agencies for approval. TNBC shall implement the measures recommended in the approved report. Funding for recovery measures related to invasive plants or animals

shall be provided through TNBC, with funds provided as described in Section VI.B above, unless funded by another source.

Unforeseen Circumstances: Due to the well documented national problem of invasive non-native plants and animals, and their effects on native vegetation and wildlife, no unforeseen circumstances exist for this event.

g. Changes in Water Availability

The irrigation of wetland reserves in the Natomas Basin relies on continuous water supplies that are generally provided by Natomas Mutual. If circumstances change and Natomas Mutual is no longer able to provide the same level of water service or ceases to provide irrigation water deliveries in the Natomas Basin, the Covered Species and their habitat could potentially experience a significant impact. Considered herein are changed circumstances that could result in the event of either temporary or long-term reductions in the delivery of irrigation water by Natomas Mutual. General water availability and optional sources for reserve irrigation is discussed in Section IV.D.4.c.

In recent years, Natomas Mutual has installed sophisticated improvements to allow substantial increases in water recirculation within the Natomas Basin. Utilizing this infrastructure, Natomas Mutual has, in recent years, been able to serve all of their water users fully during periods of drought- related water supply reductions. Thus, during short-term periods of drought, water supplies for TNBC reserves are reasonably anticipated to be adequate due to the seniority of the water rights within the Basin and Natomas Mutual's operations that can limit outflows from the Basin and increase internal recirculation.

If a prolonged drought occurs such that the maintenance of managed wetlands are in jeopardy (i.e., a drought lasting longer than 5 years) as assessed by TNBC and with concurrence of the Wildlife Agencies, TNBC shall prepare a report that explains what effects the drought is having on the NBHCP's Covered Species and mitigation lands. The report, to be submitted to the Wildlife Agencies for approval, shall identify available measures, if any, needed to assure that the basic habitat requirements for the protected species are being met. TNBC shall implement the approved report. The report shall also address any funding needed to implement such measures. Funding for drought recovery measures shall be provided through TNBC, with funds provided as described in Section VI.B above, unless funded by another source.

Unforeseen Circumstances - Drought: A drought lasting longer than 6 years has not occurred in recorded history for the Sacramento or American River Basins, in the vicinity of the Natomas Basin. The potential from such a drought is not foreseeable, nor predictable. Therefore, a drought and the damage resulting from such an event lasting longer than 6 years shall be considered an Unforeseen Circumstance.

Unforeseen Circumstances - Natomas Mutual Discontinuing Service: Natomas Mutual is a long-established privately held water company that provides irrigation water service within the Natomas Basin. As TNBC becomes a major land owner within the Basin, it will require substantial water deliveries that will

assist Natomas Mutual with remaining an economically viable company. Additionally, substantial agricultural interests are anticipated to remain within the Natomas Basin throughout the life of the permit(s). The potential for Natomas Mutual to discontinue providing irrigation water service within the Basin is not foreseeable, nor predictable because Natomas Mutual has provided irrigation service throughout the Natomas Basin since 1921 and there are no plans to discontinue service. As long as agricultural activities continue within the Natomas Basin, water supply service for irrigation purposes will be necessary. Consequently, if Natomas Mutual discontinues service it is reasonable to assume that another water company would provide irrigation service for such activities. Therefore, financial implications to TNBC resulting from Natomas Mutual discontinuing service within the Natomas Basin are considered an Unforeseen Circumstance.

h. Toxic Spills and Illegal Dumping of Toxic Materials

If one of these circumstances occurs, TNBC, with the concurrence of the Wildlife Agencies' representatives on the TAC, shall determine the extent of damage to the reserve(s) and identify and implement any appropriate remediation response. In addition, consultation with local environmental health departments or other emergency response personnel shall occur to determine the appropriate agencies and alternatives available for providing remediation. TNBC shall continue to maintain their lands in a manner that prevents toxic spills and illegal dumping of toxic materials. TNBC and the Land Use Agencies maintain all rights to prosecute and seek remediation from responsible parties for toxic spills and illegal dumping of toxic materials.

Notification: It is the duty of TNBC to notify the Wildlife Agencies, in writing, within 7 calendar days of becoming aware of an existing or potential Changed Circumstance.

Unforeseen Circumstances: Due to the geographic dispersion of the TNBC reserves within the Natomas Basin, it is unlikely that a toxic spill or illegal dumping of toxic substances would affect a substantial portion of the TNBC reserve system. Further, the Basin is served by one major roadway, Highway 99/70. This roadway poses the greatest potential for an accidental toxic spill of substantial volume. Due to the physical separation of the majority of TNBC reserves from Highway 99/70, as well as the standard practices for responding to major incidents upon state highways, such a spill would be unlikely to substantially affect the TNBC reserve system. If one of the circumstances described above occurs and results in damages to more than 20 percent of the total TNBC reserve lands, an Unforeseen Circumstance will have occurred.

i. Non Participation by a Land Use Agency within the Natomas Basin HCP

A changed circumstance may occur if one of the Land Use Permittees covered by the NBHCP either does not become a signatory to the IA, does not exercise its option to obtain Incidental Take Permits or is subject to revocation of its Permits for non-compliance. While the NBHCP is structured to ensure that mitigation will remain adequate to fully compensate impacts regardless of the number of participants (see

Section VI.L.2, Severability), adjustments through adaptive management within the TNBC reserve system may be required to ensure that the type of habitat created by the reserve adequately compensates for and represents the type of habitat affected by Authorized Development within the participating Land Use Agency Permit Area. For example, Authorized Development within the City of Sacramento's Permit Area may have greater effect on upland species habitat (e.g., Swainson's hawk) than wetland species (e.g., giant garter snake), whereas Authorized Development in Sutter County may result in greater effects to wetland habitats than to upland habitats.

It is important to note that agricultural land use patterns change in response to various circumstances, including market fluctuations and soil capabilities. Additionally, there is an historic trend for rice production to be eliminated well in advance of urban development. The result of this trend is that, at time of urban development, it appears land to be developed is primarily either fallow or ruderal in character, when in fact the land may have been in rice production and providing wetland habitat up until one or two years prior to development. As such, this NBHCP relied upon the 1997 agricultural cover types as the base conditions to which the Operating Conservation Plan responds.

With the participation of both Land Use Agencies, the NBHCP reserve system, adaptive management and other management measures are effective in compensating and mitigating for the impacts for both of these different habitats and their associated Covered Species. If one Land Use Agency should choose not to participate, the NBHCP requires that an adjustment in habitat acquisition and management may be required to assure the provision of sufficient reserve lands and mitigation to offset fully the impacts resulting from Covered Activities within that Permit Area and to ensure the remaining Land Use Agency's impacts are adequately mitigated. In order to ensure that the reserve system, mitigation measures and enhancements of the plan remain responsive to the type of impacts, it nonetheless may be necessary to re-evaluate the type of habitat to be restored, created, enhanced or managed by the reserve system if one of the Land Use Permittees does not participate.

In the event this changed circumstance should occur, the participating Land Use Agency, in conjunction with the TAC and TNBC, shall review the existing and planned reserve system relative to the types of habitat which have been impacted and are projected to be impacted by the remaining Authorized Development. The existing Adaptive Management Plans and overall reserve management measures shall be reviewed and modified, as necessary, to ensure that the reserve lands are acquired in accordance with the NBHCP 0.5 to 1 mitigation ratio and to ensure that within that ratio, adequate management and enhancement activities are incorporated in the reserve system design to respond to any change in the type of habitat and associated species which will be impacted. The Wildlife Agencies shall approve all such changes. This may require that TNBC provide a greater proportion of upland enhancements and implement additional upland habitat management activities as specified in Section IV.C.4 on acquired reserve lands if the impacts associated with the Covered Activities of the participating Land Use Agency would result in greater effects to upland species habitat than wetland habitats. Similarly, if the Covered Activities would result in the loss of more wetland habitat, the TNBC would adjust the reserve management techniques to focus on wetland habitat enhancement and management activities as set for in Section IV.C.3.

The Adaptive Management Plan shall be developed by TNBC, in consultation with the TAC to ensure that adaptive management changes do not result in adverse impacts to other Covered Species. The changes would be approved as part of the plan's Adaptive Management Program. In order to avoid significant imbalances in the type of habitat created relative to the impacts by type of habitat and Covered Species, Mid-Point Reviews will be conducted. At the Overall Program Review and the Independent Mid-Point Reviews, impacts and habitat types will be compared and any imbalances in the reserve habitat type will be identified and responded to in policies for both adaptive management and future reserve acquisition and establishment. In this way, the monitoring program for both compliance and effectiveness monitoring will interact with the reserve design and management to ensure successful and responsive habitat mitigation to impacts. (See also Biological Monitoring Section VI.E and Review Sections VI.I and J.)

Unforeseen Circumstances: If one of the Land Use Agencies either does not participate in the NBHCP or their Permits are revoked, and the Wildlife Agencies determines that there are no feasible alternatives available for reserve enhancement or acquisition within the Natomas Basin or through Out-of-Basin reserve acquisitions that will address the type of habitat impacted by the participating Land Use Agency, an unforeseen circumstance may occur. For example, if one of the Land Use Agencies should cease participation in the NBHCP after substantial build-out of the reserve system which has occurred in order to provide mitigation for impacts due to Authorized Development associated with previously issued urban development permits, and substantial changes to the reserve system are impractical or infeasible, an Unforeseen Circumstance will have occurred. This eventuality is highly unlikely, and therefore considered an unforeseen circumstance, for the following reasons:

(1) Adoption of the NBHCP and execution of the associated Implementing Agreements commit the Land Use Agencies to implement the provisions of the NBHCP. There is no basis to assume that either Land Use Permittee will fail to fulfill their obligations under the NBHCP or cease participation under the NBHCP.

(2) In order to issue urban development permits, the participating Land Use Agency Permittee must accept mitigation fees. Consequently, before Authorized Development proceeds, the participating Land Use Agency will be required to collect funds which will be used to acquire Mitigation Lands in order to offset the impacts of that Authorized Development. The participating Land Use Agency's collection of Mitigation Fees is independent of a decision by another Land Use Agency Permittee to choose whether or not to participate or continue participating in the NBHCP. Thus, TNBC will be responsible for acquiring Mitigatin Lands and adjusting the reserves to compensate for the loss of habitat associated with urban development proceeding pursuant to the participating Land Use Agency's Permit.

(3) The NBHCP includes requirements for Individual Mid-Point Reviews and an Overall Program Review. These reviews will include an analysis of whether the composition of habitat acquired and restored by TNBC reflects the composition of habitat impacted by

Authorized Development. In the event TNBC reserves do not reflect the types of habitat impacted by Authorized Development, then the Operating Conservation Program would be adjusted accordingly to correspond to the habitat types impacted through the Adaptive Management provisions of the NBHCP.

L. ENFORCEMENT, AMENDMENTS, HCP REQUIREMENTS

1. Enforcement of the Section 10(a)(1)(B) and Section 2081 Permits

The provisions of the NBHCP are enforceable through the terms and conditions of the Section 10(a)(1)(B) permit and 2081 permit issued by the USFWS and CDFG, respectively, the NBHCP Implementation Agreement executed by the respective Permittees and governing federal and state laws and regulations.

a. Notice

Any notice required to enforce, amend, or evaluate the NBHCP and terms and conditions of the Implementation Agreement must be given to the Permittees by personal delivery or by certified mail/return receipt requested.

b. Suspension/Revocation

The USFWS or CDFG may suspend their respective Permits of any given Permittee if that Permittee fails to implement the NBHCP in accordance with the terms and conditions of the permits and as provided for under applicable regulations. Suspension or revocation of a Section 10(a)(1)(B) permit, in whole or in part, by the USFWS shall be in accordance with 50 CFR 13.27-29 and each individual Permittee's Implementation Agreement. Suspension or revocation of any permit issued by the CDFG based on the NBHCP and pursuant to Fish and Game Code Section 2081, subdivision (b), in whole or in part, shall be governed by the Implementation Agreement executed by the CDFG, and sections 783.7 and 783.8 of Title 14 of the California Code of Regulations or other controlling legal authority in effect at the relevant time.

2. Severability

If one of the Land Use Agencies fails to obtain its Permits or has its Permits revoked for failure to comply with the NBHCP, the essential effect to the implementation of the NBHCP is that less Authorized Development is covered by the NBHCP. With regard to funding adequacy, the reduction in Authorized Development would result in a similar reduction in acres of mitigation land to be acquired, restored, managed, enhanced and administered as reserve lands in perpetuity. Therefore, TNBC would have adequate funding to continue to implement the NBHCP as it applies to the reduced Authorized Development and the Covered Activities within the participating Land Use Permittees' Permit Areas.

Additionally, if TNBC were to implement the NBHCP under these circumstances, the NBHCP provides for adjustments to the Mitigation Fee as necessary, to fund the acquisition, restoration, creation, enhancement and management of reserves on a 0.5 to 1.0 mitigation basis. Economic and Planning Systems, has completed the Fee Analysis since the inception of the HCP's implementation and completed an Economic Analysis that shows the financial result on TNBC if less Authorized Development than the full 17,500 acres occurs (see Appendix A).

Additionally, should one of the Land Use Agencies not participate (see Changed Circumstances Section VI.K.2.i above), the NBHCP provides for adaptive management revisions to ensure that the mitigation program continues to be proportionate to the type of habitat and species affected.

3. Amendments and Revisions

There are two types of changes which may be made to the NBHCP and/or the NBHCP Permits and/or its associated documents:

Revisions
Amendments

Any revisions or amendments shall be in accordance with all applicable legal requirements, including but not limited to the ESA, NEPA, CESA, CEQA, and any applicable state and federal regulations. TNBC shall process all amendments and revisions to the NBHCP, circulating proposed changes to all parties and, if appropriate, approving the amendment or revision by action of TNBC Board.

a. <u>Revisions (Changes to the NBHCP Not Requiring Amendment of the Plan and Incidental Take Permits)</u>

Revisions to the NBHCP are changes to the Plan provided for under the Operation Conservation Program, including Adaptive Management changes and Mitigation Fee adjustments. These revisions would not result in operations under the NBHCP that are significantly different from those analyzed in connection with the NBHCP as approved, result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the NBHCP as approved.

Revisions to the NBHCP may include, but are not limited to the following:

(1) Updating Construction "Windows" for the NBHCP Covered Species. In the event that standard construction windows established for species covered by the NBHCP are revised by USFWS or CDFG, then such revised construction windows within the NBHCP shall be automatically revised.

(2) Correction of any maps or exhibits to correct errors in mapping or to reflect previously approved changes in the ITPs or NBHCP;

(3) Establishing and amending preconstruction survey methodologies, including modifying timing of NBHCP preconstruction survey methodologies.

(4) Modifying existing or establishing new Incidental Take Avoidance Measures.

(5) Modifying reporting protocols for Annual Reports.

(6) Minor changes to survey, monitoring or reporting protocols;

(7) Revising reserve enhancement and management techniques.

(8) Establishing new reserve design criteria.

(9) Revising reserve enhancement or management practices in conjunction with Site Specific Management Plans.

(10) Approving recreational or income-generating uses for the NBHCP reserves that are consistent with the biological goals and objectives of the NBHCP Plan.

(11) Making annual adjustments to the NBHCP Mitigation Fee to keep pace with inflation, or as necessary to fully implement the NBHCP's Operating Conservation Program, including its Adaptive Management provisions and responses to Changed Circumstances.

(12) Changes to the membership of the TAC which retains representation from the Wildlife Agencies.

(13) Any other modifications to the NBHCP that are consistent with the biological goals and objectives the NBHCP that the USFWS and CDFG have analyzed and agreed to, and that will not result in operations under the NBHCP that are significantly different from those analyzed in connection with the NBHCP as approved, result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the NBHCP as approved or result in take not analyzed in connection with the NBHCP as approved including but not limited to: the approval or execution of agreements to facilitate execution and implementation of the NBHCP; action by the TNBC to delegate any of its duties specified by the NBHCP to a third party under its direct control.

The party proposing a revision to the NBHCP shall circulate to TNBC and the members of the TAC, the proposed revision along with an explanation of why the revision is necessary or desirable; and

a description of why the party believes the effects of the proposed revision are more beneficial than or are not significantly different from those described in the NBHCP as originally adopted. TNBC shall be responsible for circulating all proposed revisions to the other Permittees for review, as appropriate. If TNBC, and the USFWS and CDFG representatives to the TAC agree to the proposed revision, and no other Permittee objects within the period prescribed by TNBC, TNBC shall process the revisions to the NBHCP, including, if appropriate, approving the revision by action of TNBC Board. Notwithstanding the above, all adjustments to the Mitigation Fee shall also require approval by the City and County before becoming effective within their respective jurisdictions.

If the USFWS or CDFG representative to the TAC objects that the proposed revision should be processed as an amendment to the NBHCP, then TNBC may choose to submit the proposed revision to USFWS and CDFG for review. The USFWS and CDFG shall each respond in writing to a proposed revision within sixty (60) calendar days of receipt of the request provided that sufficient supporting documentation is included with the request. The responses shall either concur with the proposed revision, or require that the proposed revision by processed as an amendment to the Plan and ITPs. If either the USFWS or CDFG require the proposed revision to be processed as an amendment, the agency shall include in their written response an explanation for its determination.

If approved by USFWS and CDFG, the revision shall become effective upon TNBC's receipt of USFWS' and/or CDFG's approval.

b. <u>Amendments to the NBHCP</u>

Amendments to the NBHCP will require amendment of Section 10(a)(1)(B) Permits and /or the Section 2081(b) Permits, and may require amendment of the Implementation Agreement. The following summarizes the types of changes which may require a Plan Amendment and the procedures for amending each approval.

Amendments may include any of the following types of changes to the NBHCP:

(1) Proposed revisions required to be treated as Amendments pursuant to Section VI.L.3.b above.

(2) The listing under the ESA or the CESA of a new species within the Plan Area which is not an NBHCP Covered Species but which may be affected by NBHCP Covered Activities and for which a Permittee seeks coverage under the Plan and ITPs.

(3) Significant changes to the NBHCP which were not addressed in the NBHCP including, but not limited to the following:

a. Changes to the method for calculating compensation for Incidental Take, which would increase the levels of Incidental Take permitted for the NBHCP.

b. Changes to the Mitigation Fee except as otherwise provided for in the NBHCP in Section VI.B of the NBHCP.

(4) Changes to the Covered Activities which were not addressed in the NBHCP as originally adopted, and which otherwise do not meet the Revision provisions above..

(5) Extending the term of the NBHCP Permits past the 50-year term.

(6) Extension of the NBHCP Permit Area boundaries to allow development under the NBHCP within the City's or Sutter County's portion of the Swainson's Hawk Zone beyond the City's designated 252 acres.

(7) A proposal to increase the total Authorized Development permitted under the NBHCP beyond 15,517 acres (17,500 acres including MAP).

Specific procedures for requesting Amendments to the NBHCP, ITPs and the Implementation Agreement are described below.

c. Amendments to the Section 10(a)(1)(B) Permits

Following receipt of a complete application package for a proposed Amendment to a Section 10(a)(1)(B) Permit, the Service shall publish a notice of the proposed amendment to the Section 10 (a) Permit in the Federal Register as required by ESA. The Service shall use its reasonable efforts to process the proposed amendment within one hundred eighty (180) calendar days of publication, except where longer periods are required by law. The amendment of a Section 10(a) Permit shall be treated as an original permit application. Such applications typically will require submittal of a revised habitat conservation plan, a completed permit application form with appropriate fees, a revised Implementation Agreement, and preparation of an environmental review document prepared in accordance with the National Environmental Policy Act. However, the Parties acknowledge that specific document requirements may vary based on the nature of the amendment.

d. Amendments to the Section 2081 Permits

Amendments to the Section 2081(b) Permit shall be processed in accordance with applicable CESA regulations (California Code of Regulations, Title 14, Section 783.6(c)(4) and (c)(5)

4. Function of NBHCP under ESA and CESA

a. Endangered Species Act Section 10(a)(2)(A)

Section 10(a)(1)(B) of the Endangered Species Act requires the applicant to submit a conservation plan in support of an incidental take permit application. Under Section 10(a)(2)(A) of the ESA, the conservation plan must contain the elements listed below in *italics*. Chapter and section references are included after each element description to show where each of these elements is covered in the NBHCP.

(1) A description of the impacts likely to result from the proposed taking. See Chapter VII, Take Levels/Impacts of the Plan.

(2) The steps the applicant will undertake to monitor, minimize, and mitigate such impacts; the funding that will be made available to implement such measures; and the procedures to deal with unforeseen circumstances;

a. *Monitor*. See Section VI.E, Biological Monitoring.

b. *Minimize*. See Section V.A.5.a, Measures to Reduce Take [of the giant garter snake]; Section V.A.5.b, Measures to Reduce Take [of the Swainson's hawk]; and Section V.A.5.c-r, for conservation strategies for other species.

c. *Mitigate.* See Chapter IV, Conservation Plan; Chapter V, Take Avoidance, Minimization and Mitigation; Chapter VI, Conservation Plan; and Chapter VII, Take Levels/Impacts of the Plan

d. *Funding.* See Section VI.B., Funding.

e. *Unforeseen Circumstances*. Under the NBHCP, there is considerable flexibility in TNBC's ability to manage reserve lands to maintain habitat values for Covered Species. Changes in cost for land acquisition or enhancement will be accommodated by adjustment in the Mitigation Fee as necessary within the terms of the NBHCP. The Plan also has Adaptive Management provisions allowing for adjustments to certain aspects of the conservation program through time (Section VI.F). See Section VI.K above for further discussion of how Unforeseen Circumstances relates to the NBHCP's requirements.

(3) Alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized. Alternatives to the NBHCP program were considered, including a No-Project Alternative, No Rice/Hunting Revenue Alternative, and Involvement of Agriculture Alternative (see Section VII). However, due to the ubiquitous

presence of giant garter snakes in the rice fields and in the man-made water supply and drainage system, alternatives that would avoid take completely are considered to be impractical.

(4) Additional measures the USFWS may require as being necessary or appropriate for purposes of the plan. The NBHCP will be implemented through issuance of federal and state permits and the Implementation Agreements between each Permittee and the USFWS and CDFG.

Typically, an HCP should also include the following in order to provide supporting information for the statutory and regulatory HCP requirements.

(1) Delineation of the Natomas Basin and individual permit areas for each Permittee. See Figure 2.

(2) Collection and synthesis of biological data for all listed and other Covered Species being addressed in the HCP. See Chapter II, Biological Data

(3) Identification of activities that may result in take. Incidental take may occur as a result of urban development within the Basin, during operation and maintenance of water conveyance facilities within the Basin, and during acquisition, restoration and management activities of TNBC. See Section I.N, for Covered Activities that may result in take.

(4) Quantification of anticipated take levels either in terms of habitat loss (acres) or numbers of individual animals. See Chapter VII for the giant garter snake, Swainson's hawk, vernal pool species, VELB, tricolored blackbird, and other Covered Species.

(5) An explanation of how the Plan minimizes and mitigates take to the maximum extent practicable. See Section VII and Appendix A.

b. California Endangered Species Act Section 2081 Permit

Under CESA, and pursuant to its statutory mandate as a trustee for the State's fish and wildlife resources, the CDFG is charged with the obligation to conserve endangered and threatened species, and species that are candidates for listing under CESA. The giant garter snake and Swainson's hawk, among other species, are such state listed species covered by the NBHCP.

The CDFG may authorize the take of certain protected amphibians, endangered, threatened, and candidate species under CESA consistent with Section 2081, subdivision (b), of the California Fish and Game Code. The specific requirements governing issuance of an incidental take permit by the CDFG are set forth in Section 2081, subdivision (b), and Title 14 of the California Code of Regulations, commencing

with Section 783.0. The NBHCP is intended to meet all of the requirements governing an application for an incidental take permit under CESA and, as a consequence, to provide grounds for the CDFG to authorize the incidental take of State listed species covered by the NBHCP (See generally Fish & Game Code, § 2081, subds. (B)(1)-(4),(c); Cal. Code Regs., tit. 14, §§ 783.2, 783.4). The NBHCP, as a consequence, identifies the extent of take that may result because of activities covered by the NBHCP, includes measures that minimize and fully mitigate all impacts on the State listed species that result from the otherwise lawful activities covered by the NBHCP, and includes an analysis establishing that implementation of the NBHCP and associated other activities will not jeopardize the continued existence of State listed species covered by the Plan, among other obligations. See Section VI.C above.

In the event that one or more of the Covered Species that are not State Protected Species are listed as an endangered species or threatened species or candidate species pursuant to the CESA, the Section 2081 Permit shall become effective to permit the Incidental Take of such species in connection with Authorized Development within each Permittee's Permit Area as of the date the species is accepted and designated as a candidate species pursuant to California Fish and Game Code section 2074.2 upon confirmation by CDFG that substantial evidence demonstrates that the Section 2081 Permit will continue to meet the standards in California Fish and Game Code Section 2081(b) and Title 14 of the California Code of Regulations, Section 783.4 for the Additional State Protected Species. In the event CDFG determines that such standards will not be met, and the Section 2081 Permit does not become effective upon the designation of an Additional State Protected Species as a candidate, threatened, or endangered species under CESA, CDFG shall accept and give due consideration to the application for a permit amendment or for a separate Section 2081 Permit authorizing Incidental Take fo any such Additional State Protected Species. CDFG shall review and process the application for an amendment to the Section 2081 Permit or a new Section 2081 Permit to authorize Incidental Take of an Additional Staet Protected Species to ensure, to the extent consistent with CESA, that the Incidental Take authorization is effective at the time the Covered Species is accepted and designated as a candidate species under CESA.

c. <u>Implementation of the NBHCP and IA</u>

The NBHCP will be implemented by the City of Sacramento, Sutter County, RD 1000 and Natomas Mutual and TNBC through an Implementation Agreement(s) that will be executed by each Permittee. While each Permittee need not implement the NBHCP at the same time, it is anticipated that some or all NBHCP Permittees will proceed with execution of an IA following approval of the NBHCP, the IA and the associated environmental documents by USFWS and CDFG. Conversely, implementation of the NBHCP may occur over time, through periodic additions by local jurisdictions, agencies and entities, and the phased implementation of their respective NBHCP related obligations.

VII. TAKE LEVELS/IMPACTS OF THE PLAN

This chapter estimates take levels anticipated under the NBHCP and the anticipated effect of that take on the Covered Species, as required by the federal and state ESAs. Covered Activities addressed under the NBHCP consist of Authorized Development in the Permit Areas of Sutter County and the City of Sacramento operations and maintenance activities by the Water Agencies, and management activities conducted by TNBC on the habitat reserves. Within the respective Land Use Agencies' Permit Areas, Authorized Development must be lawful and otherwise approved according to their adopted general plans, specific plans and community plans and shall not conflict with the activities of TNBC. Addressing urban development, the NBHCP also satisfies the requirement in the USFWS's March 11, 1994, biological opinion, as amended, concerning the proposed Sacramento Area Flood Control Agency project that the indirect effects of that project on federally listed species--these being the increased urbanization that the flood control project would make possible--be addressed and mitigated. State law requires each of the local agency prospective applicants and CDFG to comply with California Environmental Quality Act (CEQA) prior to issuance of any incidental take permit under CESA. Likewise the prospective applicants and USWFS must comply with National Environmental Policy Act (NEPA) prior to issuance of any incidental take permit under ESA.

The USFWS actions of approving the NBHCP and issuing the requested Section 10(a)(1)(B) permits are subject to NEPA compliance and will be the subject of an Environmental Impact Statement. Issuance of take permits by CDFG and local agency implementation of the NBHCP are also subject to compliance with CEQA and will be the subject of an Environmental Impact Report.

Take levels included in this plan were developed using a GIS system prepared by CH2MHill, as refined by actual field studies conducted by May & Associates in 2001. The impacts or take levels to Covered Species are fully covered in the "Natomas Basin Habitat Conservation Plan Impacts to Covered Species" prepared by CH2MHill in February 2002, (also referred to as the Technical Memo) which is included in the Appendices to this document. The method for estimating impacts to species is habitat based, which is an acceptable method identified in the USFWS' HCP Handbook to conform to Section 10 of the ESA. Thus, suitable habitat for each Covered Species is calculated as both a baseline condition, as well as a future condition assuming all Authorized Development within the Land Use Agencies' Permit Areas is developed. The California Endangered Species Act (CESA) is more specific and references impacts to populations or numbers of individuals. In consultation with the CDFG, habitat acreage impacts are accepted and may in some cases be worst case estimate of impacts insofar as there are no known occurrences in the Natomas Basin for some Covered Species.

A. EFFECTS ON COVERED WILDLIFE SPECIES

Authorized Development expected to take place under the NBHCP will result in the loss of habitat for the giant garter snake and nesting and foraging habitat for the Swainson's hawk. Since these habitats are, or may be, occupied by numerous additional Covered Species (see Tables I-1 and I-2), these species

will also experience habitat loss under the Plan. It is also expected that individuals of these species will or may be taken during urban development as well as other Covered Activities addressed in the Plan (e.g., Water Agency Covered Activities, TNBC activities). This take could occur in many ways--e.g., immediate death or injury through crushing, either inside burrows or on the ground surface; road kill; abandonment or loss of young birds at nest sites or nest colonies as a result of disturbance or nest site destruction; starvation or exposure on construction sites as a result of displacement and disorientation; and indirect effects as described in Section VII.E below.

However, the NBHCP sets forth a program to minimize and mitigate the loss of these wildlife habitat values through long-term protection, creation, and enhancement of upland and wetland habitats under the NBHCP's proposed reserve system (Chapter IV) as well as under each Permittee's avoidance, minimization, and mitigation measures (Chapter V). The Plan's reserve system will provide for the protection of these habitat types as well as the plant and animal communities they support. The following sections describe the extent of expected take of the Plan's Covered Species taking into account the reserve system program described in Chapter IV and the take avoidance, minimization and mitigation measures set forth in Chapter V.

B. EFFECTS ON VERNAL POOL SPECIES

According to current Sutter County and City of Sacramento general plans, extensive development is not anticipated in the vernal pool portions of the seasonal ponds and wetland areas. Although vernal pool habitat is limited in the Basin, it is anticipated that small areas of vernal pool habitat, generally less than one-half acre in size, potentially could be directly affected by Covered Activities. Elsewhere in the Basin and outside these existing vernal pools, vernal pool species (especially vernal pool fairy shrimp) are not found in natural habitat and are present only in transient or incidental populations in artificial habitats. These incidental populations and artificial habitats (referred to here as "non-vernal pool habitat") are not considered to have long-term significance to the survival and recovery of the vernal pool species.

Direct loss of vernal pool species habitat will be minimized and mitigated in accordance with the measures set forth in Chapters IV and V.

Although anticipated to be minimal due to the limited presence of vernal pool habitat in the Basin, indirect effects to vernal pool habitat could result from human encroachment, invasive species, altered hydrology and non-point source pollution within vernal pool watersheds. These effects could result in changes in species mortality rates, hydrology changes, reductions in habitat area, and isolation of species. Incidental take effects on individual vernal pool species are described further below. Reserve management activities described in Chapter IV and minimization measures described in Chapter V for vernal pool habitat would be implemented to minimize incidental take of vernal pool species.

C. EXTENT OF INCIDENTAL TAKE

The federal and state Incidental Take Permits will apply to the respective Permit Areas of each Land Use Permittee and will apply to the entire Plan Area including Area B for TNBC. The NBHCP specifies particular areas where urban development can occur, the amount of Authorized Development allowed in each Land Use Agencies' jurisdiction, and the total Planned Development in the Basin of 17,500 acres. Additionally, the RD 1000 and Natomas Mutual facilities that are covered by the NBHCP extend to areas outside of the Land Use Agencies' Permit Areas. Thus, collectively, the permits issued under the NBHCP will allow take to occur broadly within the Natomas Basin, but limits Authorized Development to specific locations. Take related to Authorized Development will be mitigated on a 0.5 to 1 mitigation ratio. Based upon 17,500 acres of Planned Development, 8,750 acres of land will be placed into habitat reserves to mitigate for that take (under the Plan's provisions, a minimum of 80% of this reserve land would occur inside the Basin).

Planned Development within the Basin could potentially result in the conversion of up to 17,500 acres of undeveloped land (primarily lands currently in agriculture) in the Land Use Agencies' Permit Areas to urban use during the 50-year life of the permit (see Figure 16). The future growth scenario is based on projections contained in the approved Sutter County General Plan, the Metro Air Park Plan, the North and South Natomas Community Plans, and the City of Sacramento General Plan (see Chapter III) and the limit on Authorized Development established by the NBHCP.

The NBHCP provides a means of maintaining a par between mitigation and development in the Permit Areas by generating enough reserve land through the 0.5 to 1.0 mitigation ratio, enough money through the associated mitigation fees, and other TNBC revenues to acquire and manage rice fields, wetlands, and upland reserves (see Section IV.C). In addition to acquisition of lands, the TNBC will also manage and enhance reserve lands for the benefit of the Covered Species, thereby providing more productive habitat than the habitat displaced by Authorized Development.

The greatest impact of urban development in the Basin on the Covered Species will be the loss of agricultural land, particularly land in rice cultivation. However, all of the projected Authorized Development will not happen at once, and many areas of the Basin will continue to support agricultural uses over the next 50 years. Figure 16, Historic, Existing and Projected Urban Development Areas, and Figure 15, Rice Cultivation (1997), show land currently in agriculture. Since agriculture, particularly rice cultivation, has an anticipated long-term future in the Basin irrespective of the Plan's mitigation program, rice lands will continue to support wetland habitat for the giant garter snake and other irrigated croplands will continue to provide foraging habitat for Swainson's hawks, in addition to such areas that may be established within the reserve system. The initial reserve system goal is to manage 50% of reserve lands as rice fields in order to continue the agriculturally based wetland habitat characteristics of the Natomas Basin.

Calculations of Reserve Lands by Habitat to be Created to Compensate for Impacts

Based on the historic habitat characteristics of the Natomas Basin, and the expected impacts by species, the Conservation Plan calls for TNBC to create a system of reserves. The reserve system is to be comprised of 50% rice reserves, 25% managed marsh reserves and 25% upland reserves. It is important to note that a portion of the managed marsh reserves will include upland edges which will also allow for upland species to benefit from the managed marsh reserves. Based on the mitigation program of the Land Use Agencies, reserves are to be created at a ratio of 0.5 acres of reserve for every acre of Authorized Development. Based on these requirements, the overall authorized take of 17,500 would generate a reserve system of 8,750 acres comprised of 50% rice reserves, 25% managed marsh reserves and 25% upland reserves. Table VII-I below shows the amount of mitigation lands to be funded by each Land Use Permittee as well as the total amount of mitigation land.

TABLE VII-1
ACREAGE CALCULATIONS

Permittee	Planned Development	Reserve Total to be Created at 0.5 to 1.0	50% Rice Reserves	25% Managed Marsh Reserves	25% Upland Reserves
City of Sacramento	8,050	4,025.0	2,012.5	1,006.3	1,006.3
Sutter County	7,467	3,733.5	1,866.8	933.4	933.4
Metro Air Park	1,983	991.5	495.8	247.9	247.9
TOTAL	**17,500**	**8,750.0**	**4,375.0**	**2,187.5**	**2,187.5**

D. IMPACTS ON INDIVIDUAL SPECIES

Discussed below are: 1) the significance of the Natomas Basin to each Covered Species, 2) the extent of take of each Covered Species as a result of the Covered Activities, 3) the measures to avoid, minimize, or mitigate take of each species required by each Land Use or Water Agency Permittee, and 4) the impacts of take on each Covered Species as a result of the Covered Activities of the NBHCP. Many of the conclusions made in this section are based on the technical memorandum, Final Draft Natomas Basin Habitat Conservation Plan Impacts to Proposed Covered Species (Tech Memo), completed by CH2MHill, dated February 25, 2002.

1. Giant Garter Snake

Significance of the Natomas Basin to Giant Garter Snake

The giant garter snake is listed as Threatened under both the Federal Endangered Species Act (ESA) and the State of California Endangered Species Act (CESA). The Natomas Basin sub-population of the giant garter snake is part of the larger American Basin population. Rice fields and agricultural water supply and drainage canals in the Natomas Basin are important to the species dispersion, feeding, and reproduction. The Natomas Basin provides a portion of the remaining habitat that the larger American Basin population requires to persist, therefore the Basin and its giant garter snake sub-population is important to the continued viability of the species.

Extent of Take of Giant Garter Snake as a Result of Covered Activities

An estimate of take of the giant garter snake under the NBHCP would ideally be based on an estimate of the size of the existing garter snake population in the Natomas Basin and an estimate of how many of these snakes would likely be killed or injured during activities addressed in the Plan. However, for the reasons discussed in Section II.C.2.d, reliable quantitative estimates of the Basin's giant garter snake population do not exist. Another complicating factor is that the exact distribution of garter snakes within the rice land habitats of the Natomas Basin is also unknown. However, though the distribution is probably somewhat patchy, most rice lands in the Basin are probably occupied or could be occupied by giant garter snakes, and the intervening unoccupied agricultural terrain, mostly ditches (but also fields), probably provides avenues for dispersal and other movements.

Therefore, an alternative method of estimating take of the giant garter snake under the NBHCP is to estimate take in terms of loss of habitat acres instead of loss of numbers of snakes by assuming that all rice lands and other potential habitat in the Basin are occupied by snakes to some extent, and then estimating the amount of rice lands and other habitat that could or will be lost to Authorized Development.

Potential habitat for the giant garter snake in the Natomas Basin currently consists of rice fields, irrigation canals/ditches, ponds and seasonally wet areas, and uplands adjacent to these habitat types. The changes in potential habitat in the Basin for the giant garter snake that would result from Authorized Development are shown on Table 5-1 of the Biological Technical Memorandum. According to Table 5-1, the Natomas Basin supported about 24,567 acres of habitat (marsh, rice and canals) for giant garter snakes, about 45% of the Basin. The Future scenario (assuming 17,500 acres of urban development) shows 16,055 acres of potential habitat, resulting in a loss of habitat of 8,512 acres in the whole Basin. Of the 8,512 acres expected to be impacted, 1,617 acres are located within Metro Air Park, which is subject to a separate HCP and mitigation program that is based on and consistent with the NBHCP. This leaves 6,896 acres of habitat which would be affected by future development of the authorized activities of this HCP. Impacts by Permittee are shown in the table below:

TABLE VII-2
GIANT GARTER SNAKE CHANGE IN POTENTIAL HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Ponds / Seasonal wet areas	96	-7	-4	-10	-21	75	-21.8%
Rice	22,693	-970	-1,541[2]	-5,577	-8,087	14,606	-36.6%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	**24,567**	**-1,094**	**-1,617**	**-5,802**	**-8,512**	**16,055**	**-34.6%**

Source: CH2MHill, February 2002

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

[2] *This rice is not longer in production as MAP has prepared for urbanization.*

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that giant garter snake might use and does not represent habitat known to be occupied by the species.

The actual reduction in habitat value, however, is expected to be considerably less than the projected 8,489 acres because:

(1) Snakes primarily use the edges of rice fields, not the entire rice field. Because snakes would not use all the acreage identified as rice habitat, the actual amount of giant garter snake habitat in the Natomas Basin is overestimated and is not directly correlated to the projected changes in land use acreage that result from Authorized Development. Additionally, rice fields generally only provide summer habitat for the snake whereas, the existing canals and ponds provide a more permanent year round habitat. It is important therefore, to note that the loss of 21 acres of wet areas and ponds and 404 acres of canals, will be mitigated by the creation of 2,187.5 acres of managed marsh habitat. Rice, which for the reasons noted above, provides only seasonal habitat will also be provided under the reserve system with a total of 4,375 acres of rice in reserves;

(2) Managed marsh habitat would provide more habitat for snakes than rice fields on an acre-for-acre basis because of the larger amount of edge habitat (see Figure 18). Managed marsh habitat would also be superior to the current canal habitat in that it will not be subject to periodic degradation from maintenance activities;

(3) Managed marsh habitat would be designed to accommodate year-round habitat requirements (e.g., year-round wetland habitat to maintain prey populations, integration of wetland and upland habitats so snakes are not exposed to hazards as they move to their overwintering sites, and absence of mortality sources associated with rice production); and

(4) Rice in the reserve system would be managed to provide better habitat quality than existing rice fields.

In addition to the change in potential habitat, additional effects of urban development that may cause take of giant garter snakes include the elimination of dispersal opportunities leading to population isolation, the results of edge effects on remaining habitat, death or injury to snakes during construction activities, or entombment of snakes in their winter retreats. Also, experience with the USFWS refuge system suggests that operation and maintenance of the RD 1000 and Natomas Mutual conveyance systems will result in killing or injury of some snakes, and there will be additional take associated with short-term loss of habitat following dredging or cleaning activities. Finally, some take of giant garter snakes will likely occur during rice farming activities on TNBC's reserves, as well as during TNBC's construction and maintenance of managed marshes required for the reserve system. However, levels of take of garter snakes during each of these activities (ditch/drain maintenance, rice farming, and marsh construction) are expected to be minor; this is because the Plan's take avoidance, minimization, and mitigation measures (Section V) will be implemented, and because some of these activities (e.g., rice farming) are inherently low-impact with respect to giant garter snakes. The issuance of Incidental Take Permits therefore, will not likely jeopardize the continued existence of this species.

Measures to Avoid, Minimize, and Mitigate Take of the Giant Garter Snake

The NBHCP includes measures to avoid, minimize, and mitigate direct loss of giant garter snakes from construction activities associated with urban development and TNBC's creation of the reserves. The measures related to construction include: timing restrictions, dewatering requirements, and construction monitoring, as well as restrictions on management and maintenance practices. For example, canal and ditch maintenance activities would be limited to no more than 10% of the total miles of canals and ditches per year, including resloping. By conducting construction during the summer months when snakes are active, there is a high probability that snakes in the construction area would be able to avoid construction equipment. By dewatering habitat between November 1 and April 1, snakes would not inhabit construction zones when they emerge from their winter retreats. If dewatering must occur after April 15, it must remain dry for 15 consecutive days prior to excavating or filling habitat. Snakes have been found to leave habitat within a few days of dewatering. By waiting for 15 days after dewatering, it is reasonable to expect that any snakes would have left the construction zone prior to the start of construction activities and injury to snakes would be avoided. Providing construction monitoring (including pre-construction surveys) by a qualified biologist would help ensure that any snakes remaining in the construction area would be relocated in accordance with USFWS and CDFG procedures.

The NBHCP includes measures to avoid, minimize, and mitigate direct loss of giant garter snakes from Water Agency Covered Activities. These measures include the timing restrictions and dewatering requirements listed above, as well as restrictions on management intensity and management of vegetation control measures. Vegetation control along ditches and canals would be limited to one side of the ditch per year. With this restriction, vegetation that potentially provides habitat for snakes would be retained on one side of the ditch and the ditch could continue to provide cover for snakes following maintenance activities. Restrictions on mowing, application of herbicides/ pesticides, and burning are provided to ensure that habitat features important to the giant garter snake would not be removed as part of maintenance activities and that individual snakes are not killed or injured as a result of vegetation control practices.

In combination with the Conservation Plan, these measures would avoid, minimize and mitigate take of giant garter snakes to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Impacts to Giant Garter Snake from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento will result in the loss of foraging, rearing, and hibernation habitat for the giant garter snake and may directly kill or injure individual giant garter snakes due to construction activities although the HCP includes measures to avoid construction take to the maximum extent possible. Foraging and rearing habitat eliminated will consist of agricultural fields and irrigation supply and return ditches and their adjacent levees and berms. Roadside and other types of ditches and channels are also suitable aquatic habitat or movement corridors that may be affected either directly or indirectly by development within the City of Sacramento. Absent the take avoidance, minimization and mitigation measures of the NBHCP, this loss of habitat could potentially represent a substantial impact on the local (American Basin) and statewide population of the snake. To avoid the potential that development within the City of Sacramento would have to adversely affect the continued existence of the species in the American Basin, the City will implement the measures proposed within this NBHCP.

According to Table 5-1 of the Tech Memo, the number of acres of canals, ponds, and rice in the City's Permit Area which may be impacted by future development is 1,094. Of this, 7 acres are ponds and wet areas, 117 acres are canals and 970 acres are rice. The 8,050 acres of Authorized Development in the City of Sacramento will generate mitigation fees and as a result, 4,025 acres of permanent reserves will be acquired by TNBC. Using 25 % marsh, 50% rice, and 25% uplands proportions, 1,006 acres of managed marsh, 2,013 acres of rice, and 1,006 acres of uplands will be acquired by TNBC as permanent reserves as a result of the City's Covered Activities. The permanent managed marsh would be of a higher quality habitat value than the habitat converted to urban uses because: 1) a higher amount of wetland/upland edge habitat would be provided than rice; 2) a water management regime would provide habitat through the snake's active period; 3) year-round wetland habitat will be provided to maintain prey populations; 4) there will be an integration of marsh and upland to reduce hazards while moving to overwintering sites; and 5) it will provide decreased mortality sources. In addition, under the NBHCP more rice land would be provided in permanent preserves (2,013 acres) than would be lost by urban development in the City's

Permit Area (970 acres). While much of the rice land acquired by TNBC for mitigation land is already rice land, the enhanced habitat value results from the permanence of the reserve system and TNBC's rice production practices. Moreover, the NBHCP's reserve system will be permanent and not subject to future pressures for its urban development.

The North Natomas Community Plan (NNCP) designates a 250 foot wide non-urbanized buffer along the City side of Fisherman's lake, an area owned and managed by RD1000 and known to support giant garter snakes. Development within the NNCP will be available to pay for the acquisition of the buffer land through the North Natomas Financing Plan Land Acquisition Program, separate from the NBHCP mitigation fees. The NBHCP imposes no obligations upon RD 1000 related to this buffer.

Development in the City is expected to result in a net loss of habitat for giant garter snakes. Despite a net loss of habitat and direct take of giant garter snakes, implementation of the NBHCP in the City's Permit Area, including the creation of a permanent system of reserves, provision for a non-urbanized buffer adjacent to Fisherman's Lake, and compliance with required avoidance, minimization, and mitigation measures, will facilitate the persistence of giant garter snakes in the Basin because: 1) the quality of both marsh and rice in the reserve system would be greater than the affected habitat and could support a larger population of giant garter snakes; and 2) the habitat reserves would provide habitat that is stable in location, amount, availability, and quality thereby providing conditions conducive to supporting a stable population of giant garter snakes. The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of giant garter snakes to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

<u>Impacts to Giant Garter Snake from Development within Sutter County under NBHCP</u>

Development within Sutter County will result in the loss of foraging and rearing habitat for the giant garter snake. Foraging and rearing habitat lost will consist of agricultural fields and irrigation supply and return ditches. Absent the measures proposed to avoid, minimize and mitigate take of giant garter snake proposed within the NBHCP, this loss would be considered potentially significant to the continued existence of the species in the American Basin.

According to Table 5-1 of the Tech Memo, the number of acres of canals, ponds, and rice in Sutter's Permit Area which would be impacted by Authorized Development is 5,802 acres. Of this, 10 acres are ponds and seasonally wet areas, 215 acres are canals, and the balance or 5,577 acres are rice fields. The 7,467 acres of Authorized Development in Sutter County will generate mitigation fees and as a result, 3,733 acres of permanent reserves will be acquired by TNBC. Using 25 % marsh, 50% rice, and 25% uplands proportions, 933 acres of managed marsh, 1,867 acres of rice, and 933 acres of uplands will be acquired by TNBC as permanent reserves. Thus, loss of habitat which is predominantly in rice fields will occur, however, the Conservation Plan calls for a substantial increase in the amount of managed marsh (933 acres) which will provide a substantial increase in snake habitat over the loss of 215 acres of canals and 10 acres of ponds. The permanent managed marsh would be of a higher quality habitat value than the

habitat converted to urban uses, even rice land, because: 1) a higher amount of wetland/upland edge habitat would be provided than rice; 2) a water management regime would provide habitat through the snake's active period; 3) year-round wetland habitat will be provided to maintain prey populations; 4) there will be an integration of marsh and upland to reduce hazards while moving to overwintering sites; and 5) there will be a decrease in mortality sources. Although, much of the rice land acquired by TNBC, for mitigation land is already rice land, the enhanced habitat value results from the permanence of the reserve system and TNBC's rice production practices. Moreover, the NBHCP's reserve system will be permanent and not subject to future pressures for its urban development.

Development in Sutter County is expected to result in a net loss of habitat for giant garter snakes in that jurisdiction whether or not the City of Sacramento participates. Despite a net loss of habitat and potential direct take of giant garter snakes, implementation of the NBHCP in Sutter's Permit Area, including the creation of a permanent system of reserves and compliance with required avoidance, minimization, and mitigation measures, would encourage persistence of giant garter snakes in the Basin because: 1) the quality of both marsh and rice in the reserve system would be greater than the affected habitat and could support a larger population of giant garter snakes; 2) the habitat reserves would provide habitat that is stable in location, amount, availability, and quality thereby providing conditions conducive to supporting a stable population of giant garter snakes; and 3) the Changed Circumstances and Adaptive Management sections of the plan allow for monitoring of impacts to ensure that the type of habitat created by the reserve system supports the species impacted by Authorized Development and also includes changes to incorporate and Recovery Plans adopted for the giant garter snake. The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of giant garter snakes to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Impacts to Giant Garter Snake from the Water Agencies' Covered Activities

The impacts that may result from RD 1000's Covered Activities, and those that may result from Natomas Mutual's Covered Activities are substantially the same. As a result, the impacts of the two agencies are defined collectively for giant garter snake as well as all species addressed by the NBHCP and discussed within this section.

Experience with the USFWS refuge system suggests that operation of the RD 1000 and Natomas Mutual water conveyance systems may result in killing or injury of some snakes, and there will be additional take associated with short-term loss of habitat following dredging or cleaning activities.

Possible take of the giant garter snake by the Water Agencies' Covered Activities is mitigated under the NBHCP because: (1) the NBHCP requires the Water Agencies to employ take avoidance measures to ensure that a minimum number of giant garter snakes are directly killed or injured during the Water Agencies' Covered Activities; (2) some habitats in the Basin may be currently underutilized by giant garter snakes, allowing for some giant garter snakes to disperse to, or be re-introduced into, those

underutilized habitats; (3) the fact that the ditches and canals already support the primary giant garter snake habitat, indicates that the Water Agencies' Covered Activities may not be substantially detrimental to giant garter snake populations; and 4) additional mitigation measures as appropriate will be included in the specific management plans for the Water Agencies. The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of giant garter snakes to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Overall Impacts to Giant Garter Snake under NBHCP

Urban development within the Permit Areas is likely to destroy giant garter snake habitat (e.g., rice fields, marshes and sloughs, and irrigation ditches and drains), and may directly kill or injure individual garter snakes. Giant garter snakes may be killed or injured through vehicle strikes on roads, crushing beneath heavy construction equipment, or entombment in their winter retreats. Giant garter snakes that escape initial destruction in construction areas may also be killed or injured because of disorientation or lack of suitable cover resulting in starvation or predation. Non-construction related operations and maintenance activities by the water agencies may have similar effects on the snake. The behavior of giant garter snakes, especially their response to construction related disturbance, is not well understood. However, the NBHCP's take avoidance strategy for giant garter snakes, recognizes that some such measures could be modified under the Plan's Adaptive Management provisions.

Anticipated take of the giant garter snake, as described above, is expected to be adequately mitigated under the Plan because: (1) the Plan will establish up to 6,562.5 acres of reserve lands in both managed marsh wetlands and rice lands, designed to best meet the giant garter snake's biological needs; (2) the Plan describes take avoidance measures to ensure that a minimum number of garter snakes are directly killed or injured during development and other activities; (3) some habitats in the Basin may be currently underutilized by snakes, allowing for some snakes to disperse to or be re-introduced into them; and (4) some existing rice lands will likely not be developed under the Plan, leaving a component of rice land habitat that would work in concert with the Plan's reserve system to support the Basin's giant garter snake population.

Giant garter snake mitigation includes a combination of overall measures (i.e., pre-construction surveys), species-specific measures (i.e., timing restrictions, dewatering requirements), up-front acquisition of mitigation lands, and planned long-term protection, creation, and enhancement of upland and wetland (i.e., marsh) habitats in the reserve system. Mitigation for the species also includes a substantial monitoring program that will aid in the timely evaluation of mitigation program efficacy.

The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of giant garter snakes to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

2. Swainson's Hawk

Significance of the Natomas Basin to Swainson's Hawk

The Swainson's hawk is listed as a Threatened species under the California Endangered Species Act. Swainson's hawks use the Natomas Basin for the breeding season from March to September for nesting and foraging. The hawk overwinters in Mexico and South America. A study conducted by the Swainson's Hawk Technical Advisory Committee in 2000 monitored 24 nesting sites in the Basin, of which 17 were active. Of these, only 10 successfully nested in 2000 (i.e., reared young to fledgling), producing a total of 20 fledglings (Swainson's Hawk TAC 2000). Two new nesting territories were found in the interior of the Natomas Basin in 2001 and a third new site was found adjacent to the East Main Drainage Canal (Swainson's Hawk TAC 2001). Of the 27 territories in the Basin, 19 were active in 2001. About 35 additional nesting sites are located outside the Basin, 22 sites on the water side of the Sacramento River east levee (adjacent to the Basin) and 13 sites on the water side of the Sacramento River west levee. Loss of foraging (i.e., grassland and agricultural fields) and nesting habitat (i.e., tall oaks or other trees in riparian and other habitats) continues to impact this species statewide. The Natomas Basin provides foraging and nesting habitat for the Swainson's hawk and is important to the continued viability of the Swainson's hawk.

Extent of Take of Swainson's Hawk as a Result of Covered Activities

The HCP includes a number of protocols and mitigation measures to prevent harm to individual hawks. However, indirect or incidental take of the Swainson's hawk could result under the Covered Activities of the NBHCP from the effects of: (1) conversion of Swainson's hawk nesting and foraging habitat to urban uses; (2) adverse edge effects on Swainson's hawk habitat remaining in the Basin after development occurs; and (3) disturbance to or removal of trees which may support nesting activities of Swainson's hawk. The issuance of Incidental Take Permits in combination with the provisions of the NBHCP will not likely jeopardize the continued existence of this species.

Nesting Habitat: The Natomas Basin supports both nesting and foraging habitat for Swainson's hawk. For nesting, Swainson's hawks typically use riparian forest habitats but can use isolated trees or groves of trees outside of riparian zones (Swainson's Hawk TAC 2000). Of the existing land use types in the Natomas Basin, Riparian, Oak Groves and Tree Groves are considered potential nesting habitat for Swainson's hawk. Based on these land use types, the Natomas Basin currently supports about 328 acres of potential nesting habitat for Swainson's hawk. This acreage does not include riparian habitat along the Sacramento River on the water side of the levees which is located outside of the HCP Plan Area. The land use analysis indicates a reduction in potential nesting habitat of 65 acres.

TABLE VII-3
SWAINSON'S HAWK CHANGE IN POTENTIAL NESTING HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Riparian	124	-24	0	0	-24	100	-19.4%
Oak Groves	98	-6	-2	0	-8	89	-8.2%
Tree Groves	106	-10	-23	0	-33	73	-31.1%
TOTAL	328	-40	-25	0	-65	263	-19.8%

Source: CH2MHill, February 2002

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

Note: The above acreage is based on broad land use categoriesdevelopped by CH2MHill using the Cals system. The land use categories represent potential habitat that giant garter snake might use and does not represent habitat known to be occupied by the species.

However, the actual loss of nesting habitat would be effectively less than this amount because: 1) it is estimated that only 4 of the active nest sites are located in the area of potential nesting habitat lost to urban development; 2) riparian habitat, suitable for nesting trees, would be incorporated into the habitat reserves; and 3) tree mitigation will be advanced for these four trees following approval of the HCP regardless of when or if the nest trees are actually disturbed ; and 4) measures would be implemented to protect trees that are used by Swainson's hawk and to increase the availability of suitable nesting trees.

The tree planting program for TNBC lands is in progress and ongoing. A variety of native tree species will be planted to provide trees with differing growth rates, maturation and life span. This will ensure that nesting habitat will be available quickly (5-10 years in the case of cottonwoods and willows), and in the long term (i.e., valley oaks and sycamores), and minimize the temporal losses from impacts to trees within areas scheduled for development within the 50-year permit life. Trees will be planted throughout the Basin, increasing nesting habitat within close proximity of quality foraging habitat within the reserves. The trees will also be located in more protected areas (away from development and highways), and near ore consistent food sources. This increased value in foraging habitat based on quality and proximity to nesting habitat will enhance the nesting success (better bioenergetics) of future generation of Swainson's hawks. In addition, a total of 2,187.5 acres of upland reserves with tree groves as well as the upland edges (approximately 25% or 547 acres) of the 2,187.5 acres of managed marsh will be established under the NBHCP. Over time, tree groves and nest tree planting mitigation will create substantial new nesting habitat for the Swainson's hawk. Thus, although 263 acres of potential nesting habitat will be impacted, substantially more acres of upland habitat and edges with trees will be created.

Foraging Habitat: Foraging habitat for Swainson's hawk consists of alfalfa, grasslands, pasture and certain row crops, such as tomatoes and sugar beets. Swainson's hawks have been observed foraging along the margins of rice fields when the fields are flooded, and to forage in rice fields that are not flooded. Nonetheless, rice provides relatively little habitat for Swainson's hawks; therefore this habitat type is not considered as foraging habitat in the analysis. Based on this characterization, the Natomas Basin supports about 21,908 acres of foraging habitat for Swainson's hawks (Table 5-5 of the Tech Memo). The future scenario shows 12,703 acres of habitat remaining after completion of Authorized Development including Authorized Development by Metro Air Park. Of the foraging habitat which would be impacted by urban development, 6,917 acres are within the City of Sacramento, 1,860 acres are within Sutter County, and 403 acres are attributed to build-out in Metro Air Park.

The importance of suitable foraging habitat to Swainson's hawks however is influenced by the proximity of foraging habitat to nest sites. Swainson's hawks have been found to forage up to18 miles from nest sites, but most foraging occurs much closer to nest sites. The CDFG considers habitat within 1.0 mile from the nest site as the more valuable foraging habitat than habitat at greater distances. The baseline amount of foraging habitat for Swainson's hawk within 1 mile of nest sites is 12,446 acres (Table 5-6 of the Tech Memo). At the Future scenario, a total of 4,149 acres are expected to be impacted in the Basin, leaving 8,279 acres of foraging habitat within 1 mile of nesting sites remaining. Of the 4,149 acres expected to be impacted by development, 3,679 acres are located in the City of Sacramento, 165 acres are located in Sutter County, and 305 acres are located in Metro Air Park. This net reduction would be at least partially, if not entirely, offset by the greater quality of upland habitat (a total of 2,187.5 acres of upland reserves) in the habitat reserves (i.e., native grassland and managed specifically to provide foraging habitat), and by upland components of the other reserve habitats.

TABLE VII-4
SWAINSON'S HAWK CHANGE IN POTENTIAL FORAGING HABITAT* (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Non-rice Crops	9,698	-2,523	-232	-159	-2,915	6,784	-30.0%
Pasture	353	-3	-20	0	-23	330	-6.5%
Ruderal	1,444	-868	-6	-5	-879	565	-60.9%
TOTAL	12,446	-3,679	-305	-165	-4,149	8,297	-33.3%

Source: CH2MHill, February 2002
**within 1 mile of nesting sites*
[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

In addition to the 2,188 acres of upland reserve habitat proposed under the NBHCP, there will be numerous other opportunities for Swainson's hawk forage within TNBC reserve system. It is anticipated that 10% of rice crops will be rotated out of rice production annually, thus providing additional rotating forage land each year. Rice fields are drained for two of the seven month period during which Swainson's hawk forage in the Natomas Basin and, when drained, these rice fields provide additional foraging habitat. Within TNBC managed marsh reserve component, substantial upland areas and the seasonally dry component of the managed marsh provide foraging habitat for Swainson's hawk. (See Section IV.C.3.d which requires that on wetland reserves, typically include 20-30% of the reserve as upland habitats (for basking, hibernacula, etc.) Based upon the upland reserve component and these additional opportunities, Swainson's hawk foraging habitat within TNBC reserve system will be greater than the 0.5 to 1.0 mitigation required under the NBHCP. The table below shows the total acreage of upland habitat projected to be included in the TNBC reserve system. The proposed Mitigation Ratio (0.5:1), in combination with restoration and enhancement efforts, and operational and management practices of rice reserves, would comprise a system of upland areas for foraging equivalent to 3,371.9 acres.

TABLE VII-5
UPLAND FORAGING HABITAT WITHIN TNBC RESERVES

Reserve Habitat Type	Acreage	Percent Upland Area	Upland Acreage
25% Upland Areas	2,187.5	100	2,187.5
25% Managed marsh of which 20-30% is upland edges	2,187.5	25	546.9
MAP Additional Swainson's Hawk Mitigation Land	200	100	200
Fallow rice reserves	4,375	10	437.5
TOTAL UPLAND FORAGING ACREAGE			**3,371.9**

While not under the authority of TNBC or the Permittees, Sacramento International Airport maintains approximately 4,050 acres of buffer lands surrounding the existing airport. These buffer lands provide a large contiguous block of habitat within and adjacent to the Swainson's Hawk Zone and provide substantial foraging habitat for Natomas Basin Swainson's hawk populations. Development of these buffers lands to urban uses would require that Sacramento County either participate in a revision to the NBHCP or a separate consultation process with the Wildlife Agencies to secure an Incidental Take Permit. Analysis of such a permit application would consider the impacts of proposed development on the viability of

Natomas Basin Swainson's hawk populations and the project applicants would be required to fully mitigate the impacts of proposed development.

Measures to Avoid, Minimize, and Mitigate Take of the Swainson's Hawk

The NBHCP includes measures to avoid, minimize, and mitigate take of Swainson's hawks related to change in potential habitat within the Basin. These measures include: 1) avoiding removal of known nest trees, if practicable; 2) preserving valley oaks, wherever possible; 3) preserving and restoring riparian habitat, particularly within the buffer at Fisherman's Lake; and 4) implementing a tree planting program on TNBC habitat reserves. The tree planting program could create nesting opportunities in areas with limited nesting habitat but that have adequate foraging habitat and increase overall the nesting population of hawks in the Basin.

Also, the NBHCP includes measures to avoid, minimize, and mitigate take of Swainson's hawk related to construction impacts of urban development or TNBC activities: 1) pre-construction surveys to determine locations of nest sites; 2) timing restrictions to avoid disturbing Swainson's hawks during the breeding season; and 3) on-site biologist to monitor construction activity that might cause nest abandonment or forced fledgling. The effects of the Water Agency Covered Activities on Swainson's hawks would be minimal because most of the Covered Activities are expected to occur outside Swainson's hawk nesting areas. In combination with the Conservation Plan, these measures would avoid, minimize and mitigate take of Swainson's hawk to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Impacts to Swainson's Hawk from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento will result in the loss of foraging habitat and could disturb or eliminate active nest sites due to construction activities. Foraging habitat includes alfalfa, non-rice crops, grassland, and pasture. Absent the avoidance, minimization and mitigation measures of the NBHCP, this loss of habitat would potentially represent a substantial impact on the Swainson's hawk in the City's Permit Area. that might adversely affect the continued existence of the species in the Basin.

According to Tables 5-5 and 5-6 in the Biological Tech Memo, the number of acres of potential foraging habitat, including alfalfa, non-rice crops, grassland, ruderal and pasture, in the City's Permit Area which would be impacted by urban development is 6,925 acres. Of this, Table 5-6 of the Tech Memo estimates that 3,679 acres are located within 1 mile of nesting sites and therefore, are considered more productive habitat for the hawk. The Future Scenario, assuming 8,050 acres of Authorized Development, shows 1,006.3 acres of uplands reserve would be created and managed to minimize City impacts to foraging habitat. The uplands habitat will be managed by TNBC to specifically provide the habitat requirements of the Swainson's hawk (i.e., grasslands and nesting trees). In addition, approximately 25% (or an additional 251 acres) of the managed marsh reserves will be upland edges which will also be managed for the benefit of the hawk.

Authorized Development within the City's Permit Area (Figure 2) is within the Swainson's Hawk Zone is limited to the 252 acres designated for urban development by the City in 1994. The City is not proposing any additional lands within the Swainson's Hawk Zone for coverage under the NBHCP and its associated Permits. The foraging habitat converted to urban uses, therefore, is not generally within one mile of the majority of nesting sites. Also, the NNCP designates a 200 foot wide agricultural buffer along the western boundary of the community plan area between the City limits and designated urban uses (page 59 - NNCP). This buffer is part of and contained within the 252 acres of City designated urban development located within the Swainson's Hawk Zone. This buffer is intended to reduce the disturbance of the riparian habitat, including existing hawk nest sites, along Fisherman's Lake from human and other activities associated with the urban area.

In the 2001 Settlement Agreement, the City was obligated to amend the North Natomas Financing Plan to provide for a 250 foot wide agricultural buffer, 50 feet wider than NNCP. The Financing Plan was amended to include this increased buffer width in the Land Acquisition Program in June 2002. Also, the Settlement Agreement requires the City to consider a community plan amendment to widen the agricultural buffer from 250 feet to 800 feet wide. As of January 2003, the Council has not taken action on this proposed buffer width amendment.

Development in the City will be subject to avoidance, minimization, and mitigation measures designed to reduce removal and disturbance of hawk nest trees.

The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of Swainson's hawk to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

<u>Impacts to Swainson's Hawk from Development within Sutter County under NBHCP</u>

Development within Sutter County will result in the loss of foraging habitat and could disturb or eliminate active nest sites due to construction activities. Foraging habitat includes alfalfa, non-rice crops, grassland, and pasture. Absent the avoidance, minimization and mitigation measures of the NBHCP, this loss of habitat could potentially represent a substantial impact on the Swainson's hawk in Sutter's Permit area and could adversely affect the continued existence of the species in the Basin.

According to Tables 5-5 and 5-6 in the Biological Tech Memo, the number of acres of potential foraging habitat, including alfalfa, non-rice crops, grassland, ruderal and pasture, in the Sutter's Permit Area is 1,860 acres of which 165 acres are located within 1 mile of nesting sites. Foraging habitat for Swainson's hawk within Sutter County is limited due to the type of agricultural practices that occur in the County. Rice is the predominant crop and does not promote a large prey base when compared to more favorable crops, such as alfalfa, or ruderal habitats. Based on Authorized Development in Sutter County (7,467 acres), Sutter County's contribution to the reserve system would include 933.4 acres of upland reserves and 933.4 acres of managed marsh with upland edges. The loss of foraging habitat will be offset by the fact that the uplands habitat reserves will be managed by TNBC to specifically provide that habitat requirements of the

Swainson's hawk (i.e., grasslands). And the amount of quality habitat to be created by the reserves will be significantly greater than the amount of high quality habitat (within 1 mile of nesting sites) currently available in the Sutter County portion of the Basin.

No Authorized Development under the NBHCP within Sutter County may occur within the one-mile wide Swainson's Hawk Zone adjacent to the Sacramento River. This area is not included in Sutter County's NBHCP Permit Area. Additionally, upon execution of the NBHCP IA, Sutter County will initiate a General Plan Amendment to redesignate land in the Swainson's Hawk Zone from Industrial/Commercial Reserve to Agriculture. Avoiding development within this zone will reduce impacts to nesting and foraging Swainson's hawks, however, suitable foraging habitat outside that one-mile zone may still be lost as a result of the County's Authorized Development. Additional mitigation practices such as tree preservation and planting within NBC reserves will further offset the loss of Swainson's hawk foraging habitat in the Permit Area.

Given the relatively low value foraging habitat and the minimal number of existing nesting trees, the Sutter County portion of Natomas Basin is neither critical or unique Swainson's hawk habitat and is not critical to the species survival or recovery. Although there could be impacts on Swainson's hawks in Sutter's Permit area from the loss of foraging habitat and disturbance of nest sites, implementation of the NBHCP is sufficient to maintain Swainson's hawks in the Permit Area and the measures specific to urban development within the Sutter County permit area will minimize effects on Swainson's hawk. The NBHCP will avoid, minimize and mitigate take of Swainson's hawk to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Impacts to Swainson's Hawk from the Water Agencies' O&M under NBHCP

No direct killing or injury of individual Swainson's hawks is expected to occur as a result of the Water Agencies' Covered Activities. This is because: (1) most of the Water Agencies' Covered Activities is expected to occur outside Swainson's hawks nesting areas; (2) Swainson's hawks occur in the Basin for only a portion of the year; and (3) the NBHCP requires take avoidance measures to avoid disturbance to individual Swainson's hawk nest trees during the nesting season. The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of Swainson's hawk to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Overall Impacts to Swainson's Hawk under NBHCP

The greatest impact of urban development on the Swainson's hawk in the Natomas Basin would occur if significant portions of the Swainson's Hawk Zone (Figure 13) were developed. Only 252 acres of urban development located within the City of Sacramento Permit Area is anticipated under the NBHCP within the Swainson's Hawk Zone, an approximately one mile wide buffer along the east side of the Sacramento River for along the length of the Natomas Basin. Of these 252 acres of land in the Swainson's Hawk Zone, about 80 acres will be a 250 foot wide agricultural buffer along the City's side of Fisherman's

Lake. Sutter County's Permit Area excludes the Swainson's Hawk Zone from urban development, and upon execution of the NBHCP IA, the County will initiate a General Plan Amendment to remove the existing Industrial/Commercial Reserve General Plan designation from Sutter County lands within the Swainson's Hawk Zone. Also, the NBHCP protects nesting habitat along Fisherman's Lake in that the area adjacent to Fisherman's Lake is protected by a minimum 250 foot wide non-urbanized buffer on the City side and no proposed urban development on the west side in the unincorporated portion of Sacramento County.

Because the effectiveness of the NBHCP to adequately minimize the effects of take of the Covered Species depends in part on the exclusion of future urban development from the Sutter County portion of the Swainson's Hawk Zone, and a limitation of development in the Swainson's Hawk Zone within the City to 252 acres, approval by Sutter County of future urban development within the Swainson's Hawk Zone or approval of development by the City in the Swainson's Hawk Zone beyond the 252 acres would constitute a significant departure from the Plan and would trigger a reevaluation of the City's and/or Sutter's permits and possible suspension or revocation of the permits. The NBHCP also establishes as a priority the acquisition of upland habitats in the Swainson's Hawk Zone for inclusion in the Plan's reserve system in order to minimize the loss of nesting and foraging habitat.

With respect to urban development outside the Swainson's Hawk Zone, the NBHCP requires the retention and maintenance of sufficient nesting and foraging habitat to mitigate for the loss of habitat needed to maintain existing Swainson's hawk population levels throughout the Natomas Basin. This will be achieved through the acquisition or protection of suitable upland habitats outside the Swainson's Hawk Zone as well as within the zone. The Plan also requires establishment of a nest tree planting program, as described in Chapter V, to ensure the availability of future Swainson's hawk nest trees to mitigate for the loss of or impacts to nest trees in urban development areas. Also, irrespective of these measures, some portion of the Basin's agricultural lands – some of which represent suitable Swainson's hawk foraging habitat – are expected to remain in agricultural production. Thus, the Basin's anticipated ongoing land use patterns, together with the NBHCP's specific measures to mitigate for the impacts of urban development in the Basin, are expected to support long-term survival of the Swainson's hawk within the Plan Area.

With respect to edge effects, the NBHCP establishes two means to minimize such effects. First, it directs the NBC to focus upland reserve site acquisition in the Swainson's Hawk Zone; second, it requires that habitat contiguity be a primary factor in selecting upland habitat reserve sites. These provisions will ensure that substantial amounts of Swainson's hawk habitat will be protected in the Basin's most important habitat area (the Swainson's Hawk Zone), and that upland habitats will not be selected for the reserve system randomly (either inside the zone or outside), but with a strategy that maximizes habitat contiguity.

Little to no direct killing or injury of individual Swainson's hawks is expected to occur under the NBHCP. This is because Swainson's hawks occur in the Natomas Basin for only a portion of the year (the nesting season), because most development activities under the Plan are expected to occur outside

Swainson's hawk nesting areas, and because take avoidance measures are required to avoid disturbance to individual Swainson's hawk nest trees during the nesting season (see Section IV.C). However, a few nest trees could be unavoidably lost during the non-nesting season if development occurs along the Sacramento River corridor or in other currently unspecified nesting areas over the life of the permit. The effects of these losses are expected to be minor, however, because the Plan sets avoidance of nest trees as a first priority (and nest tree destruction as a last resort), and because the Swainson's hawk nest tree planting program will offset any such nest tree losses over the long term.

Swainson's hawk mitigation that is proposed under the NBHCP includes a combination of overall measures (i.e., annual surveys for nesting raptors, advance acquisition of 200 acres per year), species-specific measures (e.g., acquisition of upland reserves within the Swainson's Hawk Zone, construction windows and buffer zones for occupied nests), measures to prevent the loss of nest tree, and avoidance or minimization of impacts to nesting Swainson's hawks or their nest trees.

The planned long-term protection, creation, and enhancement of upland and wetland habitats in the reserve system, in combination with upland reserves being established in the Swainson's Hawk Zone adjacent to the Sacramento River will offset the loss of Swainson's hawk foraging habitat. Additionally, the Conservation Plan and mitigation measures project 10% of TNBC rice fields to fallow each year allowing additional foraging area for the hawk. It is important to note that it will be essential that development be avoided in this zone to minimize and fully mitigate adverse effects to this species under the NBHCP.

Wetland complexes require a 75 foot upland buffer around wetlands designed for giant garter snake habitat. This buffer is to provide giant garter snake basking areas and refugia, but will also contribute to the amount of Swainson's hawk foraging habitat within the refuge. The proximity of this upland habitat to water and green feed will increase forage base production in these areas.

The Technical Memo Table 5-5 estimates that 9,188 acres of general foraging habitat (excluding reserves) will be lost to urban development within the Natomas Basin area overall. Of these acres, 6,925 acres are located in the City of Sacramento Permit Area and 1,860 acres in the Sutter County Permit Area and the balance of 403 acres is located in Metro Air Park. Relative to foraging habitat within one mile of nesting sites, Table 5-6 of the Tech Memo indicates more limited impacts of 4,149 acres comprised of 3,679 acres within the City of Sacramento, 165 acres in Sutter County and 305 acres in Metro Park. The Conservation Plan calls for the creation of 2,187.5 acres of upland habitat managed to support the Swainson's hawk and other upland species. Additionally: each managed marsh area includes an upland edge which will provide additional habitat for foraging hawks; approximately 10% of TNBC rice fields will remain fallow each year, providing additional foraging habitat; and, TNBC seasonal marsh and rice fields will be drawn down for a substantial portion of the Swainson's hawk foraging season, thus providing additional foraging habitat The HCP seeks to enhance the survival of the species through limiting development within the Swainson's Hawk Zone and through careful creation and enhancement of new habitat areas. This determination of mitigation effectiveness assumes the establishment of upland reserves in the Swainson's Hawk Zone that are managed as optimal Swainson's hawk foraging habitat. The

NBHCP will avoid, minimize and mitigate take of Swainson's hawk to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

3. Valley Elderberry Longhorn Beetle (VELB)

Significance of the Natomas Basin to VELB

While there are numerous blue elderberry shrubs adjacent to the Sacramento River, there are only scattered isolated shrubs along roadsides and the edges of agricultural fields within the interior of the Natomas Basin. VELB has not been documented to occur in the Permit Areas, however, elderberry shrubs present in the Basin are potential habitat for the species. The Permit Areas are not important to the viability of the species in that VELB has not been documented to occur there.

Extent of Take of VELB as a Result of Covered Activities

Quantifying habitat for the VELB for the purposes of the NBHCP is focused on riparian areas within the Natomas Basin and the creation of upland habitat that may include riparian areas. Little change is expected in the potential for VELB to occur in the Natomas Basin, with minimal riparian habitat occurring within the area proposed for development. In addition, the potential exists for elderberry shrubs to be planted in the managed marsh reserves, which would include 2,187.5 acres of permanent, managed marsh area. Assuming potential VELB habitat includes riparian habitat and habitat reserve land, the number of acres of VELB habitat increases from 123 to 2,187.5 acres within the Natomas Basin. Overall habitat conditions are expected to improve for the VELB.

Measures to Avoid, Minimize, and Mitigate Take of VELB

Although habitat conditions are expected to improve, removal of individual elderberry shrubs (resulting in potential elderberry beetle mortality) could still occur. Potential impacts to VELB during urban development are addressed in the NBHCP by requiring compliance with the USFWS' Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS, 1999b). Key aspects of the guidelines include: 1) survey for the beetles and host shrubs by a qualified biologist through the required pre-construction survey; 2) avoidance of occupied elderberry bushes with a 100-foot construction buffer area (may be reduced with the approval of the USFWS); and 3) mitigation of occupied elderberry bushes where avoidance is not possible. Construction impacts could also occur during development of the habitat reserve system. TNBC is also required to comply with the USFWS Conservation Guidelines. Impacts to the VELB may also occur through the Water Agencies' Covered Activities. The Water Agencies are required to comply with the USFWS Construction Guidelines in areas containing VELB.

Impacts to VELB from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento is not anticipated to result in a large-scale loss of elderberry shrubs or VELB within the riparian areas along the Sacramento River because no development activities will occur in that area under the NBHCP. Isolated shrubs, or patches of elderberry shrubs, within undeveloped farmland may be affected by City development, which could result in a loss of potential habitat (i.e., elderberry shrubs) for the species. In such cases, impacts to the species shall be mitigated in accordance with USFWS Conservation Guidelines for the species, thus take of VELB in the Permit Area is unlikely to adversely affect the species.

Impacts to VELB from Development within Sutter County under NBHCP

Development within Sutter County is not anticipated to result in a large-scale loss of blue elderberry shrubs or VELB within the riparian areas along the Sacramento River because no development activities will occur within a one-mile radius of the river. Isolated shrubs may be affected by development within Sutter County, which could result in a loss of potential habitat (i.e., elderberry shrubs) for the species. In such cases, impacts to the species shall be mitigated in accordance with USFWS Conservation Guidelines for the species, thus take of VELB within the Permit Area is unlikely to adversely affect the species.

Impacts to VELB from the Water Agencies' Covered Activities under NBHCP

Because relatively little of the Water Agencies' Covered Activities is expected to occur in river corridors that support valley elderberry shrubs and because no VELB has been found in the Natomas Basin, take of the VELB not likely to occur; and there may be occasional disturbance to, or destruction of, elderberry bushes during the Water Agencies' Covered Activities.

Overall Impacts to VELB under NBHCP

Elderberry bushes found in the Permit Areas will be avoided and protected from development, and, where avoidance is not feasible, the bushes will be moved to and mitigated for within TNBC reserves. If valley elderberry longhorn beetles or elderberry bushes are found, required mitigation consistent with USFWS Conservation Guidelines shall be required. Retaining existing elderberry shrubs and planting new elderberry shrubs within the TNBC habitat reserves would create and preserve potential habitat for VELB should it inhabit the Permit Areas.

The Natomas Basin does not include banks of the Sacramento River (See Section I). Overall, neither the Permit Areas nor the Natomas Basin support a significant amount of riparian habitat supporting blue elderberry nor does the Permit Area support abundant isolated blue elderberry shrubs.

Mitigation for VELB includes a combination of overall measures (e.g., pre-construction surveys); species-specific measures (e.g., avoidance of blue elderberry shrubs); compliance with current USFWS

habitat conservation guidelines for the species; maintenance of the Swainson's Hawk Zone which encompasses numerous blue elderberry bushes; and long-term protection, creation, and enhancement of upland and wetland habitats in the reserve system.

Given the limited effects on VELB due to Authorized Development and Water Agency Covered Activities, the NBHCP will avoid, mimimize and mitigate take VELB to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

4. Tricolored Blackbird (Agelaius tricolor)

Significance of the Natomas Basin to Tricolored Blackbird

The tricolored blackbird is listed as both a Federal Species of Concern and a State Species of Special Concern. A 1997 tricolored blackbird survey conducted by Ted Beedy and Bill Hamilton found approximately 230,000 breeding tricolored blackbirds in California (Thomas Reid Associates, 2000). A follow-up survey conducted in 1999 found fewer than 95,000 breeding individuals in California. The tricolored blackbird is occasionally observed within the Natomas Basin and was observed foraging on the Metro Air Park site during field reconnaissance during 1993 (Thomas Reid Associates, 2000). During surveys conducted in 1997 and 1999, no breeding sites for tricolored blackbird were found in the Natomas Basin. However, subsequent surveys identified a nesting colony in the TNBC's mitigation land reserve in the eastern edge of the Basin (Betts-Kismat-Silva property).

The Permit Area supports scattered copses of emergent marsh vegetation mostly within agricultural ditches that may potentially provide nesting habitat for the species, although it is not currently known to be utilized. However, the tricolored blackbird is an occasional visitor and actively forages in the Natomas Basin. On the basis of the opportunistic behavior of tricolored blackbirds and the limited extent of native marsh habitat in the Permit Area, emergent vegetation associated with agriculture and irrigation canals in the Basin provide marginal nesting habitat for tricolored blackbirds.

Extent of Take of Tricolored Blackbird as a Result of Covered Activities

Changes in potential habitat in the Natomas Basin for tricolored blackbird with the implementation of the NBHCP are presented in Table 5-4 of the Tech Memo. These land use categories would be attributable to urban development in the Basin and would result in the overall net loss of potential foraging habitat acreage for tricolored blackbird of about 15,311 acres. Of this, 6,083 acres are located in the City of Sacramento, 7,341 acres in Sutter County and 1,888 acres in Metro Air Park. This is a very broad estimate of foraging habitat since the species is only infrequently observed in Natomas Basin, and sightings have largely been in proximity to wetland or emerging marsh areas which also support nesting habitat. A more realistic assessment of habitat impacts would be to consider habitat which supports both nesting and foraging. Table 5-4 of the Tech Memo, estimates that prime habitat for both nesting and foraging includes ponds and seasonally wet areas, riparian corridors, and canals. A total of 449 acres of prime nesting and

foraging habitat for the tricolored blackbird is expected to be impacted. Of this total, 148 acres would be located in the City of Sacramento, 225 acres in Sutter County and 76 acres in Metro Air Park. With the development of habitat reserves, including 2,187 acres of marsh reserves, and avoidance, minimization and mitigation measures included in the HCP, the issuance of Incidental Take Permits therefore, will not jeopardize the continued existence of this species.

TABLE VII-6
TRICOLORED BLACKBIRDS CHANGE IN POTENTIAL HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Nesting Habitat							
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Riparian	124	-24	0	0	-24	100	-19.4%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	**1,998**	**-148**	**-76**	**-225**	**-449**	**1,549**	**-22.5%**
Foraging Habitat							
Alfalfa	371	0	0	0	0	371	0.0%
Non-rice Crops	16,686	-4,663	-325	-1,529	-6,517	10,169	-39.1%
Grassland	886	-427	0	-134	-560	325	-63.2%
Pasture	674	-23	-22	-101	-147	527	-21.8%
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606	-35.6%
TOTAL	**41,310**	**-6,083**	**-1,888**	**-7,341**	**-15,311**	**25,998**	**-37.1%**

Source: CH2MHill, February 2002

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that tricolored blackbird might use and does not represent habitat known to be occupied by the species.

Measures to Avoid, Minimize, and Mitigate Take of the Tricolored Blackbird

The NBHCP includes measures to avoid, minimize, and mitigate take of the giant garter snake. Because the tricolored blackbird shares some habitat similarities with the giant garter snake, these measures would also serve to protect the blackbird. Specific measures include: timing restrictions, dewatering requirements, and vegetation control management. Additionally, the plan calls for the development of 2,187 acres of marsh reserves with upland components which more than compensates for the loss of 449 acres of foraging and nesting habitat. This type of managed reserve habitat has already been shown to be successful in supporting the species. The only known colony of the tricolored blackbird in the Natomas Basin is within the TNBC Betts-Kismat-Silva reserve. In combination with the Conservation Plan, these measures would avoid, minimize and mitigate take of tricolored blackbirds to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with the CESA.

Impacts to Tricolored Blackbird from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento may result in the loss of patches of suitable emergent marsh nesting habitat and could result in the loss of foraging habitat, which may be used by tricolored blackbirds. The preferred habitats for tricolored blackbird nesting (e.g., marsh and riparian) are very limited in the City's Permit Area, including 7 acres of ponds and seasonally wet areas, 117 acres of canals and 24 acres of riparian habitat. Based on the required take avoidance, minimization, and mitigation measures, take of the tricolored blackbird is expected to be rare to infrequent during the term of the permits. Authorized Development in the City of Sacramento will be required to fund the development of 1,006 acres of managed marsh reserves with upland components which will more than compensate for the loss of foraging and nesting habitat. The NBHCP will create new habitat to support the species, and will avoid, minimize and mitigate take of tricolored blackbirds to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with the CESA.

Impacts to Tricolored Blackbird from Development within Sutter County under NBHCP

Development within Sutter County may result in the loss of small areas of suitable emergent marsh nesting habitat and could also result in the loss of marginal nesting habitat consisting of agricultural fields (i.e., silage and rice). The preferred habitats for tricolored blackbird nesting (e.g., marsh and riparian) are very limited in the County's Permit area, including 10 acres of ponds and seasonally wet areas and 72 acres of canals. Based on the required take avoidance, minimization and mitigation measures, take of the tricolored blackbird in the Permit Area is expected to be rare to infrequent during the term of the permits. It is noteworthy that the only known tricolored blackbird nesting site within the Basin occurs in Sutter County and is located within the TNBC Betts-Kismat-Silva reserve site. Authorized Development in Sutter County will be required to fund the development of 933 acres of marsh reserves with upland components which will more than compensate for the loss of foraging and nesting habitat. The NBHCP will create new habitat to support the species, and will avoid, minimize and mitigate take of tricolored blackbirds to the

maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with the CESA.

Impacts to Tricolored Blackbird from the Water Agencies' Covered Activities under NBHCP

The CNDDB shows only sparse utilization of the Natomas Basin by the tricolored blackbird. These birds are very mobile and, consequently, take of individual blackbirds as a result of the Water Agencies' Covered Activities is expected to be rare to infrequent. Such take shall be minimized through the NBHCP's Water Agencies' Covered Activities conservation measures (Chapter V.C).

Overall Impacts to Tricolored Blackbird under NBHCP

A total of 449 acres of prime nesting and foraging habitat for the tricolored blackbird is expected to be impacted. Of this total, 148 acres would be located in the City of Sacramento, 225 acres in Sutter County and 76 acres in Metro Air Park. The Permit Areas support scattered copses of emergent marsh vegetation mostly within agricultural ditches, which are sparsely utilized by the species. Emergent marsh is the preferred nesting habitat for the species. In the absence of significant marsh habitat, the Permit Area offers little to the conservation of the species. The NBHCP Conservation Plan however, calls for the creation of 2,187.5 acres of managed marsh which will provide good quality nesting and foraging area for the tricolored blackbird.

The combination of the overall measures (i.e., pre-construction surveys for nesting tricolored blackbirds and its habitat); species-specific measures (e.g., avoidance of tricolor blackbird nesting colonies within development lands and reserve lands); planting of nesting habitat (e.g., cattail and tule marsh); and long-term protection, creation, and enhancement of upland and wetland habitats in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP.

The NBHCP will create new habitat to support the species, and will avoid, minimize and mitigate take of tricolored blackbirds to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with the CESA.

5. Aleutian Canada Goose (*Branta canadensis leucopareia)*

Significance of the Natomas Basin to Aleutian Canada Goose

The Aleutian Canada goose has been delisted by the USFWS, but continues to be a Species of Concern. The Aleutian Canada goose is known to forage in a variety of agricultural settings, however, no records of foraging Aleutian Canada goose are known from the Basin . Abundant foraging habitat for the species is present to the north of the Basin (Humboldt and Del Norte Counties) and to the south in the San Joaquin Valley near Modesto. However, the Aleutian Canada Goose may be an occasional visitor to the

Basin in its winter migration from the Aleutian Islands to winter sites in the south, notably areas near Modesto and Los Banos.

Extent of Take of Aleutian Canada Goose as a Result of Covered Activities

Take of the Aleutian Canada goose could result under the Covered Activities of the NBHCP from the effects of conversion of foraging habitat to urban uses. Foraging habitat for the goose includes non-rice crops, pasture, and rice (roosting and foraging). Changes in potential habitat in the Permit Area for Aleutian Canada goose with the implementation of the NBHCP are presented in Table 5-8 of the Tech Memo. Changes to the Permit Areas' land uses attributable to Covered Activities represent a loss of potential Aleutian Canada goose foraging habitat of 14,751 acres as shown in Table VII-6 below. These figures include impacts to rice lands which also affect roosting habitat for the goose. Because the Aleutian Canada goose is an occasional visitor in the Natomas Basin, and due to other additional foraging habitat to the north and south of the Basin, the issuance of Incidental Take Permits therefore, will not likely jeopardize the continued existence of this species.

TABLE VII-7
ALEUTIAN CANADA GOOSE CHANGE IN POTENTIAL HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Non-rice Crops	16,686	-4,663	-325	-1,529	-6,517	10,169	-39.1%
Pasture	674	-23	-22	-101	-147	527	-21.8%
Rice (roosting/ foraging)	22,693	-970	-1,541	-5,577	-8,087	14,606	-35.6%
TOTAL	**40,053**	**-5,656**	**-1,888**	**-7,207**	**-14,751**	**25,302**	**-36.8%**

Source: CH2MHill, February 2002

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that Aleutian Canada goose might use and does not represent habitat known to be occupied by the species.

Measures to Avoid, Minimize, and Mitigate Take of Aleutian Canada Goose

In addition to pre-construction surveys and other avoidance, minimization and mitigation measures, the NBHCP includes the development of both upland reserves and rice and marsh reserve areas which may attract the Aleutian Canada goose to the Basin. As noted above, the goose is an infrequent visitor. The

creation of 2,197 acres of upland reserves may provide suitable foraging and resting areas for the migrating goose. The preservation and enhancement of over 4,300 acre of rice lands in TNBC reserves will further ensure attractive foraging and nesting areas are available in the basin and will ensure the conservation needs of the species is met.

Impacts to Aleutian Canada Goose from Development in the City of Sacramento under NBHCP

The Aleutian Canada goose is an uncommon winter visitor to the Natomas Basin. Suitable foraging habitat (e.g., rice and other grain crops) would be impacted by development within the City of Sacramento. A total loss of potential habitat for the goose within the City's Permit Area is estimated at 5,656 acres. The managed reserve units to be developed under the NBHCP may offer improved wintering habitat conditions for this species, thereby improving the value of potential wintering habitat in the Natomas Basin compared to current conditions. Authorized Development within the City will be required to fund 4,025 acres of reserves including rice, wetlands and upland areas which would be suitable foraging habitat for the goose and will ensure the conservation needs of the species is met.

Impacts to Aleutian Canada Goose from Development within Sutter County under NBHCP

Due to the infrequent use of the Natomas Basin by Aleutian Canada Goose, the anticipated reduction in forage and roosting habitat are not expected to substantially impact this species. The managed reserve units to be developed under the NBHCP may offer improved wintering habitat to this species, thereby improving the value of habitat within the Natomas Basin. Authorized Development within the Sutter County will be required to fund 3,733.4 acres of reserves including rice, wetlands and upland areas which would be suitable foraging habitat for the goose and will ensure the conservation needs of the species is met.

Impacts to Aleutian Canada Goose from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are zero, rare, or infrequent, and the adverse effects of such take will be insignificant.

Overall Impacts to Aleutian Canada Goose under NBHCP

The Aleutian Canada goose winters in areas both north and south of the Natomas Basin and is expected to be only an occasional winter visitor in the Basin. It grazes in marshes and grain crops (e.g., stubble fields) and roosts on the water. Conflicts between the Aleutian Canada goose and development activities in the Natomas Basin are expected to be minor--e.g., periodic, potential disturbance when winter stubble fields are prepared for construction projects.

Abundant foraging grounds for the species are present both to the north and south of the Basin. Because the Basin has not been known to support foraging Aleutian Canada geese, little to no take of this species is expected to occur during the life of the permits and it is unlikely that the Basin is significant to the continued existence of the species. Additionally, the creation of new habitat areas managed to support and attract the species, along with other HCP measures will avoid, minimize and mitigate impacts to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

6. White-faced Ibis (*Plegadis chihi)*

Significance of the Natomas Basin to White-faced Ibis

The white-faced ibis forages in fresh, emergent wetland, shallow flooded pond margins, and muddy ground of wet meadows and irrigated, or flooded, pastures and croplands. The ibis requires extensive marshes for nesting. No suitable nesting habitat occurs in the Natomas Basin for this species. White-faced ibis are now common winter visitors to the Basin. The intensive agricultural use of the Basin largely precludes the presence of nesting white-faced ibis. The lack of suitable nesting habitat in the Natomas Basin limits the area's value as habitat for white-faced ibis. Therefore, development within the Basin is not anticipated to jeopardize the continued existence or preservation of the species.

Extent of Take of White-faced Ibis as a Result of Covered Activities

Changes in potential habitat in the Natomas Basin for white-faced ibis with the implementation of the NBHCP are presented in Table 5-3 of the Tech Memo. Land uses identified as potential habitat for the Ibis include: alfalfa fields, ponds and seasonally wet areas, rice fields and canals. The land use changes would be attributable to urban development in the Basin and would result in the overall net loss of potential foraging and roosting habitat acreage for white-faced ibis of about 8,512 acres of which 1,097 acres are within the City's Permit Area, 5,802 acres are within Sutter County's Permit Area and 1,617 acres are within Metro Air Park.

Measures to Avoid, Minimize, and Mitigate Take of the White-faced Ibis

The NBHCP includes measures to avoid, minimize, and mitigate take of the giant garter snake. Because the white-faced ibis shares some habitat similarities with the giant garter snake, these measures would also serve to protect the ibis. Specific measures include: timing restrictions, dewatering requirements, and vegetation control management. Additionally, the plan calls for the development of 2,187 acres of marsh reserves and over 4,300 acres of rice which will provide enhanced resting and foraging habitat for the Ibis which will provide higher quality areas for birds wintering in the area. The creation of new habitat areas managed to support and attract the species, along with other mitigation measures will ensure the conservation needs of the species is met.

TABLE VII-8
WHITE-FACED IBIS CHANGE IN POTENTIAL HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Alfalfa	371	0	0	0	0	371	0.0%
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606	-35.6%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	**24,938**	**-1,097**	**-1,617**	**-5,802**	**-8,512**	**16,426**	**-34.1%**

Source: CH2MHill, February 2002

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that white-faced ibis might use and does not represent habitat known to be occupied by the species.

Impacts to White-faced Ibis from Development within the City of Sacramento under NBHCP

Of the total habitat which may be impacted by urban development, 1,094 acres is located in the City of Sacramento. White-faced ibis do not nest in the Natomas Basin and potential nesting habitat (e.g., large emergent marshes) is very limited in the Basin; therefore, the species is not likely to nest there in the future. The rice fields in the Basin are considered suitable foraging habitat for ibis. Development within the City of Sacramento has the potential to reduce the quantity of ibis foraging habitat in the Permit Area. However, rice fields are locally and regionally common outside of the Basin. The lack of suitable nesting habitat in the Natomas Basin limits the area's value as habitat for white-faced ibis. The NBHCP would provide enhanced habitat reserves that could provide nesting habitat suitable for use by this species. Suitable nesting habitat in proximity to flooded fields could provide improved habitat for white-faced ibis in the Plan Area. Since the plan requires authorized development in the City to finance the development of 3,089 acres of wetland and seasonally inundated areas (wetland reserves and rice field reserves) which will provide enhanced habitat, impacts will be well compensated for and would not adversely affect the species. The creation of new habitat areas managed to support and attract the species, along with other mitigation measures will ensure the conservation needs of the species is met.

Impacts to White-faced Ibis from Development within Sutter County under NBHCP

While the large amount of rice fields make the Natomas Basin an attractive habitat for foraging and breeding, rice fields and the associated farming practices are often incompatible with the nesting and breeding patterns of the white faced ibis. While development in Sutter County's portion of Natomas Basin would reduce foraging habitat for the white-faced ibis, such foraging habitat is locally prevalent and the development within Sutter County would not substantially affect this species. The lack of appropriate nesting habitat within the Natomas Basin restricts the area's value as habitat for white-faced ibis. The NBHCP will provide enhanced habitat reserves that may offer appropriate nesting habitat for this species. Such nesting habitat, in proximity to flooded rice fields that provide forage, could provide substantially improved habitat for the white-faced ibis within the Sutter County portion of the Natomas Basin. It is estimated that approximately 5,802 acres of habitat would be affected in Sutter County including rice fields. Since the plan calls for the Authorized Development in Sutter County to finance 2,799.4 acres of wetland and seasonally inundated areas (wetland reserves and rice field reserves) which will provide substantially enhanced habitat, impacts will be compensated and development will not adversely affect the species. The creation of new habitat areas managed to support and attract the species, along with other mitigation measures will ensure the conservation needs of the species is met.

Impacts to White-faced Ibis from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to White-faced Ibis under NBHCP

The white-faced ibis is a common winter visitor of the Natomas Basin although it is not known to nest in the Basin. The combination of the overall measures (i.e., pre-construction surveys), species-specific measures (i.e., avoidance of disturbance of nesting colonies during the nesting season both within development lands and reserve lands), planting of suitable nesting and foraging habitat in the reserve system, and long-term protection, creation, and enhancement of upland and wetland habitats in the reserve system are anticipated to effectively compensate for potential adverse effects to this species, if it were to occupy this area in the future. The NBHCP calls for the creation of 8,750 acres of reserves, of which 6,562.5 acres will be managed marsh and rice fields which will provide direct benefit for the ibis.

If implemented, this combination of measures will minimize and mitigate potential future effects to the white-faced ibis to the maximum extent practicable in accordance with the ESA and fully mitigate effects in accordance with the CESA. If the species occupies the NBHCP in the future, and the measures will also protect and enhance the conservation needs of the white-faced ibis habitat in the NBHCP Plan Area.

7. Loggerhead Shrike (*Lanius ludovicianus*)

Significance of Plan Area to Loggerhead Shrike

The loggerhead shrike is a State Species of Special Concern. The loggerhead shrike is observed regularly throughout the Natomas Basin. Suitable nesting and foraging habitat is common throughout the Basin. Foraging habitat for the loggerhead shrike (i.e., annual grassland and to a lesser extent agricultural fields) is widespread in the Plan Area and in the region. The species' primary prey items include grasshoppers and other small terrestrial insects, as well as small rodents. The majority of the Plan Area is farmed in rice, which requires significant management and pest control to be economically viable. Given the intensive nature of the agricultural practices in the Plan Area, the quality of foraging and nesting habitat for the loggerhead shrike is compromised. Habitat of higher quality (i.e., annual grassland) is present both to the east and to the west of the Plan Area. Because suitable loggerhead shrike habitat within the Plan Area is of low quality and higher quality habitat is present elsewhere in the region, it is unlikely that the Plan Area represents an area important to the continued existence or preservation of the species.

Extent of Take of Loggerhead Shrike as a Result of Covered Activities

According to Table 5-12 in the Tech Memo, foraging habitat for the shrike is expected to decrease in the future (about 9,014 acres) due to urban development and other Covered Activities throughout the Basin. As noted above, annual grasslands, pasture and ruderal areas are potentially higher quality habitats for the shrike because of the presence of exterior fencing (perching sites), absence of mechanical disturbance and limited pesticide use which would limit insect prey. Of the 9,014 acres of potential habitat to be impacted, 560 acres are grasslands, 147 acres are pasture and 1,231 acres are ruderal lands. Assuming pasture, grasslands and ruderal lands are the more productive and significant habitat types a total of 1,938 acres would be impacted by future development. Future land use conditions include 2,187.5 acres of permanent upland habitat reserves which would provide potential foraging areas for shrikes. The system of habitat reserves would be managed primarily with a habitat focus and would be protected from market and other forces that would continue to affect agricultural lands in the Basin. Accordingly, the stability and quality of reserve lands helps offset the loss of foraging acreage and ensure that loggerhead shrikes can continue to use portions of the Basin for foraging. The issuance of Incidental Take Permits therefore will not likely jeopardize the continued existence of this species.

Measures to Avoid, Minimize, and Mitigate Take of Loggerhead Shrike

The measures to be implemented to avoid, minimize and mitigate take of loggerhead shrikes include: 1) habitat preservation and enhancement, 2) promote agricultural practices on TNBC reserves that enhance habitat values for shrike, and 3) retain suitable lookout perches, including fence posts and tree limbs. Avoidance, minimization and mitigation measures implemented as part of the giant garter snake and northwestern turtle management plans for O&M activities would protect any loggerhead shrike habitat that would potentially occur in RD1000 and Natomas Mutual's system of canals and drainages.

TABLE VII-9
LOGGERHEAD SHRIKE CHANGE IN POTENTIAL HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Alfalfa	371	0	0	0	0	371	0.0%
Grassland	886	-427	0	-134	-560	325	-63.2%
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169	-39.1%
Oak Groves	98	-6	-2	0	-8	89	8.2%
Orchard	182	-132	0	0	-13	169	7.1%
Pasture	674	-23	-22	-101	-147	527	21.8%
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Riparian	124	-24	0	0	-24	100	19.4%
Ruderal	1,970	-1,137	-6	-88	-1,231	739	62.5%
Rural Residential	377	-46	-10	0	-56	321	14.9%
Tree Groves	106	-10	-23	0	-33	73	31.1%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	**23,348**	**-6,473**	**-464**	**-2,077**	**-9,014**	**14,332**	**-38.6%**

Source: CH2MHill, February 2002

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that loggerhead shrike might use and does not represent habitat known to be occupied by the species.

Impacts to Loggerhead Shrike from Development within the City of Sacramento under NBHCP

The Plan Area supports low-quality habitat in the Plan Area for the loggerhead shrike. Also, only a few individuals have been observed during reconnaissance-level surveys and habitat mapping surveys. Development within the City of Sacramento would reduce suitable loggerhead shrike habitat in the Plan Area, but City development is anticipated to have minimal effects on the shrike because the species is

uncommon in the NBHCP area, and relatively common elsewhere in the Sacramento Valley. Assuming higher quality habitat is comprised of grasslands, ruderal areas and pasture, a total of 1,587 acres of such lands would be impacted by Authorized Development in the City. Authorized Development in the City will however, be required to fund the reserve system of which 1,006 acres will be uplands and 1,006 acres will be managed marsh with upland components. Based on the avoidance and compensation measures described above, City Authorized Development is expected to have minimal effects on the loggerhead shrike in the Plan Area.

Impacts to Loggerhead Shrike from Development within Sutter County under NBHCP

Because the Plan Area only supports marginal quality habitat for the species, development within Sutter County is anticipated to have a very little effect on the species. Assuming higher quality habitat is comprised of grasslands, ruderal areas and pasture, a total of 323 acres of such lands would be impacted by Authorized Development in the Sutter County. Authorized Development in the Sutter County will however, be required to fund the reserve system of which 933.4 acres will be uplands and 933.4 acres will be managed marsh with upland components. Based on the above take avoidance measures, little to no take of loggerhead shrikes in the Sutter County portion of the Basin as a result of Authorized Development.

Impacts to Loggerhead Shrike from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Loggerhead Shrike under NBHCP

Because habitat of higher quality (i.e., annual grassland) is present both to the east and to the west of the Plan Area, and because suitable loggerhead shrike habitat within the Plan Area is of low quality, it is unlikely that development in the Plan Area will substantially affect the continued existence or preservation of the species.

The combination of the overall measures (i.e., pre-construction surveys); species-specific measures (e.g., avoidance of nest sites during the nesting season within development and reserve lands, maintenance of perching and nesting habitat within reserve lands); and long-term protection, creation, and enhancement of upland and wetland habitats in the reserve system is expected to effectively compensate for potential adverse effects to this species under the NBHCP. Also as noted above, assuming pasture, grasslands and ruderal lands are the more productive and significant habitat types a total of 1,987 acres would be impacted by future development which would be compensated by the development of 2,187 acres of upland reserves.

If implemented, the NBHCP will minimize and mitigate potential future effects to the Loggerhead shrike to the maximum extent practicable in accordance with the ESA and fully mitigate effects in accordance with the CESA.

8. Burrowing Owl (*Athene cunicularia hypugea*)

Significance of Plan Area to Burrowing Owl

The burrowing owl is a Federal Species of Concern and a State Species of Special Concern. Burrowing owls are known to occur sporadically in grassland habitats, the borders of agricultural fields, roadsides, and airports (CNDDB 2000) throughout much of the Central Valley. Because the majority of the Plan Area is significantly disturbed, and in many areas undergoes recurring disturbance as a result of agricultural practices, the majority of the Plan Area is of low value to the species.

Extent of Take of Burrowing Owl as a Result of Covered Activities

Potential foraging habitat for the burrowing owl is provided by alfalfa, canals, grassland, pasture, and upland habitat reserves. According to Table 5-10 of the Tech Memo, 1,931 acres of potential habitat are included in the Basin. The Future scenario, assuming 17,500 acres of urban development, shows that a total of 707 acres would be impacted. Of this, 450 acres are in the City of Sacramento, 235 acres are in the Sutter County and 22 acres are located in Metro Air Park. The proposed reserve system would establish 2,187 acres of upland reserves suitable for the burrowing owl, which more than compensates for the loss of 707 acres of potential habitat. Overall habitat conditions are expected to improve for the burrowing owl. As such, the issuance of Incidental Take Permits will not jeopardize the continued existence of this species. Additionally, although not under the direct control of the City of Sacramento or Sutter County, buffer lands surrounding the Sacramento International Airport (approximately 4,000 acres) are expected to remain in open space which may also provide habitat for the owl.

Measures to Avoid, Minimize, and Mitigate Take of Burrowing Owl

Potential impacts to burrowing owls during urban development are addressed in the NBHCP by requiring compliance with CDFG's Staff Report on Burrowing Owl Mitigation. Key aspects of the Staff Report include: 1) surveys of the project site and a 500 foot buffer by a qualified biologist during both the wintering and the nesting seasons, 2) avoidance of burrows with a 160-foot construction buffer area, and 3) mitigation where avoidance is not possible, including translocating owls to a permanent mitigation area.

Impacts to Burrowing Owls from Development within the City of Sacramento under NBHCP

Burrowing owls are uncommon in the NBHCP area. Burrowing owls in the Plan Area tend to occur along undisturbed levees or in undisturbed fields (i.e., uncultivated), such as portions of the Sacramento International Airport. Development in the City of Sacramento may result in the loss of nesting or wintering

burrowing owls. The loss of nesting or wintering burrowing owls could have a substantial effect on the species in the Plan Area without the implementation of compensatory mitigation involving the passive relocation of owls to a dedicated mitigation area. Development within the City of Sacramento in the Plan Area is not likely to have a substantial effect on the overall continued existence of the species throughout its range, but local owl populations could be reduced in the Plan Area. The Tech Memo estimates that 450 acres of grasslands, pasture and alfalfa suitable for habitat by the owl would be affected by urban development in the City of Sacramento's portion of Natomas Basin. The reserve system calls for the Authorized Development in the City's Permit Area to finance 1006.3 acres of upland habitat throughout the Basin.

TABLE VII-10
BURROWING OWL CHANGE IN POTENTIAL HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Alfalfa	371	0	0	0	0	371	0.0%
Grassland	886	-427	0	-134	-560	325	-63.2%
Pasture	674	-23	-22	-101	-147	527	-21.8%
TOTAL	**1,931**	**-450**	**-22**	**-235**	**-707**	**1,223**	**-36.6%**

Source: CH2MHill, February 2002

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that burrowing owl might use and does not represent habitat known to be occupied by the species.

Impacts to Burrowing Owls from Development within Sutter County under NBHCP

Development within Sutter County may result in the loss of nesting burrowing owls. The loss of nesting burrowing owls would be considered a significant effect on the species in the Plan Area without implementing compensatory mitigation involving the relocation of the bird to a dedicated mitigation area. However, because of the limited extent of undisturbed suitable habitat in the Plan Area, development within Sutter County is not likely to have a significant effect on the overall continued existence or preservation of the species. The Tech Memo estimates that 235 acres of grasslands, pasture and alfalfa suitable for habitat by the owl would be affected by urban development in Sutter County. The reserve system calls for Authorized Development in Sutter County to finance 933.4 acres of upland habitat throughout the Basin.

Impacts to Burrowing Owls from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be minor or insignificant.

Overall Impacts to Burrowing Owls under NBHCP

The burrowing owl will benefit from the upland reserves established under the Plan as well as upland habitats established in association with the wetland reserves. Based on the implementation of measures within this document, take of burrowing owls in the Natomas Basin is expected to be infrequent to rare during the term of the permits.

The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); species-specific measures (e.g., avoidance of burrow sites during the breeding season both within development lands and reserve lands, species relocation); additional mitigation according to California Department of Fish and Game guidelines; and long-term protection, creation, and enhancement of upland habitat in the reserve system are expected to effectively compensate for potential adverse effects to western burrowing owl under the NBHCP. A total of 727 acres of potential burrowing owl acreage would be impacted in the Basin. The reserve system will create 2,187 acres of enhanced upland habitat.

These HCP measures will avoid, minimize and mitigate take of burrowing owls to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance CESA.

9. Bank Swallow (*Riparia riparia)*

Significance of Plan Area to Bank Swallow

The bank swallow occurs in California during breeding season (May through July) and winters in South America. Suitable nesting habitat for the species is limited in the Plan Area for several reasons. The bank swallow requires vertical cliffs or banks for nesting with friable soils. Vertical banks or cliffs are not present in Natomas Basin except in areas along the Sacramento River (outside the HCP Plan Area). This species has only been observed nesting in natural riverbanks, typically away from the active channel, with friable soils (CNDDB 2000, Small 1994). Waterways within the Plan Area are largely channelized and designed to resist erosion even under the highest velocity flood flows. Many of these channels are also cleared of vegetation periodically to maintain their capacity. The combination of channel configuration and recurring disturbance from vegetation clearing probably precludes the presence of this species in the Plan Area.

Extent of Take of Bank Swallow

Foraging habitat for the bank swallow includes alfalfa, canals, grassland, pasture, ponds, rice, riparian, and non-rice crops. According to Table 5-11 in the Tech Memo, foraging habitat for the swallow is expected to decrease in the future due to urban development and other Covered Activities throughout the Basin. Because this habitat is located remote from nesting sites, it may support foraging by the species, but would be of lesser quality than foraging habitat in proximity to suitable cliffs or bluffs for nesting. Future land use conditions could impact a total of 15,760 acres of land uses which might support foraging by the swallow. Of this 6,231 acres is located in the City of Sacramento, 7,566 acres are located in Sutter County and 1,964 acres are located in Metro Air Park. The Conservation Plan includes 8,750 acres of permanent habitat reserves which would provide potential foraging areas for the swallows. The system of habitat reserves would be managed primarily with a habitat focus and would be protected from market and other forces that would continue to affect agricultural lands in the Basin. Accordingly, the stability and quality of reserve lands helps offset the loss of foraging acreage and ensure that swallows can continue to use portions of the Basin for foraging. As such, the issuance of Incidental Take Permits will not likely jeopardize the continued existence of this species.

Measures to Avoid, Minimize and Mitigate Take of Bank Swallow

Pre-construction surveys will be conducted by the Permittees to identify if the species has resettled in the Natomas Basin. As noted above no bank swallow nesting colonies are currently recorded in the Basin because of the absence of cliffs and bluffs. The species could benefit from any riparian habitats protected or created under the NBHCP because it could use the created habitat for nesting or foraging. In addition, the following measures would be implemented to avoid and minimize take of the species: 1) TNBC would use applicable USFWS or CDFG approved bank swallow recovery or management plans, 2) disturbance of nesting colonies would be strictly avoided within the nesting season by TNBC during their construction activities, and 3) disturbance of nesting colonies would be strictly avoided within the nesting season by urban development during their construction activities.

Additionally, limitations of development within the Swainson's Hawk Zone adjacent to the Sacramento River will also benefit this species because the bank swallow is more likely to nest and forage along the banks of the Sacramento River. In addition, the NBHCP does not authorize urban development on the water side of Sacramento River levees.

Impacts to Bank Swallow from Development within the City of Sacramento under NBHCP

No suitable bank swallow nesting habitat (i.e., streams with steep, erodible banks) occurs in the City's Permit area. The agricultural fields, ditches, and canals in the Plan Area are considered suitable foraging habitat, but no suitable nesting habitat occurs in the area; therefore, bank swallows are likely to occur in the area during migration, but they are not likely to nest in the Plan Area. Therefore, development

within the City of Sacramento would not have an effect on nesting bank swallows and minimal effects on the quantity of foraging habitat in the region.

TABLE VII-11
BANK SWALLOW CHANGE IN POTENTIAL HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Alfalfa	371	0	0	0	0	371	0.0%
Grassland	886	-427	0	-134	-560	325	63.2%
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169	39.1%
Pasture	674	-23	-22	-101	-147	527	21.8%
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606	35.6%
Riparian	124	-24	0	0	-24	100	19.4%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	**43,308**	**-6,231**	**-1,964**	**-7,566**	**-15,760**	**27,547**	**-36.4%**

Source: CH2MHill, February 2002

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that bank swallow might use and does not represent habitat known to be occupied by the species.

Impacts to Bank Swallow from Development within Sutter County under NBHCP

Because the species is not known to occur in the Plan Area and because potentially suitable habitat in the Plan Area is of low quality and high quality habitat is available to the north of the Plan Area, it is unlikely that the Plan Area represents an area important to the continued existence or preservation of the species. As planned, a one-mile buffer from the Sacramento River would avoid impacts to the species.

Impacts to Bank Swallow from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected

take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Bank Swallow under NBHCP

No bank swallow nesting colonies are currently recorded in the NBHCP Plan Area; however, the species does nest to the north along the Sacramento and Feather Rivers and may occur in the NBHCP area over the life of the Plan. Consequently it may benefit from any riparian habitats protected or created under the NBHCP, which it could use for nesting or foraging. If the presence of this species in the Plan Area increases in the future, appropriate conservation measures could be implemented. Take of bank swallows in Natomas Basin is expected to be rare to infrequent during the life of the permits.

Although unlikely to occur in the NBHCP area, the combination of the overall measures (i.e., pre-construction surveys for Covered Species or their habitat), species-specific measures (i.e., avoidance of nesting sites during the nesting season both within development lands and reserve lands), and establishment of reserves within the Swainson's Hawk Zone that encompasses nesting habitat for bank swallow on the Sacramento River side of the levee will avoid, minimize and mitigate take of bank swallows to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

10. Northwestern Pond Turtle *(Clemmys marmorata marmorata)*

Significance of Plan Area to Northwestern Pond Turtle

The Northwestern Pond Turtle is both a State (CESA) Species of Special Concern and Federal (ESA) Species of Concern. The Plan Area supports agricultural supply and return ditches that may have suitable foraging and basking habitat for the species, however, the intense management of the adjacent agricultural land (i.e., plowing, planting, chemical application, flooding) probably precludes significant reproduction of the species in the area. Pond turtles have been observed in the Natomas East Main Drain canal (known as Steelhead Creek) to the east of the Plan area, and some have been reported on Conservancy lands.

Extent of Take of Northwestern Pond Turtle as a Result of Covered Activities

Changes in potential habitat in the Natomas Basin for northwestern pond turtle with the implementation of the NBHCP are presented in Table 5-2 of the Tech Memo. These land use changes would be attributable to urban development in the Basin and would result in the overall net loss of potential habitat acreage for northwestern pond turtle of about 8,536 acres. In addition to direct impacts to acreage, the Tech Memo also reports that proximity to canals in urban areas may increase predation by cats and other domestic animals. The HCP does however, include buffer lands adjacent to Fisherman's Lake which will assist in maintaining or improving the habitat for this species. In combination with the Conservation Plan

which will create new habitat to support the species, additional measures are included to ensure that issuance of Incidental Take Permits will not likely jeopardize the continued existence of the species.

TABLE VII-12
NORTHWESTERN POND TURTLE CHANGE IN POTENTIAL HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606	35.6%
Riparian	124	-24	0	0	-24	100	19.4%
Canals (all)	1,769	-117	-72	-215	-404	494	72.1%
TOTAL	**24,691**	**-1,118**	**-1,617**	**-5,802**	**-8,536**	**16,155**	**-34.6%**

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh. Source: CH2MHill, February 2002*

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that northwestern pond turtle might use and does not represent habitat known to be occupied by the species.

Measures to Avoid, Minimize, and Mitigate Take of the Northwestern Pond Turtle

The NBHCP includes measures to avoid, minimize, and mitigate take of the giant garter snake. Because the northwestern pond turtle shares some habitat similarities with the giant garter snake, these measures would also serve to protect the turtle. Specific measures include: timing restrictions, dewatering requirements, vegetation control management and the creation of managed marsh habitat.

Impacts to Northwestern Pond Turtle from Development in the City of Sacramento under NBHCP

The Plan Area supports limited aquatic and upland breeding habitat for pond turtles. Most of the aquatic habitat occurs along managed canals and ditches. Potential breeding habitat is limited to undisturbed areas near aquatic habitats in the Plan Area. Development within the City of Sacramento will result in the loss of foraging and basking habitat for the turtle and may affect individuals residing in suitable habitat; however, development within the City of Sacramento is not anticipated to have a substantial overall effect on the species. A total of 1,118 acres of potential habitat for the turtle (including rice) will be impacted by Authorized Development in the City. Of this total, 970 acres are rice fields, which because of mechanical and chemical disturbance and lack of dry basking sites, is not considered high quality habitat for the turtle.

The remaining 148 acres of ponds, seasonally wet areas, riparian areas and canals represents a more realistic estimate of impacts to areas that may provide higher quality habitat. Authorized Development will be required to finance a reserve system, of which the City's contribution would include 1,006 acres of managed marsh which will provide enhanced habitat for turtles.

Impacts to Northwestern Pond Turtle from Development within Sutter County under NBHCP

Development within Sutter County will result in the loss of foraging and basking habitat for the turtle and may affect individuals that are resident in suitable habitat; however, development within Sutter County is not anticipated to have a significant overall effect on the species. A total of 5,802 acres (including rice fields) of potential habitat for the turtle will be impacted by Authorized Development in Sutter County. Of this total, 5,577 acres are rice fields, which because of mechanical and chemical disturbance is not considered high quality habitat for the turtle. The remaining 225 acres of ponds, seasonally wet areas and canals represents a more realistic estimate of impacts to areas that may provide higher quality habitat. Sutter County's contribution to the reserve system will support 933.4 acres of managed marsh which will provide enhanced habitat for the turtle.

Impacts to Northwestern Pond Turtle from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Northwestern Pond Turtle under the NBHCP

Low numbers of northwestern pond turtles may inhabit the aquatic habitats of the Natomas Basin, including the canals and ditches of the water conveyance system. If present in the Basin, pond turtles will benefit from the managed marsh and rice field habitats established within the NBHCP's reserve system. If present, take of the northwestern pond turtle could occur under the NBHCP as a result of habitat destruction during construction activities, including the removal of irrigation ditches and drains, and during ditches and drain maintenance. However, such take within the Plan Area will be minimized by the dewatering requirement and is therefore expected to be at relatively minor levels.

The combination of the overall measures (i.e., pre-construction surveys for Covered Species and its habitat, preservation of the area adjacent to Fisherman's Lake); species-specific measures (i.e., dewatering procedures requirement under giant garter snake mitigation); and long-term protection, creation, and enhancement of upland habitat and suitable wetland habitat in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP.

These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

11. California Tiger Salamander (*Ambystoma californiense*)

Significance of Plan Area to California Tiger Salamander

The California tiger salamander (CTS) is a federal and state Candidate species. The California tiger salamander has not been documented either historically or presently from the Plan Area. Because potentially suitable habitat (i.e., seasonally ponded areas) are limited and because adjacent upland areas supporting ground squirrels are constrained by agricultural operations, it is unlikely that the Plan Area represents a significant area to the continued existence or preservation of the salamander.

Extent of Take of California Tiger Salamander as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

In addition, there are 21 acres of seasonally wet areas and ponds within the Basin that would be affected by development which could result in direct impacts to the California tiger salamander, if the species is identified in the area. Finally, indirect impacts may result if urban development in proximity to ponds and wet areas limits access of the California tiger salamander to upland areas. While these impacts may occur it is important to note that the species has not been reported in the Natomas Basin to date.

Measures to Avoid, Minimize, and Mitigate Take of California Tiger Salamander

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the tiger salamander: 1) report to USFWS development plans that affect vernal pools within the Basin, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters subject to separate Section 404 permits are present, and 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and a separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional Waters of the U.S. or not - will be authorized through the Incidental Take Permits and

the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4. of Chapter V of the NBHCP.

In addition to the above vernal pool actions, the HCP requires that TNBC will consult with the TAC and California tiger salamander researchers and experts periodically during implementation of the Plan to determine what if any additional conservation opportunities for this species might exist within the Plan's proposed reserve system. Such opportunities might include but are not limited to establishment of creation of wetland and upland habitats suitable for tiger salamanders within the reserve system (e.g., stock ponds or "artificial" vernal pools) and if appropriate, possible re-introduction of tiger salamanders into the Basin.

For habitat areas with seasonally wet areas and ponds, the required pre-construction surveys will also help identify if the California tiger salamander is present and any appropriate avoidance and mitigation standards available at that time from USFWS and CDFG will be employed.

Impacts to Tiger Salamander from Development within the City of Sacramento under NBHCP

The California tiger salamander has not been documented historically or currently in the Plan Area, and the Plan Area supports limited marginal habitat for the species.

Development in the City of Sacramento is not likely to adversely affect California tiger salamanders or threaten the preservation or conservation of this species because this salamander species is not known to occur in the Plan Area and the vernal pools in the Plan Area that represent potentially suitable habitat are not designated for development.

Impacts to Tiger Salamander from Development within Sutter County under NBHCP

Because the California tiger salamander has not been documented to occur either historically or presently within the Plan Area and because the Plan Area only supports limited marginal (i.e., disturbed) habitat for the species, development within Sutter County in anticipated to have a negligible effect on the species.

Impacts to Tiger Salamander from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to California Tiger Salamander under NBHCP

Tiger salamanders will benefit under the NBHCP from the vernal pool protections of the NBHCP, or, if necessary, from any mitigation implemented to offset development impacts in vernal pool areas. The species could also benefit from other wetland and upland habitats established within the NBHCP's reserve areas. However, California tiger salamander terrestrial habitat requirements are not clearly understood, and the extent to which the Plan's reserve areas can contribute to salamander conservation is similarly unclear. Any such measures shall be incorporated into the NBHCP's conservation program through its Adaptive Management provisions. Because California tiger salamanders have not been known to historically or currently exist in the Permit Areas or in areas not currently designated for development (e.g., the vernal pool areas), take of this species under the NBHCP is expected to be rare to infrequent during the life of the permits.

Although not known to occur in the NBHCP area, suitable vernal pool and other seasonal wetland habitats for the California tiger salamander are present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat), the vernal pool protections that are already incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP.

These HCP measures will avoid, minimize and mitigate take of species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

12. Western Spadefoot Toad *(Scaphiopus)*

Significance of Plan Area to Western Spadefoot Toad

The western spadefoot toad is a California Species of Special Concern which to date, has not known to occur in the Plan Area. Limited suitable habitat in the form of seasonal wetlands are present in the Plan Area. However, the highly disturbed nature of the Plan Area combined with the recurring disturbance of agricultural fields which support the majority of these seasonal wetlands probably precludes the presence of the species. Additionally, the majority of occurrences of spadefoot toad are in the San Joaquin Valley and southern Coast Range indicating that the Plan Area is not a significant area important to the continued existence or preservation of the species.

Extent of Take of Western Spadefoot Toad as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially

suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

It is possible that other seasonally wet areas and ponds (non-vernal pool areas) could also provide habitat for the western spadefoot toad, although as noted above, this type of habitat is relatively limited in Natomas Basin and there are no records of the western spadefoot toad occurring in the Natomas Basin. As such, issuance of Incidental Take Permits is not expected to jeopardize the continued existence of this species.

Measures to Avoid, Minimize, and Mitigate Take of the Western Spadefoot Toad

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the Western spadefoot toad: 1) report to USFWS development plans that affect vernal pools within the Permit Areas to the USFWS, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters subject to separate Section 404 permits are present, and 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation and mitigation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional Waters of the U.S. or not - will be authorized through the Incidental Take Permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4. of Chapter V of the NBHCP.

In addition to the above vernal pool actions, the HCP requires that TNBC will consult with the TAC and western spadefoot toad experts periodically during implementation of the NBHCP to determine what if any additional conservation opportunities for this species might exist within the Plan's proposed reserve system. Any such opportunities shall be incorporated into the NBHCP's conservation program through its Adaptive Management provisions.

For habitat areas with seasonally wet areas and ponds, the required pre-construction surveys will also help identify if the western spadefoot toad is preseent and any appropriate avoidance and mitigation standards available at that time from USFWS and CDFG will be employed.

Impacts to Western Spadefoot Toad from Development in the City of Sacramento under NBHCP

The western spadefoot toad has not been documented historically or currently in the Plan Area, and the Plan Area supports limited marginal habitat for the species. Development within the City of Sacramento is not likely to adversely affect western spadefoot toads or threaten the preservation or conservation of this species because this toad species is not known to occur in the Plan Area and the vernal pools in the Plan Area that represent potentially suitable habitat are not designated for development.

Impacts to Western Spadefoot Toad from Development within Sutter County under NBHCP

Because the species is not known to occur in the Plan Area or in Sutter County and because suitable habitat is limited in the Plan Area, development within Sutter County is not anticipated to have a significant effect on the continued existence or preservation of the species.

Impacts to Western Spadefoot Toad from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Western Spadefoot Toad under NBHCP

Although not known to occur in the NBHCP area, suitable vernal pool and other seasonal wetland habitats for the western spadefoot toad is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat), the vernal pool protections that are already incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP.

These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will fully mitigate effects in accordance with CESA.

13. Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

Significance of Plan Area to Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp is a Federally Listed Threatened Species. The Plan Area supports habitat for the vernal pool fairy shrimp in the form of roadside ditches and seasonal wetlands. The majority of the potential habitat for the species within the Plan Area is artificial in origin and lacks linkages to larger intact habitat areas (i.e., vernal pool grasslands) limiting the value of the Plan Area to the continued existence or preservation of the species.

Extent of Take of the Vernal Pool Fairy Shrimp as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially

suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat for vernal pool species.

Measures to Avoid, Minimize and Mitigate Take of the Vernal Pool Fairy Shrimp

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the vernal pool fairy shrimp: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters subject to separate Section 404 permits are present, and 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, the HCP requires that TNBC will consult with the TAC, and fairy shrimp and tadpole shrimp experts periodically during implementation of the NBHCP to determine what if any additional conservation opportunities for Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp and midvalley fairy shrimp might exist within the Plan's proposed reserve system. Any such opportunities shall be incorporated into the NBHCP's conservation program through its Adaptive Management provisions.

Impacts to Vernal Pool Fairy Shrimp from Development in the City of Sacramento under NBHCP

Development within the City of Sacramento could result in the loss of suitable habitat for the species and this loss may have a substantial effect on individuals of this federally listed species; however, because of the limited extent, and relatively low quality, of the habitat present in the Plan Area, development within the City of Sacramento is not anticipated to have a substantial effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development within the City of Sacramento. Implementation of compensatory mitigation that is consistent with USFWS programmatic guidelines for large brachiopod species may be required to offset impacts on the species.

Impacts to Vernal Pool Fairy Shrimp from Development within Sutter County under NBHCP

Development within Sutter County will result in the loss of suitable habitat for the species and this loss may have a significant effect on individuals of this federally listed species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, development within Sutter County is not anticipated to have a significant effect on the species as a whole.

Impacts to Vernal Pool Fairy Shrimp from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Vernal Pool Fairy Shrimp under NBHCP

Vernal pool fairy shrimp could benefit under implementation from the vernal pool protections of the NBHCP, or if necessary, from any mitigation implemented to offset development impacts in vernal pool areas. The species could also benefit from other wetland and upland habitats established in the NBHCP's reserve areas. However, vernal pool fairy shrimp occurrence and distribution in the Plan Area is not well understood, and the extent to which the Plan's reserve areas can contribute to vernal pool fairy shrimp conservation is similarly unclear. Any such measures shall be incorporated into the NBHCP's conservation program through Adaptive Management provisions.

This species is likely to occur in the NBHCP area and suitable vernal pool and seasonal wetland habitat for the vernal pool fairy shrimp is present in scattered locations of the Plan Area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitats); the vernal pool protections incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

14. Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)

Significance of Plan Area to Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp is a Federally Listed Endangered Species. There have been 154 reported occurrences of this species in California, of which 54 reports were in Sacramento County and four (4) were in Sutter County (CDFG 2001). The Plan Area supports habitat for the vernal pool tadpole shrimp in the form of roadside ditches and seasonal wetlands. The majority of the habitat for the species within the Plan Area is artificial in origin and lacks linkages to larger intact habitat areas (i.e., vernal pool grasslands) limiting the value of the Plan Area to the continued existence or preservation of the species.

Extent of Take of Vernal Pool Tadpole Shrimp as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the

NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Vernal Pool Tadpole Shrimp

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the vernal pool tadpole shrimp: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, and 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, the HCP requires that TNBC will consult with the TAC, and fairy shrimp and tadpole shrimp experts periodically during implementation of the NBHCP to determine what if any additional conservation opportunities for Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp and midvalley fairy shrimp might exist within the Plan's proposed reserve system. Any such opportunities shall be incorporated into the NBHCP's conservation program through its Adaptive Management provisions.

Impacts to Vernal Pool Tadpole Shrimp from Development in the City of Sacramento under NBHCP

Development within the City of Sacramento could result in the loss of suitable habitat for the species and this loss may have a substantial effect on individuals of this federally listed species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, development within the City of Sacramento is not anticipated to have a substantial effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development within the City of Sacramento. Implementation of compensatory mitigation that is consistent with USFWS programmatic guidelines for large brachiopod species may be required to offset impacts on the species.

Impacts to Vernal Pool Tadpole Shrimp from Development within Sutter County under NBHCP

Development within Sutter County will result in the loss of suitable habitat for the species and this loss may have a significant effect on individuals of this federally listed species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, development within Sutter County is not anticipated to have a significant effect on the species as a whole. Implementation of

compensatory mitigation that is consistent with USFWS programmatic guidelines for large branchiopod species may be required to offset impacts.

Impacts to Vernal Pool Tadpole Shrimp from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur within the Permit Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Vernal Pool Tadpole Shrimp under NBHCP

Vernal pool tadpole shrimp could benefit under implementation from the vernal pool protections of the NBHCP, or, if necessary, from any mitigation implemented to offset development impacts in vernal pool areas. The species could also benefit from other wetland and upland habitats established in the NBHCP's reserve areas. However, vernal pool tadpole shrimp occurrence and distribution in the Plan Area is not well understood, and the extent to which the Plan's reserve areas can contribute to vernal pool tadpole shrimp conservation is similarly unclear. Any such measures shall be incorporated into the NBHCP's conservation program through Adaptive Management provisions.

Although not known to occur in the NBHCP area, marginally suitable vernal pool habitat for the vernal pool tadpole shrimp (*Lepidurus packardi*) is present in scattered locations in the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); the vernal pool protections incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

If implemented, this combination of measures will minimize and fully mitigate potential future effects to the vernal pool tadpole shrimp, if the species occupies the NBHCP in the future, and will also protect vernal pool tadpole shrimp habitat in the NBHCP Plan Area.

15. Midvalley Fairy Shrimp (*Branchinecta n.sp.*)

Significance of Plan Area to Midvalley Fairy Shrimp

This species has no official State or Federal listing however it occurs in vernal pool habitats that support associated fairy shrimp which are either threatened or endangered. Although seasonal wetlands present in the Plan Area may provide suitable habitat for the species, it has not been documented in the area nor has the species been documented from elsewhere in Sutter County. The lack of known

occurrences and the generally disturbed nature of the Plan Area probably preclude the presence of significant populations of the species. Therefore the Plan Area does not represent an area important to the continued existence or preservation of the species.

Extent of Take of the Midvalley Fairy Shrimp as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Midvalley Fairy Shrimp

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the midvalley fairy shrimp: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, the HCP requires that TNBC will consult with the TAC, and fairy shrimp and tadpole shrimp experts periodically during implementation of the NBHCP to determine what if any additional conservation opportunities for Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp and midvalley fairy shrimp might exist within the Plan's proposed reserve system. Any such opportunities shall be incorporated into the NBHCP's conservation program through its Adaptive Management provisions.

Impacts to Midvalley Fairy Shrimp from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento could result in the loss of suitable habitat for the species and this loss may have a substantial effect on individuals of this special-status species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have a substantial effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for City development. Implementation of compensatory mitigation that

is consistent with USFWS programmatic guidelines for large brachiopod species may be required to offset impacts on the species.

Impacts to Midvalley Fairy Shrimp from Development within Sutter County under NBHCP

Because the midvalley fairy shrimp has not been documented to occur either historically or presently within the Plan Area and because the Plan Area only supports marginal (i.e., disturbed) habitat for the species, development within Sutter County is anticipated to have a negligible effect on the species.

Impacts to Midvalley Fairy Shrimp from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur within the Permit Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Midvalley Fairy Shrimp under NBHCP

Midvalley fairy shrimp could benefit under implementation from the vernal pool protections of the NBHCP, or if necessary, from any mitigation implemented to offset development impacts in vernal pool areas. The species could also benefit from other wetland and upland habitats established in the NBHCP's reserve areas. However, midvalley fairy shrimp occurrence and distribution in the Plan Area is not well understood, and the extent to which the Plan's reserve areas can contribute to midvalley fairy shrimp conservation is similarly unclear. Any such measures shall be incorporated into the NBHCP's conservation program through Adaptive Management provisions.

Although not known, or expected to occur in the NBHCP area due to species range and known habitat affinities, some marginally suitable vernal pool habitat for the midvalley fairy shrimp is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); the vernal pool protections incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

If implemented, this combination of measures will minimize and fully mitigate potential future effects to the midvalley fairy shrimp, if the species occupies the NBHCP in the future, and will also protect potential midvalley fairy shrimp habitat in the NBHCP Plan Area.

16. Delta Tule Pea (*Lathyrus jepsonii var. jepsonii*)

Significance of Plan Area to Delta Tule Pea

The Delta tule pea is a Federal Species of Concern. The vast majority of the known Delta tule pea occurrences are in the Sacramento-San Joaquin Delta and these occurrences are generally stable or increasing in size. This species has not been documented from the Plan Area and suitable habitat for the species is limited in extent. Because the species is not known from the Plan Area and because the species is currently relatively stable within the center of its historic range in the Sacramento-San Joaquin Delta, the Plan Area does not represent an area important to the continued existence or preservation of the species.

Extent of Take of the Delta Tule Pea as a Result of Covered Activities

Potential habitat for the Delta tule pea is provided by ponds and marsh habitat reserves. According to Table 5-13 of the Tech Memo, a total of 1,874 acres of potential habitat for the Delta tule pea exists in the Basin comprised of ponds and seasonally wet areas, and canals. Impacts associated with development would effect a total of 425 acres, of which 124 acres are located in the City of Sacramento, 225 acres are located in Sutter County and 76 acres are located in Metro Air Park.

TABLE VII-13
DELTA TULE PEA CHANGE IN POTENTIAL HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	**1,874**	**-124**	**-76**	**-225**	**-425**	**1,449**	**-22.7%**

Source: CH2MHill, February 2002

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that delta tule pea might use and does not represent habitat known to be occupied by the species.

Measures to Avoid, Minimize and Mitigate Take of the Delta Tule Pea

The NBHCP includes a measure for TNBC to consider introducing the Delta tule pea into suitable locations in the Natomas Basin. Introducing the Delta tule pea into the system of habitat reserves would

benefit the species by increasing population size and distribution. In addition, the NBHCP requires TNBC to monitor any known populations of covered plant species within the NBHCP area.

Impacts to Delta Tule from Development within the City of Sacramento under NBHCP

The Delta tule pea has not been documented in the Plan Area and potential habitat is limited to emergent marsh areas in ditches and canals. The NBHCP requires the creation and management of wetland and upland reserves and the enhanced maintenance and operation of canals and ditches in the Plan Area may result in enhanced habitat that could support this species. Potential habitat impacts in the City of Sacramento are 124 acres of canals and seasonally wet areas. In turn, the City development will contribute 1,006 acres of managed marsh to the reserve system. Therefore, potential impacts to the Delta tule pea under the NBHCP are not anticipated to be substantial.

Impacts to Delta Tule Pea from Development within Sutter County under NBHCP

Because the species has not been documented to occur either historically or presently within the Plan Area and because the Plan Area only supports a limited extent of suitable habitat for the species, development within Sutter County is not anticipated to have a substantial effect on the continued existence or preservation of the species. Potential habitat impacts in the Sutter County are 225 acres of canals and seasonally wet areas. In turn, the Sutter County development will contribute 933.4 acres of managed marsh to the reserve system.

Impacts to Delta Tule Pea from the Water Agencies' Covered Activities under the NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are zero, rare, or infrequent, and the adverse effects of such take will be insignificant.

Overall Impacts to Delta Tule Pea under NBHCP

Although not known to occur in the NBHCP area, suitable habitat for the Delta tule pea is present wherever emergent marsh occurs in the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); species-specific measures (i.e., potential for species introduction into suitable habitats in the reserve system); and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., emergent marsh) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. A total of 425 acres of potential habitat in the Basin would be impacted by Authorized Development which will be compensated by the creation of 2,187 acres of managed marsh reserve areas. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

7. Sanford's Arrowhead (*Sagittaria sanfordii)*

Significance of Plan Area to Sanford's Arrowhead

Sanford's arrowhead is a Federal Species of Concern. The Plan Area is not known to support Sanford's arrowhead; however, suitable habitat is present in the Plan Area in the form of unmaintained agricultural supply and return ditches. Because the Plan Area is not known to support the species and because the majority of suitable habitat in the Plan Area is maintained for water conveyance (i.e., cleared of vegetation) the Plan Area does not represent an area important to the continued existence or preservation of the species.

Extent of Take of Sanford's Arrowhead as a Result of Covered Activities

Potential habitat for the Sanford's arrowhead is provided by ponds and marsh habitat reserves. According to Table 5-14 of the Tech Memo, 1,874 acres of ponds, seasonally wet areas and canals which could serve as potential habitat are included in the Basin. The Future scenario, assuming 17,500 acres of urban development, shows impacts to 425 acres of potential habitat. The NBHCP mitigation program will create 2,187.5 acres of managed marsh reserves resulting in an improvement to Sanford's arrowhead habitat of 1,762 acres. Overall habitat conditions are expected to improve for the Sanford's arrowhead.

TABLE VII-14
SANFORD'S ARROWHEAD CHANGE IN POTENTIAL HABITAT (ACRES)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition[1]	Overall % Change
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	**1,874**	**-124**	**-76**	**-225**	**-425**	**1,449**	**-22.7%**

Source: CH2MHill, February 2002

[1] *Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.*

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that Sanford's arrowhead might use and does not represent habitat known to be occupied by the species.

Measures to Avoid, Minimize, and Mitigate Take of the Sanford's Arrowhead

The NBHCP includes a measure for TNBC to consider introducing Sanford's arrowhead into suitable locations in the Natomas Basin. Introducing Sanford's arrowhead into the system of habitat reserves would benefit the species by increasing population size and distribution. In addition, TNBC shall monitor any known populations of covered plant species within the NBHCP area.

Impacts to Sanford's Arrowhead from Development within the City of Sacramento under NBHCP

The Sanford's arrowhead has not been documented in the Plan Area and potential habitat is limited to wetlands in ditches and canals. The NBHCP requires the creation and management of wetland and upland reserves and the enhanced maintenance and operation of canals and ditches in the Plan Area may result in enhanced habitat that could support this species. Therefore, potential impacts to the Sanford's arrowhead under the NBHCP are not anticipated to be substantial and the creation of new habitat in the reserve system may benefit the species. Authorized Development in the City may impact 124 acres of potential habitat for Sanford's arrowhead which is compensated by the City's contribution to the managed marsh reserve system of 1,006 acres.

Impacts to Sanford's Arrowhead from Development within Sutter County under NBHCP

Because the species has not been documented to occur either historically or presently within the Plan Area and because the Plan Area only supports a limited extent of suitable habitat for the species, development within Sutter County is not anticipated to have a substantial effect on the continued existence or preservation of the species. Authorized Development in the Sutter County may impact 225 acres of potential habitat for Sanford's arrowhead which is compensated by the County's contribution to the managed marsh reserve system of 933.4 acres.

Impacts to Sanford's Arrowhead from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Sanford's Arrowhead under NBHCP

Although not known to occur in the NBHCP area, suitable habitat for Sanford's arrowhead is present wherever seasonal marsh occurs in the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); species-specific measures (i.e., potential for species introduction into suitable habitats in the reserve system); and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., emergent marsh and seasonal wetland) in the

reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

18. Boggs Lake Hedge-Hyssop (*Gratiaola heterosepala)*

Significance of Plan Area to Boggs Lake Hedge-Hyssop

This species occupies a variety of seasonally wet habitats including vernal pools and seasonally inundated lake margins (Skinner and Pavlik 1994, Hickman 1993). Bogg's Lake hedge- hyssop has not been found in highly disturbed or altered landscapes supporting seasonal wetlands such as the lands present within the Plan Area (CDFG 1992b). Because the Plan Area is highly disturbed and because the species has not been previously documented from the area, it can be presumed that the Plan Area is not significant in the continued existence or preservation of the species.

Extent of Take of the Boggs Lake Hedge-Hyssop as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Boggs Lake Hedge-Hyssop

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the Boggs Lake hedge-hyssop: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means

including but not limited to, the introduction of Boss's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass and legenere into the vernal pool areas or other suitable locations in the NBHCP Plan Area.

Impacts to Boggs Lake Hedge-Hyssop from Development in the City of Sacramento under NBHCP

Bogg's Lake hedge-hyssop has not been documented in the Plan Area. Development within the City of Sacramento could result in the loss of suitable habitat (i.e., seasonal wetlands and vernal pools) for the species. This habitat loss could result in the loss of individuals of this special-status plant species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have a substantial effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for urban development.

Impacts to Boggs Lake Hedge-Hyssop from Development within Sutter County under NBHCP

Because Bogg's Lake hedge-hyssop has not been documented to occur either historically or presently within the Plan Area and because the Plan Area has been significantly disturbed, it is unlikely that the species would be present, therefore development within Sutter County is not anticipated to have a significant effect on the species.

Impacts to Boggs Lake Hedge-Hyssop from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Boggs Lake Hedge-Hyssop under NBHCP

Although not known, or expected, to occur in the NBHCP area, marginally suitable habitat for the Bogg's Lake hedge-hyssop is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species or their habitat), the vernal pool protections incorporated into the NBHCP, and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

19. Sacramento Orcutt Grass (*Orcuttia viscida)*

Significance of Plan Area to Sacramento Orcutt Grass

Because the species has not been documented from the Plan Area and because suitable habitat for the species is not present, the Plan Area is not considered significant in the continued existence or preservation of the species.

Extent of Take of Sacramento Orcutt Grass as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Sacramento Orcutt Grass

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the Sacramento orcutt grass: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means including but not limited to, the introduction of Boss's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass and legenere into the vernal pool areas or other suitable locations in the NBHCP Plan Area.

Impacts to Sacramento Orcutt Grass from Development within the City of Sacramento under NBHCP

Sacramento orcutt grass has not been documented in the Plan Area and potential habitat is limited to few vernal pools on the far eastern edge of the Plan Area. Development within the City of Sacramento

could result in the loss of marginally suitable habitat for the Sacramento orcutt grass in the form of seasonal wetlands and vernal pools. This habitat loss may result in the loss of individuals of this federally listed species; however, because of the limited extent of potential habitat and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have an effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development.

Impacts to Sacramento Orcutt Grass from Development within Sutter County under NBHCP

Because Sacramento orcutt grass has not been documented to occur either historically or presently within the Plan Area and because the Plan Area does not support suitable habitat for the species, development within Sutter County is not anticipated to have a significant effect on the species.

Impacts to Sacramento Orcutt Grass from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species, were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Sacramento Orcutt Grass under NBHCP

The Plan Area generally does not include vernal pools with the required high terrace formation that supports this species. Vernal pool restoration programs could provide enhanced habitat for this species.

Although not known, or expected, to occur in the NBHCP area, some marginally suitable deep vernal pool habitat for the Sacramento orcutt grass is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); the vernal pool protections incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

20. Slender Orcutt Grass (*Orcuttia tenuis*)

Significance of Plan Area to Slender Orcutt Grass

Because the species has not been documented from the Plan Area and because suitable habitat for the species is not present, the Plan Area is not considered significant in the continued existence or preservation of the species.

Extent of Take of the Slender Orcutt Grass as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Slender Orcutt Grass

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the slender orcutt grass: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition. TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means including but not limited to, the introduction of Boss's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass and legenere into the vernal pool areas or other suitable locations in the NBHCP Plan Area.

Impacts to Slender Orcutt Grass from Development within the City of Sacramento under NBHCP

Slender orcutt grass has not been documented in the Plan Area and potential habitat is limited to few vernal pools on the far eastern edge of the Plan Area. Development within the City of Sacramento could result in the loss of marginally suitable habitat for the slender orcutt grass in the form of seasonal wetlands and vernal pools. This habitat loss may result in the loss of individuals of this federally listed species; however, because of the limited extent of potential habitat and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have an effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development.

Impacts to Slender Orcutt Grass from Development within Sutter County under NBHCP

Because slender orcutt grass has not been documented to occur either historically or presently within the Plan Area and because the Plan Area does not support suitable habitat for the species, development within Sutter County is not anticipated to have a significant effect on the species.

Impacts to Slender Orcutt Grass from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Slender Orcutt Grass under NBHCP

The Plan Area generally does not include vernal pools with the required high terrace formation that supports this species. Vernal pool restoration programs could provide enhanced habitat for this species. Due to the current lack of suitable habitat and the lack of known occurrences of this species, development and other Covered Activities under the NBHCP are not likely to effect the continued existence or preservation of this species. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

21. Colusa Grass (*Neostapfia colusana*)

Significance of Plan Area to Colusa Grass

Although Colusa grass is known to occur in large vernal pools with clay soils similar to those soils occurring in the Plan Area, past disturbances (i.e., leveling and filling of large vernal pools) precludes this species occurrence. There are no known occurrences of this species within the Plan Area. The Plan Area is not considered significant in the continued existence or preservation of the species.

Extent of Take of the Colusa Grass as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Colusa Grass

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the Colusa grass: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means including but not limited to, the introduction of Boss's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass and legenere into the vernal pool areas or other suitable locations in the NBHCP Plan Area.

Impacts to Colusa Grass from Development within the City of Sacramento under NBHCP

Colusa grass has not been documented in the Plan Area and potential habitat is limited to few vernal pools on the far eastern edge of the Plan Area. Development within the City of Sacramento could result in the loss of marginally suitable habitat for this species in the form of seasonal wetlands and vernal pools. This habitat loss may result in the loss of individuals of this federally listed species; however, because of the limited extent of potential habitat and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have an effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development.

Impacts to Colusa Grass from Development within Sutter County under NBHCP

Because suitable habitat does not occur in the Plan Area, no impacts to Colusa grass are expected from the implementation of the NBHCP. However, lands within the Plan Area are suitable (i.e., basin rim landforms with clayey soils) for restoration and creation of suitable Colusa grass habitat.

Impacts to Colusa Grass from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take

of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be minor or insignificant.

Overall Impacts to Colusa Grass under NBHCP

Although not known, or expected, to occur in the NBHCP area, marginally suitable habitat for Colusa grass is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species or their habitat), the vernal pool protections incorporated into the NBHCP, and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

22. Legenere (*Legenere limosa)*

Significance of Plan Area to Legenere

Although seasonal wetlands present in the Plan Area may provide suitable habitat for the species, it has not been documented in the Plan Area. The lack of known occurrences and the generally disturbed nature of the Plan Area probably preclude the presence of significant populations of the species, therefore the Plan Area does not represent an area important to the continued existence or preservation of the species.

Extent of Take of the Legenere as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Legenere

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the legenere: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and

separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means including but not limited to, the introduction of Boss's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, and legenere into the vernal pool areas or other suitable locations in the NBHCP Plan Area.

Impacts to Legenere from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento could result in the loss of suitable habitat for the legenere. This habitat loss may have a substantial effect on individuals of this special-status species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have a substantial effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development.

Impacts to Legenere from Development within Sutter County under NBHCP

Because legenere has not been documented to occur either historically or presently within the Plan Area and because the Plan Area only supports marginal (i.e., disturbed) habitat for the species, development within Sutter County is not anticipated to have a substantial effect on the species.

Impacts to Legenere from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Legenere under NBHCP

Legenere is found along lake shores and in vernal pools, and other seasonally inundated habitat areas. The Plan Area does not currently support deep vernal pools that remain inundated for significant periods during the winter and spring. However, creation of wetland reserves may result in enhanced habitat that could support this species.

Although not known to occur in the NBHCP area, suitable vernal pool and seasonal wetland habitat for legenere is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); the vernal pool protections incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

E. TAKE AS A RESULT OF INDIRECT KILLING OR INJURY

The impacts of urban development and other Covered Activities in the Natomas Basin on Covered Species would not be through direct killing or injury as a result of construction and O&M activities alone. For example, in some cases, individual garter snakes or other Covered Species may escape direct death or injury by fleeing the construction area, but may subsequently perish if they do not reach suitable, available habitat. Similarly, some animals may reach alternate habitat but perish from competition or reproductive exclusion if the habitat reached by refugees is already at carrying capacity, or, animals already inhabiting such habitats may perish as a result of the same increased competition. Other mortality factors that may come into play as a result of urban development are road kills and depredations by domestic pets. For example, giant garter snakes are susceptible to road kills (see Section II.C.2); thus, increased traffic in the Natomas Basin as a result of development may increase this mortality factor for snakes as well as other wildlife in areas near or adjacent to development. Also, human population increases associated with development will likely increase pet populations, which, in turn, may increase wildlife mortality in some areas as a result of predation by domestic dogs and cats. Because indirect take will predominantly occur within areas of Authorized Development, such take has already been largely accounted for within the discussions of impacts to individual species. Some minor additional take beyond those levels previously discussed could occur along the margins of Authorized Development and throughout the Basin due to an overall increase in vehicular traffic.

F. EFFECTS OF THE PLAN ON LONG-TERM SURVIVAL OF WETLAND-DEPENDENT SPECIES

The giant garter snake is the principal wetland dependent species expected to be significantly affected by habitat loss as a result of urban development in the Permit Areas. However, the issuance of incidental take permits for the Permit Areas is not expected to jeopardize the long-term survival of the giant garter snake. This is because the Plan will result in a reduction of take due to: (1) the NBHCP's establishment of a permanent system of managed rice lands and wetlands designed and managed specifically for consistency with giant garter snake biology; (2) the Plan's emphasis on hydrological connectivity between existing and newly created habitat areas within the Basin; and (3) the Plan includes substantial measures to avoid and minimize take by the Land Use Agencies and TNBC.

Although the NBHCP will protect and enhance wetland and upland habitat values in the Basin, urban development will result in a net conversion of agricultural land (rice lands and row crops) to urban uses. Nevertheless, over the term of the permits, continued rice farming and construction and management of managed marshes are expected to play an essential role in sustaining long-term populations of giant garter snakes in the Basin as well as of other Covered Species utilizing the same habitat. In the event that new information indicates that the Plan's current provisions are not optimal for protecting giant garter snakes and other wetland species, the Plan's Adaptive Management, recovery plan adaptation, 9,000-acre and individual Land Use Agency Independent Mid-Point Review provisions will provide for significant corrective measures to be implemented over the 50 year term of the permits.

In the Natomas Basin, the current giant garter snake population is believed to have been maintained over the past 20 years or so in a land use pattern of about 50% rice and 50% other irrigated non-wetland crops. The extent of rice land in the Basin, both actively farmed and fallow, has been somewhat over 21,000 acres in recent years (see Chapter III). If development occurs as described in the NBHCP, but the current pattern of rice, non-wetland irrigated crops, and the present water conveyance system (the ditches and drains) otherwise remain, the Basin's giant garter snake population would reasonably be expected to persist into the future, if considered together with the conservation program for the snake as described in the Plan.

The best information available from the rice industry indicates that good growing conditions and a strong future market for rice imply a stable, continuing level of rice farming in northern California. The Natomas Basin is reputed to be prime rice growing land. However, the viability of rice farming depends on a federal price subsidy program and on the availability of plentiful summer irrigation water (see Chapter III), and conditions changing these factors could lead to a reduction or elimination of rice farming from the Basin over the long term.

If rice farming were to cease in the Basin, the remaining non-wetland cropland and irrigation system would probably be insufficient to sustain the giant garter snake population. This conclusion is based, in part, on the fact that giant garter snakes used to inhabit rice growing regions in northern San Joaquin Valley, but have largely disappeared since the rice lands were converted to other crops. Similarly, if an excessive proportion of the Basin were to be urbanized, resulting in extensive losses of rice lands and other snake habitats, the giant garter snake population might decline to the point of extirpation. The impacts of urban development on the giant garter snake in the Basin may result from three sources (see Section VII.D.1 above): (1) take of individual snakes due to the activities described in the Plan; (2) take as a result of habitat loss; and (3) take as a result of indirect effects of development, including increased traffic, domestic animal predation, water pollution, and similar effects associated with urbanization. In addition, if urban development occurred at levels that ultimately would substantially reduce or eliminate agriculture in the Basin, the components of the irrigation system (e.g., ditches, drains, canals) that currently support giant garter snakes and the extent of the system would likely also decline or disappear, probably resulting in extirpation of the giant garter snake from the Basin (winter drainage alone does not provide sufficient giant garter snake habitat).

Anticipated take of giant garter snakes resulting from urban development activities in the Permit Areas are described in Section VII.D.1 above. This section considers the effects of proposed development on overall wetland acreage available in the Basin through time, and the likelihood that rice farming will persist in the Basin over the long-term.

One measure of gross habitat value in the Basin is the acreage of extant wetlands (i.e., marsh lands and rice lands). However, the conversion of rice land to urban uses is not necessarily the full measure of the impacts of urban growth. It is the matrix of rice land, non-rice land, other wetlands, and the irrigation and drainage system that constitutes present giant garter snake habitat in the Basin. Nonetheless, when addressing gross land use changes on the scale of thousands of acres, an estimated accounting of rice land and other wetland acreage through time is a reasonable measure of the anticipated long-term effects of urban development in the Basin and the effectiveness of the NBHCP's proposed mitigation program. Table VII-14 presents projected data on the status of land use over time in the Natomas Basin, and Table VII-15 presents projected data on the area of rice lands and wetlands anticipated in the Basin as a result of the NBHCP's mitigation program. As can be seen from these tables, the OCP anticipates preserving or creating 4,375.5 acres of rice land habitat managed to support wetland species such as the giant garter snake, and creation of an additional 2,263.5 acres of managed marsh habitat. Table VII-15 shows that the overall projected loss of wet habitat (rice and marsh lands) as a result of the adoption of the HCP would be a 3% decline in wet areas in the Natomas Basin overall. Of this, the majority of decline is attributable to conversion of rice to urban uses. While rice shows an overall net loss in the future, marsh land is projected to substantially increase over current levels from 96 acres (present condition in the Basin) to 2,263 (or a 24 fold increase) acres after implementation of the HCP and associated mitigation program.

Under the provisions of the NBHCP, habitat land acquisition would transfer some rice land into the reserve system. Rice lands acquired by TNBC for Mitigation Lands are expected to remain in rice cultivation or to be converted to managed marsh lands. Either of these habitats would support continuation of the giant garter snake. TNBC managed rice and managed marsh habitat will also include upland edges to support cover and hibernation sites for the giant garter snake during winter months

Similarly, the flexibility of the NBHCP to allow in-Basin and out-of-Basin mitigation purchases is expected to have a minor impact on the total amount of rice farmed in the Basin. If the TNBC buys land outside the Basin, then land in the Basin will likely remain in private hands and in rice production and other types of farming. The principal loss would then be from urbanization. Assuming development of 17,500 acres, the total extent of wetland--rice and marsh–however, there would be a substantial gain in marsh habitat. The permanent protection of NBC reserve lands and the substantial increase in the extent of marsh are thus anticipated to result in a benefit to the long-term stability of giant garter snake populations in the Natomas Basin.

TABLE VII-15
STATUS OF WETLAND OVER TIME (IN ACRES)

Wetland Type	Baseline Acreage	Acres Impacted by Planned Development	Lands to be Preserved or Created by TNBC	Lands Not Included as Planned Development under this HCP	Remaining Lands (TNBC Mitigation Lands plus lands not impacted by Planned Development)
Rice Lands	22,693.0	(8,087.0)	4,375.0	14,606.0	14,606.0 to 18,981.0
Marsh, ponds and wet areas	96.0	(21.0)	2,187.5	75.0	2,262.5
Canals	1,778.0	(404.0)	N/A	1,374.0	1,374.0
TOTAL	**24,854.0**	**(8,512.0)**	**6,562.5**	**16,055.0**	**18,242.0 to 22,617.5**

Note: TNBC may acquire rice fields. It is assumed that these rice fields would be fields located outside of the area of Planned Development. Therefore, the lower range for remaining lands does not credit TNBC with providing a net increase in rice lands. On the other hand, if TNBC acquires land suitable for rice and enters that land into active rice cultivation as part of the reserve system, a net increase in remaining rice lands may result. It is also possible that some existing rice lands would be acquired and converted to managed marsh, resulting in a reduction in rice lands remaining, but an increase in marsh lands which may be more valuable to the wetland Covered Species.

TABLE VII-16
PROPORTION OF WETLAND BY TYPE OVER TIME (IN ACRES)

	RICE LANDS				MARSH LANDS				WET AREAS OVERALL	
Plan Year	**Mitigation Lands**	**Other In Basin**	**TOTAL**	**% of Basin**	**Mitigation Lands**	**Other In Basin**	**TOTAL**	**% of Basin**	**Basin Wetlands (Rice plus Marsh)**	**% of Basin**
Present	0.0	22,693.0	22,693.0	42.9%	0.0	96.0	97.0	0.2%	22,790.0	42.6%
Project Com-pletion	4,375.0	14,606.0	18,981.0	35.5%	2,187.5	75.0	2,262.5	4.2%	21,243.5	39.7%

Plan Year: 1997
Basin: Defined as the Natomas Basin Plan Area comprised of 53,537 acres.
Mitigation Lands: Lands to b preserved at a 0.5 to 1 Mitigation Ratio of which 50% of lands are planned to be rice and 25% of lands are planned to be managed marsh habitat and the balance of 25% planned for upland reserves.

G. SPECIES RECOVERY

The appropriate role of the NBHCP in giant garter snake and Swainson's hawk recovery is not known at this time because the USFWS has not yet completed a final Giant Garter Snake Recovery Plan and the CDFG has not developed a Swainson's Hawk Recovery Plan. However, the NBHCP incorporates a recovery plan adaptation provision (see Section VI.H) that allows for modifications to the NBHCP in light of future recovery plans when and if such plans are approved.

Ultimately, recovery of the giant garter snake depends on conservation of garter snake populations throughout the Central Valley, including the Natomas Basin. The NBHCP provides a system of reserves and establishes an entity (The Natomas Basin Conservancy) to administer the program in perpetuity. By providing mitigation for the impacts of urban development on giant garter snakes in the Permit Areas and providing them with a protected reserve system in the Plan Area, and through the recovery plan adaptation described above, the NBHCP effort will contribute to statewide giant garter snake recovery efforts.

The NBHCP also allows, if certain conditions are met for some Mitigation Lands to be purchased out-of-Basin (see Section IV.B). The purpose of this provision is potentially to reduce the cost of the Plan by allowing acquisition of lower-cost land and to reduce the impact of land acquisition on farming in the Basin.

H. IMPACTS OF RESERVE MANAGEMENT

Habitat restoration and management activities in the NBHCP reserve system at times will require significant amounts of earth moving and surface disturbance (e.g., to create managed marsh wetlands). These activities may result in some levels of take of the Covered Species, especially the giant garter snake. Additional ongoing reserve management activities may also result in take (e.g., through ditch and drain maintenance, road kills, etc.), and take for scientific purposes (e.g., during monitoring) will periodically occur. However, take levels as a result of these activities are expected to be minor to negligible because: (1) TNBC will implement all take avoidance measures as described in Section V.B; and (2) the benefits of these activities in creating and maintaining the Mitigation Land system is expected to more than offset any such minor take levels.

1. Authorizing Management Take/Take for Scientific Purposes

As explained above, certain operations associated with reserve establishment and management (e.g., construction of managed marshes) could result in incidental take of giant garter snakes and other Covered Species. Other activities undertaken during reserve management (e.g., trapping of giant garter snakes for population monitoring purposes or for relocation to other habitats) could result in intentional (as opposed to "incidental") take. The take would be for scientific purposes or for the propagation and enhancement of survival and must be authorized by a permit under Section 10(a)(1)(A) of the federal ESA. Both these types of take are authorized under the NBHCP subject to the conditions described below.

For purposes of management activities, the federal Section 10(a)(1)(B) permit and state Section 2081 permit issued to TNBC pursuant to the NBHCP shall authorize all take of Covered Species resulting from mitigation activities and management and operation of the NBHCP's reserve system, provided that: (1) such take results from mitigation measures (e.g., capture/relocation) specifically intended to minimize more serious forms of take (e.g., killing/injury) or that are part of a monitoring program specifically described in the NBHCP; (2) such activities are directly associated in time or place with activities authorized under the permits; (3) such take occurs during activities conducted by the agents or employees of the USFWS, CDFG, TNBC, or any person acting under the direct guidance or authority of these entities; and/or (4) such take occurs during activities specifically described in a reserve management or monitoring plan approved by the USFWS and CDFG. These provisions are consistent with USFWS policy as described in the USFWS "Habitat Conservation Planning Handbook" (USFWS 1996). In addition, the state and federal permits issued to TNBC shall authorize all management related take that occurs on duly established NBHCP Mitigation Lands, irrespective of the location of those lands (i.e., management take occurring on out-of-Basin reserve sites is covered).

With respect to activities requiring take for scientific purposes (e.g., trapping, handling, and marking of Covered Species), the federal permit issued pursuant to the NBHCP shall be considered a joint Section 10(a)(1)(B)/10(a)(1)(A) permit. However, the permit shall only authorize take during those activities provided that: (1) the activities are directly associated with monitoring or similar requirements under the NBHCP; (2) the person(s) undertaking or retained to undertake the activities submits a resume to the USFWS describing their relevant qualifications; (3) the USFWS authorizes the person(s) to undertake the activities via a written letter or memorandum; and (4) the person(s) implements such additional terms and conditions as may be described in the USFWS' letter of authorization.

I. MAXIMUM EXTENT PRACTICABLE

1. Summary of Findings Under ESA and CESA

To issue a Section 10(a) permit, the U.S. Fish and Wildlife Service must have sufficient evidence to find that take has been avoided, minimized, and mitigated to the maximum extent practicable. To make this finding, USFWS must examine a variety of facets - biological, physical, legal, and economic. To issue a Section 2081 Permit, CDFG must have sufficient evidence demonstrating the applicants will minimize and fully mitigate the impacts of the take authorized under the 2081 permits. The Conservancy and the Land Use Permittees have proposed minimization measures and mitigation in the NBHCP to adequately address all of the impacts resulting from the proposed take under ESA and CESA.

To address the findings required under ESA and CESA, it is necessary to review all aspects - biological, physical, legal, and economic. As evidence to support the findings, the Land Use Permittees and The Conservancy submit Appendix H, the Biological Resources Tech Memo to identify take of the Covered Species; Appendix A, the Economic Analysis for the economic discussion of maximum extent practicable; as well as the conservation strategies and measures to reduce take identified in the NBHCP.

The Conservancy and the other Permittees evaluated the extent of take on Covered Species and proposed mitigation and minimization measures in the NBHCP to offset fully the impacts of such take as described in detail earlier in Chapter VII. The NBHCP conservation strategies and mitigation program provide for the collection of Mitigation Fees to purchase 0.5 acres of Mitigation Land for each acre of land developed, resulting in approximately 8,750 acres of Mitigation Lands as replacement habitat for Covered Species. Habitat on Mitigation Lands will be preserved, established, enhanced and actively managed to maximize the values of the Mitigation Lands to the Covered Species. Under the NBHCP, take would be avoided, minimized, mitigated and monitored through the following measures:

1. Identification and implementation of incidental take conservation measures to minimize impacts to NBHCP Covered Species as set forth in Chapters V and VI.

2. Establishment, enhancement and active management of up to 8,750 acres of high quality reserve habitat in perpetuity that is managed specifically for the benefit of NBHCP Covered Species. Of this Mitigation Land, approximately 6,562.5 acres would be managed marsh and rice fields which would provide direct benefits to giant garter snake and other wetland dependent species. Approximately 2,187.5 acres would be in upland reserves for the benefit of Swainson's hawk and other upland dependent species. The NBHCP also provides additional habitat for hawk foraging along upland edges of wetland reserves.

3. Establishment of a monitoring and reporting plan to gauge the anticipated biological success and effectiveness of the NBHCP and to provide information for the Adaptive Management Plan which is designed to improve the biological success of the NBHCP as new information becomes available or conditions change.

4. Implementation of a funding program which contains assurances that the NBHCP will be implemented.

From a biological standpoint, the Mitigation Ratio of 0.5 to 1 is appropriate given the paucity of extant natural, undisturbed habitat for the Covered Species found within the Plan Area when compared to the enhanced value of the reserve lands that will result from habitat restoration, creation and management. Limited natural habitat remains within the Plan Area. Some of the habitat within the Permit Areas subject to urban development is of high quality and some is of very low or limited value. Agricultural lands, and agricultural drainage canals and ditches provide artificial habitat within the Plan Area. All land converted to Authorized Development within the Permit Areas are subject to the NBHCP and required to pay the Mitigation Fees or contribute Mitigation Lands, including those portions of the Mitigation Fee related to future management and monitoring, whether the land lost to urban development is of high, low, or limited value to the Covered Species. In addition, the system of habitat reserves established and actively managed by The Conservancy in implementing the NBHCP will provide higher quality habitat for the Covered Species than currently exists. For example, as described in Chapter VII, the managed marsh, with its islands and lagoons, provides significantly more beneficial "edge" habitat for the snake than a typical rice

field. The enhanced value of the Mitigation Lands thus, will establish improved habitat for the benefit of the Covered Species and their range.

Also, the system of habitat reserves, both in size and distribution, is beneficial to the biological diversity of species and is designed to specifically benefit the Covered Species. Because of the varied quality of habitat throughout the Permit Areas and the required enhancement of habitat by The Conservancy, the NBHCP proposes a Mitigation Ratio of one half acre of habitat land in the Plan Area for one acre of development within the Permit Areas. Nonetheless, for giant garter snake, one of the primary Covered Species under the NBHCP, habitat values will result in an effective mitigation ratio much higher than the 0.5 to 1 mitigation ratio because the quality of both marsh and rice habitat in the reserve system would be greater than the quality of the habitat lost to development and because the enhanced reserves will be designed, managed and monitored to support viable populations of such species. Similarly, under the NBHCP, the loss of Swainson's hawk nesting habitat would be mitigated by active management of reserve lands to increase the number of available nest trees and the quality of foraging habitat, thus meeting the CDFG mitigation requirements for this species. Take of the remaining Covered Species also would be mitigated by the acquisition and active management of Mitigation Lands under the NBHCP.

The NBHCP also requires the following conservation measures to avoid and minimize take of giant garter snake, Swainson's hawk, and the other NBHCP Covered Species. These measures must be implemented before disturbance of the land (i.e., grading) can occur: 1) a pre-construction biological survey by a qualified biologist must be completed for each development site, 2) grading can only occur during the active season of the giant garter snake (May through September each year), 3) grading can only take place within certain distance of Swainson's hawk nesting trees (i.e., ½ mile) during nesting until after the young have fledged (March 15 to September 15 each year), and 4) ditches and canals must be dewatered for at least 15 days before they are filled and notice of dewatering provided to the California Department of Fish and Game and the U.S. Fish and Wildlife Service in order that they might take steps to re-locate any giant garter snakes or other Covered Species found during the dewatering process. The Permittees will require these measures also to minimize impacts on other Covered Species.

Based upon the analysis to identify take of the Covered Species contained in Chapters V and VII of the NBHCP, and in the Biological Resources Technical Memo, and for the reasons stated above, the Permittees believe the mitigation and conservation strategies provided in the NBHCP would mitigate fully the effects of incidental take.

The Permittees also have considered the physical constraints of providing mitigation to the maximum extent practicable and to achieve mitigation that minimizes and fully mitigates take of Covered Species. Within the Natomas Basin, a limited number of acres would be available for acquisition by TNBC under the willing seller / willing buyer process. Consequently, the NBHCP provides a "release valve" by allowing the TNBC to acquire reserve land located outside the Basin under specified circumstances, and up to a maximum of 20 percent of the total required mitigation land.

In determining whether the mitigation proposed by the Permittees is the maximum extent practicable and minimizes and fully mitigates take, the Permittees also have considered legal requirements pertaining to the imposition of mitigation on Covered Activities. In this regard, the Permittees must comply with statutory and constitutional nexus requirements. Those legal constraints require that: (i) mitigation imposed on Authorized Development bear a rational relationship to the impacts of such development on existing habitat, and (ii) the mitigation be roughly proportional to the impacts caused by the Authorized Development (e.g., as measured by the amount of habitat lost and the amount of habitat required to be provided to offset this loss. As described in Chapters V, VI and VII and the accompanying technical reports, the Land Use Permittees have proposed a mitigation ratio and a corresponding Mitigation Fee which the applicants believe fairly compensates for the impacts of take caused by the Authorized Development, and at a level that is roughly proportional to the impacts caused by such development. In other words, for Authorized Development which would impact low quality or no habitat, a higher mitigation ratio requirement would result in those developers paying Mitigation Fees at a level which would exceed the impact caused by their projects. Thus, the mitigation ratio takes into account the varying quality of extant habitat impacted by Authorized Development and distributes the mitigation measures in an equitable manner by requiring developers to fund the mitigation measures designed to address the direct and indirect impacts of their development.

In determining the applicable mitigation for impacts resulting from Authorized Development, from an economic standpoint, the NBHCP proposes that a Mitigation Fee is required to be paid by the developer (both private and public) of each acre of Authorized Development whether or not the land has known or potential habitat for any of the Covered Species. Moreover, there is no maximum amount of Mitigation Fee (or fee cap) proposed in the NBHCP. TNBC is responsible for analyzing the fee and recommending to the Land Use Permittees the amount of the Mitigation Fee or necessary fee increases sufficient to implement the NBHCP. Each Land Use Agency will evaluate, consider and take action on any proposed increase in the Mitigation Fee. If a particular Land Use Agency does not take action to adopt an appropriate Mitigation Fee that will provide for the successful implementation of the NBHCP with respect to the impacts caused by Covered Activities within that Land Use Agency's Permit Area, the Wildlife Agencies would consider the circumstances and, if necessary, revoke the Land Use Permittee's Incidental Take Permit.

The Conservancy and the Permittees also evaluated the Mitigation Fee to determine its effect on the cost burden sustained by Authorized Development. The historic and current Mitigation Fee is reviewed and analyzed in the Economic Analysis prepared by Economic and Planning Systems, see Appendix A. According to EPS, the cost burden that can be placed on urban development must generally not exceed a range of 15 to 20 percent if the development is to be feasible. With the current Mitigation Ratio 0.5 to 1 and the historic trend of the Mitigation Fee, the Economic Analysis demonstrates that the mitigation required by the NBHCP is economically feasible. In conjunction with the development fees and other infrastructure the cost burdens for urban development within the Basin already push the industry standard for feasibility. Nonetheless, although the NBHCP allows the Mitigation Fees to increase each year because there is no cap, the economic analysis indicates that the fees likely will increase in step with increases in land

values such that the costs to developers and the Conservancy will not exceed the maximum cost burden of 20%.

Additionally, land acquisition prices for habitat have increased since 1997, when the HCP originally was adopted. As the land acquisition prices have increased, the Mitigation Fee accordingly has increased. As the supply of land suitable for habitat mitigation in the Basin diminishes over time, the land acquisition price will increase because less land will be available for reserve lands. Consequently, the upward pressure on land acquisition prices would increase significantly if the NBHCP mitigation ratio increased to a ratio of 1 to 1 or higher, or if the NBHCP required the purchase of lands in specified reserve areas. Thus, a mitigation ratio above 0.5 to 1 would require the purchase of more reserve lands as mitigation. This would result in a higher price per acre for land, forcing the Mitigation Fee above the acceptable margin, and likely making the development infeasible.

The Land Use Permittees and The Conservancy also considered the effects on Authorized Development resulting from the Mitigation Fees in combination with other development fees to which developers would be subject. From an economic market perspective, if the Mitigation Fees were increased to an amount that is too high to justify urban development by a project proponent, urban development within the Natomas Basin will slow down and the corresponding impact on the Covered Species within the Natomas Basin will decrease or be delayed. Alternately, developers may choose to locate their development projects outside of the Natomas Basin and in other jurisdictions, which could result in additional impacts to species at locations outside of the Permit Areas. It must be noted that the purpose and objective of the Land Use Permittees is to secure Permits to allow Authorized Development to occur in the Basin under the NBHCP. Approving too high of a mitigation fee could make development infeasible, making it impossible to achieve the goals and objectives of the Land Use Permittees.

Based upon the analysis contained in Appendices A, H and I, and for the reasons stated above, The Conservancy and the other Permittees believe the mitigation, conservation strategies and minimization measures provided in the NBHCP would minimize and mitigate the impacts of the Covered Activities to the maximum extent practicable under the ESA and in accordance with CESA's requirements to minimize and fully mitigate effects on Covered Species.

J. ALTERNATIVES TO THE PROPOSED NBHCP

1. No Action Alternative

The No Action Alternative, in which all take would be avoided and no federal or state permits would be obtained, for the Land Use Agencies or for the Water Agencies-was considered but rejected for the following reasons. The North Natomas Community Plan Area is an area that the City of Sacramento has designated as needed to provide an adequate housing mix for the City. Additionally, the Sutter County General Plan has for sometime contemplated and committed lands in south Sutter County for urban uses necessary to support the economic health of Sutter County. Due to the nearly ubiquitous presence of the

giant garter snake in the rice fields and in the man-made water supply and drainage system, alternatives that avoid take are impractical. Finally, because of the pattern of widespread giant garter snake use in the Basin and the various impacts to wildlife that accompany urban development, urbanization of the Natomas Basin in the absence of the NBHCP would likely result in the cumulative, unmitigated destruction of giant garter snake habitat and ultimately extirpation of the species from the area.

2. Alternative Reserve Management

Alternative reserve management systems were evaluated that would not allow hunting and/or rice production on any reserve lands. The alternative was rejected as financially unacceptable. Even small ongoing revenues will be effective in helping fund the NBHCP and its conservation programs, and can help lower endowment costs for long-term reserve land management. Coupled with the cost of infrastructure, flood protection, schools, and the like, the burden of funding the NBHCP through development fees alone could, over the long-term, become a strain on landowners. To the extent that rice farming and hunting are compatible with the NBHCP's wetland reserve objectives and operation of the Sacramento International Airport, these revenue sources should be utilized to help distribute the costs of the program and to keep the mitigation fee as low as possible. The improved prospects for NBHCP funding of an adequate long-term revenue stream from these sources, so long as they are compatible with Plan objectives, are therefore important to the long-term success of the Plan's conservation program. Nevertheless, under the NBHCP's funding provisions (see Sections VI.B), the development fee must be raised as necessary to ensure adequate funding to maintain the Plan's mitigation obligations.

3. Alternate Proportions of Marsh and In-Basin Land

The proposed proportion of mitigation lands managed as seasonal or permanent marsh (as opposed to rice farming) or acquired in-Basin (as opposed to out-of-Basin) represents a balancing between biological and local interests. Retention of land in rice farming in the Natomas Basin and on NBHCP reserve lands, while having a biological basis (based on currently available data), also has economic, political and social considerations affecting the practicality of local implementation. The biological objective for the giant garter snake under the Plan is persistence of the Natomas Basin garter snake population and contribution to long-term recovery of the species in its historical range. However, limitations to local acceptability of the Plan have been conveyed during public review of early drafts of the NBHCP. Public acceptability means a reasonable mitigation fee, limited uncertainty, general compatibility with land use plans and existing agriculture, and minimal loss of tax revenue.

The key issues between biological and local objectives balanced by the NBHCP are: (1) the proportion of mitigation land that can be maintained in rice production; and (2) the proportion of mitigation land that can be established out-of-Basin. On the biological side, the current percentage of managed marsh (25%) and out-of-Basin land (20%) allowed by the Plan may not be biologically optimal. On the local interest side, acquisition of lands in-Basin and large amounts of conversion of rice lands to marsh has a high economic cost and exacerbates the impact of urbanization on loss of productive agricultural land. However,

the NBHCP can adapt to meet changing biological circumstances through: (1) USFWS adoption of a Giant Garter Snake Recovery Plan and CDFG adoption of a Swainson's Hawk Recovery Plan (see Sections VI.H.1 and VI.H.2, respectively); (2) the Plan's Adaptive Management provisions (see Section VI.F); (3) 9,000-acre Overall Program Review as described in Section VI.I; and (4) the Land Use Permittees' Independent Mid-Point Reviews as described in Section VI.J. These provisions allow the NBHCP program to pursue alternatives of greater or lesser proportions of marsh and greater or lesser in-Basin land, and other measures if it is later demonstrated that this is biologically necessary. However, prior to acquisition of Mitigation Lands in Area B, the NBHCP TAC, including USFWS and CDFG representatives, must review and approve the acquisition. The NBHCP further stipulates conditions under which Mitigation Lands may be acquired in Area B (see Section IV.C.2.b of this NBHCP).

VIII. REFERENCES

A. BIBLIOGRAPHY

Ahl, J. S. B. 1991. "Factors Affecting Contributions of the Tadpole Shrimp, *Lepiduris packardi*, to its Over-summering Egg Reserves." *Hydrobiologia* 212: 137-143.

American Ornithologist Union. 1957. *Check-List of North American Birds*. 5th ed. Washington D.C.: American Ornithologists' Union.

Babcock, K. W. 1995. "Home Range and Habitat Use of Breeding Swainson's Hawks in the Sacramento Valley of California." *J. Raptor Res*. 29: 193-197.

Barr, C. B. 1991. *The Distribution, Habitat, and Status of the Valley Elderberry Longhorn Beetle Desmocerus californicus dimorphus*. U.S. Fish and Wildlife Service. Sacramento, California.

Beak Consultants. (Giberson, K. and B.L. Jackson). *Giant Garter Snake 1992 Field Survey Report, Vol. III, Appendix C: Habitat Evaluation and Survey Location Maps*. Prepared for Sutter Bay Associates and North Natomas Landowner Association, Inc.

_____. (Martin, D. and D. Christophel). October 1992. *Giant Garter Snake 1992 Field Survey Report*. Prepared for Sutter Bay Associates and North Natomas Landowner Association, Inc.

_____. *Giant Garter Snake 1992 Field Survey Report Volume II, Appendices A and B.*

Bechard, M. J. and J. K. Schmutz. 1995. "Ferruginous Hawk (*Buteo regalis*)." In *The Birds of North America, No. 172* (A. Poole and F. Gill, eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Bechard, M. .J. 1982. *Effect of vegetative cover on foraging site selection by Swainson's hawks in Southeastern New Mexico*. Condor 90:311-323.

Beedy, E. C., and A. Hayworth. 1991. *Breeding Status, Distribution, and Habitat Association of the Tricolored Blackbird (Agelaius tricolor), 1850-1989*. (JSA 88-187). Prepared by Jones and Stokes Associates, Inc., Sacramento, California for the U.S. Fish and Wildlife Service. Sacramento, California.

Bent, A. C. 1950 "Life Histories of North American Wagtails, Shrikes, Vireos and Their Allies." *U.S. National Museum Bulletin* 197.

Bent, A. C. 1948. "Life Histories of North American Nuthatches, Wrens, Thrashers, and Their Allies." *U.S. Natl. Mus. Bull*. 195. 475 pages.

Bent, A. C. 1942. "Life Histories of North American Flycatchers, Larks, Swallows, and Their Allies." *U.S. Natl. Mus. Bull*. 179. 555 pages.

Bent, A. C. 1938. "Life Histories of North American Birds of Prey." Part 2. *U.S. National Museum. Bulletin* 170.

Bent, A. C. 1929. "Life Histories of North American Shorebirds." Part 2. *U.S. National Museum Bulletin* 146.

Biosystems Books, Santa Cruz, California. *Life on the Edge: A Guide to California's Endangered Natural Resources, Wildlife.* 1994.

Bloom, P. H. 1980. *The Status of the Swainson's Hawk in California, 1979*. Wildlife Mgmt. Branch, Nongame Wildl. Invest., Job II-8.0. California Dept. Fish and Game. Sacramento, California.

Bloom, Peter. November 1980. *The Status of the Swainson's Hawk in California, 1979.*

Bontadelli, Pete. July 2, 1990. Letter to Mr. Raymond Barsh. *California Endangered Species Act Consultation for the American River Watershed Investigation, Preliminary Report on Impacts to State-listed Species in the Natomas Portion of the Project.*

Borcalli & Associates. June 1992. *North Natomas Landowners Association: North Natomas Comprehensive Drainage Plan Draft*.

Broderick, L. Ryan, Regional Manager, California Department of Fish and Game, *Letter to Messrs. Combs, Smith, and Edgar*, dated February 28, 1995.

Brode, John M. and George E. Hansen. January 1992. *Status and Future Management of the Giant Garter Snake (Thamnophis gigas) Within the Southern American Basin, Sacramento and Sutter Counties, California.* California Department of Fish and Game Inland Fisheries Division Endangered Species Project.

Brown, N. L., December 1996. *Endangered Species Recovery Program.* California State University, Stanislaus Foundation Biological Sciences Web Server. Http://arnica.csustan.edu/esrpp/swainson.htm.

CalFlora Database. [Online]. [Accessed 2001, August 10 and 29].

California Department of Fish and Game (CDFG). 2001. California Natural Diversity Database.

CDFG. 1995. *Staff Report on Burrowing Owl Mitigation*.

CDFG. 1994a. *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California*. Sacramento, California.

CDFG. 1994b. *1992 Annual Report on the Status of California State-listed Threatened and Endangered Animals and Plants.* Sacramento, California.

CDFG. 1992. 1991 *Annual Report on the Status of California State-listed Threatened and Endangered Animals and Plants.* Sacramento, California.

CDFG. 1990. *California's Wildlife,* November

CDFG. December 22, 1988. *Suggested Mitigation for Giant Garter Snake (GGS) Habitat Losses within North Natomas Community Plan Drainage Area.*

CDFG. 1992. *Conceptual Habitat Suitability Index Model for Swainson's Hawk.*

CDFG. 1988. *Five-year Status Report for Swainson's Hawk.*

CDFG. 1993. Southern California Coastal Sage Scrub Natural Communities Conservation Plan: Scientific Review Panel, Conservation Guidelines and Documentation. California Department of Fish and Game and the Resources Agency.

CDFG. January 24, 1994. *Revised Draft Mitigation Guidelines for the Giant Garter Snake (Thamnophis gigas).*

California Department of Conservation. *The Williamson Act 1991-1993 Report.*

California Native Plant Society. February 1994. *Inventory of Rare and Endangered Vascular Plants of California.* Fifth Edition.

California Rice Industry Association. *California Rice Statistics and related National and International Data.* Statistical Report. Third Quarter 1994.

California Rice Promotion Board. 1990. *California Rice Industry Economic White Paper.*

California Rice Promotion Board. *California Rice, Nature's Gift.*

CH2MHill. July 1,2002, *Final Report, Natomas Basin Habitat Conservation Plan: Impacts to Proposed Covered Species.*

City of Sacramento Department of Planning and Development. *North Natomas Community Plan*. May 13, 1986. Amended May 3, 1994. Adopted by City Council Resolution No. 86-348; amended by City Council Resolution No. 94-259.

City of Sacramento Department of Planning and Development. _____. March 1994. *Final Supplement to the 1986 North Natomas Community Plan EIR*.

City of Sacramento Department of Planning and Development. _____. March 1993. *Draft Supplement to the 1986 North Natomas Community Plan EIR.*

City of Sacramento Department of Public Works, Engineering Division. October 22, 1990. *Draft - Environmental Impact Report: Natomas West Assessment District Improvements.* Contributors: Jones & Stokes Associates, Inc., Omni-Means, Ltd., PAR Environmental Services, Inc., and Peak & Associates, Inc.. State Clearinghouse #89020200.

City of Sacramento. 1997a. *Natomas Basin Habitat Conservation Plan, Sacramento and Sutter Counties, California*. Published by City of Sacramento. November.

City of Sacramento, Planning and Development Department, Environmental Services Division. 1993. *Draft Supplement to the 1996 North Natomas Community Plan EIR*. State Clearinghouse No. 93012011. Sacramento, California. March.

City of Sacramento, Department of Utilities. 1996b. *Draft EIR for the North Natomas Comprehensive Drainage Plan, Levee Improvements, Canal Widening and Additional Pumping Capacity.* State Clearinghouse No. 96042030. Prepared by Jones & Stokes Associates, Inc., Sacramento, California. December.

City of Sacramento, Department of Planning and Development. 1994a. *North Natomas Community Plan.* Sacramento, California. Adopted by City Council Resolution No. 94-259, May 3.

City of Sacramento and U.S. Bureau of Reclamation. 2000. *City of Sacramento Fish Screen Replacement Project – Environmental Assessment/Initial Study, Final Report*. September. Cleary, E. C., S. E. Wright, and R. A. Dolbeer. 1999. *Wildlife Strikes to Civil Aircraft in the United States, 1990-1998*. Federal Aviation Administration Wildlife Aircraft Strike Database Serial Report Number 5. November.

County of Sacramento. December 15, 1993. County General Plan.

County of Sacramento. Ordinance No: SZC 93-0045, Metro Air Park Special Planning Area Zoning Code.

County of Sutter. October 16, 1992. *Exhibit A: Pleasant Grove Water District Boundary Description*.

Cribbs, Hal -- Cribbs and Associates, October 1994. *Background Information on the Natomas Basin, Managed Wetlands, and Hunting Programs*

DeHaven, Richard L. U. S. Fish and Wildlife Service. June 2000. *Breeding Tricolored Blackbirds in the Central Valley, California: A Quarter-Century Perspective*

Dodge, Donald M. May 27, 1993. Letter to Jerry Mensch. *Approval of Giant Garter Snake Mitigation Plan for the City's San Juan Canal and Pump Station Drainage Project.*

EIP Associates. February 13, 1992. *SAFCA. Swainson's Hawk and Giant Garter Snake Draft Habitat Conservation Plan*, Briefing Packet. Presentation to SAFCA Board of Directors.

_____. February 1992. *Executive Summary: Sacramento Area Flood Control Agency; Swainson's Hawk Giant Garter Snake Draft Habitat Conservation Plan*.

_____. February 1992. *Sacramento Area Flood Control Agency/Draft: Swainson's Hawk and Giant Garter Snake Habitat Conservation Plan*.

Eckert, A. W. 1981. *The Wading Birds of North America (North of Mexico).* Garden City, New York: Doubleday and Company, Inc.

Economic & Planning Systems, *Economic Analysis of Natomas Basin Habitat Conservation Plan*, Draft Report, November 23, 1994, Final Report, March 8, 1994. Revised Report, August 11, 1995.

Economic & Planning Systems, *Economic Analysis of Natomas Basin Habitat Conservation Plan*, Final Report, March 12, 2002, EPS # 10365.

Economic & Planning Systems, Fee Reports -: NBHCP Fee Update -- 2002; EPS #12461, April 25, 2002

Eng, L. L., D. Belk, and C. H. Eriksen. 1990. "California Anostraca: Distribution, Habitat and Status." *Journal of Crustacean Biology* 10 (2): 247-277.

Estep, J. A. 1984. Diurnal Raptor Eyrie Monitoring Program. (Project W-65-R-1, Job No. 11-2.0). California Department of Fish and Game, Nongame Wildlife Investigations. Sacramento, California.

Estep, James A. 1989. *Biology, Movements, and Habitat Relationships of the Swainson's Hawk in the Central Valley of California, 1986-87*. California Department of Fish and Game, Nongame Bird and Mammal Section Report.

Estep, James A. *Nesting Swainson's Hawks in the Natomas Basin Habitat Conservation Plan Area 2000 Annual Survey Results.* Swainson's Hawk Technical Advisory Committee. September 2000.

Estep, James A. *Nesting Swainson's Hawks in the Natomas Basin Habitat Conservation Plan Area 2000 Annual Survey Results.* Swainson's Hawk Technical Advisory Committee. 2001.

Federal Aviation Administration. 1997. *Subject: hazardous wildlife attractants on or near airports.* Advisory Circular dated May 1, 1997. 10 pp. plus appendix.

Fredrickson, L. H. and B. D. Dugger. *Management of Wetlands at High Altitudes in the Southwest*. The School of Natural Resources, University of Missouri. October 1993.

Fitch, H. S. 1940. "A Biogeographical Study of the Ordinoides Artenkreis of Garter Snakes (genus *Thamnophis*)." *University of California Publications in Zoology*, 44 (1): 1-50 + plates.

Fugro-McClelland (West), Inc. May 1993. *Final Environmental Impact Report for the Revised Natomas Area Flood Control Improvement Project*. Project No. 9351-8507. Prepared for Sacramento Area Flood Control Agency.

_____. March 1993. *Volume I Final Environmental Impact Report for The Metropolitan Airport/Vicinity Special Planning Area General Plan Amendment and Rezone. No. 89-GPB-ZOB-0781. (Vol. I: Final EIR; Vol. II: Appendices)*. State Clearinghouse No. 92032074. Prepared for the County of Sacramento Department of Environmental Review and Assessment.

_____. March 1993. *Volume II Final Environmental Impact Report for The Metropolitan Airport/Vicinity Special Planning Area General Plan Amendment and Rezone No. 89-GPB-ZOB-0781. (Vol. I: Final EIR; Vol. II: Appendices)*. State Clearinghouse No. 92032074. Prepared for the County of Sacramento Department of Environmental Review and Assessment.

Gaines, D. 1974. "The Birds of Yolo." *California Syllabus*. Oakland.

Garrett, K., and J. Dunn. 1981. "Birds of Southern California." *Los Angeles Audubon Society*.

Gibbs, J. P., F. A. Reid, and S. M. Melvin. 1992. "Least Bittern (*Ixobrychus exilis*)." In *The Birds of North America, No. 17* (A. Poole and F. Gill, eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Grinnell, J., and Miller, A. H. 1944. "The Distribution of the Birds of California." *Pacific Coast Avifauna* No. 27.

Hall, Thomas (U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control). January 1996. *Sacramento International Airport Wildlife Hazard Management Plan.* Sacramento County Department of Airports.

Hansen, G. E. 1993. *Survey and Analysis of the Giant Garter Snake (Thamnophis couchii gigas), the Western Pond Turtle (Clemmys marmorata), the California Red-legged Frog (Rana aurora draytoni), and the Foothill Yellow-legged frog (Rana boylei) in the Bear Creek Unit of the Merced County Streams Project, California.* (Contract Purchase Order No. DACW05-92-P1766). Prepared for the U.S. Army Corps of Engineers. Sacramento, California.

Hansen, R. W. 1980. Western Aquatic Garter Snakes in Central California: An Ecological and Evolutionary Perspective. MA Thesis. California State University, Fresno, California. 78 pages.

Hansen, George E. and John M. Brode. 1992a. *Results of Relocating Canal Habitat of the Giant Garter Snake (Thamnophis gigas*) During Widening of State Route 99/70 in Sacramento and Sutter Counties, California. Final Report for Caltrans Interagency Agreement 03E325 (FG7550) (FY 87/88-91/92).

Hansen, George E. and John M. Brode. 1992b. *An Evaluation of the Time and Conditions Required for Newly Constructed Waterways to Become Suitable Habitat for the Giant Garter Snake (Thamnophis gigas)*. Unpubl. Rep. dated May 1992. 33 pp. plus appendices.

Hansen, George E. 1988. *Review of the status of giant garter snake and its supporting habitat during 1986-1987*.

Hansen, George E. and John M. Brode. 1980. *Status of the giant garter snake, Thamnophis gigas (Fitch)*. California Department of Fish and Game, Inland Fisheries Endangered Species Program. Special Publication 80-5 dated September 1980.

Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. "Burrowing Owl (*Speotyto cunicularia*)." In *The Birds of North America*, No. 61. Eds. A. Poole and F. Gill. Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Helm, B. P. 1998. "Biogeography of Eight Large Brachiopods Endemic to California." In *Ecology, Conservation, and Management of Vernal Pool Ecosystems*, eds. C. W. Witham, E. T. Bauder, D. Balk, W. R. Ferren Jr., and R. Ornduff, Pp 124-139. Sacramento: California Native Plant Society.

Heitmeyer, M.E., California Waterfowl Association, Sacramento, CA. May 1989. *Agriculture/Wildlife Enhancement in California: The Central Valley Habitat Joint Venture*.

Hickman, James. 1990. *The Jepson Manual Higher Plants of California*. University of California Press.

Holland, D. C., and R. B. Bury. Status of the Western Pond Turtle (*Clemmys marmorata*) in 1991. Prepared for presentation at the Western Section, Wildlife Society 1992 annual meeting in San Diego, California. February 5-8, 1992.

Holt, D. W. and S. M. Leasure. 1993. "Short-Eared Owl (*Asio flammeus*)." In *The Birds of North America, No. 62* (A. Poole and F. Gill, eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

James, A. H. 1977. "Sandhill Cranes Breeding in Sierra Valley, California." *Western Birds* 8: 159-160.

Jennings, M. R., and M. P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California*. California Department of Fish and Game, Inland Fisheries Division. Rancho Cordova, CA.

Johnsgard, P.A. 1990. *Hawks, eagles, and falcons of North America*. Smithsonian Institution Press, Washington, DC

Kaufman, K. 1996. *Lives of North American Birds*. Haughton Mifflin Company, Boston, MA. 675 pages.

Kelly, J. R., M. K. Laubhan, F. A. Reid, J. S. Wortham, and L. H. Fredrickson, in Waterfowl Management Handbook, *Leaflet 13.4.8. Options for Water-level Control in Developed Wetlands*. 1993.

Kennedy, E. D. and D. W. White. 1997. "Bewick's Wren (*Thryomanes bewickii*)." In *The Birds of North America, No. 315* (A. Poole and F. Gill, eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Leidy, G.R. October 1992. (Pacific Environmental Consultants). *Ecology, Status and Management of the Giant Garter Snake (Thamnophis gigas)*. Prepared for Sutter Bay Associates and the North Natomas Landowners Association, Inc.

May and Associates. 2001. Biological Resource Mapping of the Natomas Basin. Prepared for City of Sacramento, NPDS Department. Sacramento, California. August.

McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. *Birds of Northern California, an Annotated Field List*. 2nd ed. Golden Gate Audubon Society, Berkeley.

Metro Air Park Property Owners Association. 2000. *Draft Habitat Conservation Plan for the Metro Air Park Project in the Natomas Basin, Sacramento County, California*. Prepared by Metro Air Park Property Owners' Association. Palo Alto, California. November.

Miller, M.R., Sharp, D.E., Gilmer, D.S. (California Department of Fish and Game), and Mulvaney, W.R. (U.S. Fish and Wildlife Service). March 1989. *Rice Available to Waterfowl in Harvested Fields in the Sacramento Valley, California*. California Department of Fish and Game # 75(2):113-123, 1989

Moyle, P.B. and E.D. Wikramanayake. October 1989. *Fish Species of Special Concern of California*. Department of Wildlife & Fisheries Biology, University of California, Davis. Final Report Submitted to the State of California, The Resources Agency, Department of Fish and Game, Inland Fisheries Division, Rancho Cordova. Contract No. 7337.

Natomas Basin Conservancy. 2000. *Site-specific Management Plans for the Natomas Basin Conservancy's Mitigation Lands, Sacramento and Sutter Counties, California*. Prepared by Wildlands, Inc., Citrus Heights, California for The Natomas Basin Conservancy, Sacramento, California. July.

New, Ilson. 1995. Set Wings, Inc., *Letter to Harold C. Cribbs*, dated January 11, 1995.

Nussbaum, R. A., E. D. Brodie, Jr., and R. M. Storm. 1983. *Amphibians and Reptiles of the Pacific Northwest*. Moscow, ID: University of Idaho Press.

Pacific Environmental Consultants. 1992. *Ecology, Status and Management of the Giant Garter Snake (Thamnophis gigas)*.

_____. March 11, 1994. Letter to U.S. Army Corps of Engineers Regulatory Branch (Attn: Tom Kavanaugh). Subject: "Endangered Species Act Consultation on the Revised Natomas Area Flood Control Improvement Project (PN 199200719) in Sacramento and Sutter Counties, California."

The Planning Center. July 31, 1991. *South Sutter County General Plan Amendment Draft Environmental Impact Report*. SCH. No. 90030904. Prepared for Sutter County Planning Department. Contact: Peter Bridges.

Remson, Jr., J. V. 1978. *Bird Species of Special Concern in California*. California Department of Fish and Game, Sacramento. Wildlife Management Administration. Report No. 78-1.

Ryder, R. R. and D. E. Manry. 1994. "White-faced Ibis (*Plegadis chihi*)." In *The Birds of North America, No. 130* (A. Poole and F. Gill, eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Sacramento County. 2000. *Draft EIR for the General Plan Amendment for Long-term Planning in North Natomas or Other Appropriate Areas*. State Clearinghouse No. 1999022071. Prepared by County of Sacramento, Department of Environmental Review and Assessment. Sacramento, California. November.

Sacramento County Airport System (SCAS). 2001. Response to Notice of Preparation of Environmental Impact Statement/Environmental Impact Report (EIR/EIS) for the Natomas

Schaaf & Wheeler, Consulting Civil Engineers. February 1994. *Reconnaissance-Level Report: South Sutter County Flood Control Alternatives*. Prepared for Sacramento Area Flood Control Agency.

Schlorff, R. W., and P. H. Bloom. 1984. "Importance of Riparian Systems to Nesting Swainson's Hawks in the Central Valley of California." In *California Riparian Systems - Ecology, Conservation, and Productive Management*. (R. E. Warner and K. M. Hendrix, eds.) Berkeley: University of California Press. 612-618.

Shuford, W. D., C. M. Hickey, R. J. Safran, and G. W. Page. 1996. "A Review of the Status of White-Faced Ibis in Winter in California." *Western Birds.* 27: 169-196.

Skinner, Mark W., and Bruce M. Pavlic. 1994. *Inventory of Rare and Endangered Vascular Plants of California*. 5th ed. California Native Plant Society. [6th ed., electronic update.]

Smith, E. L., and K. C. Kruse. 1992. "The Relationship Between Land-use and the Distribution and Abundance of Loggerhead Shrikes in South-central Illinois." *Journal of Field Ornithology* 63:420-427.

Smith, Richard, Deputy Director, Fish and Wildlife Service, *Memorandum to Regional Directors 1, 2, 3, 4, 5, 6, and 7 and Assistant Director of Ecological Services*, dated September 14, 1994

Smith, W. David, Rollins, Glenn L., and Shinn, Richard L. *A Guide to Wetland Habitat Management in the Central Valley*. A Cooperative Effort. California Department of Fish and Game and California Waterfowl Association.

Stebbins, R. C. 1972. *California Amphibians and Reptiles*. Berkeley, CA: University of California Press.

Stone, R. D., W. B. Davilla, D. W. Taylor, G. L. Clifton, and J. C. Stebbins. 1988. *Status Survey of the Grass Tribe Orcuttieae and Chamaesyce hooverii (Euphorbiacea) in the Central Valley of California*. Biosystems Analysis, Inc. Tiburon, California. Prepared for the U.S. Fish and Wildlife Service, Endangered Species Office. Sacramento, California.

Strong, M.A. March 1991. Prepared by the Department of the Interior, U.S. Fish and Wildlife Service, Region 1, Sacramento, California. *Environmental Assessment/ Proposed, North Central Valley Wildlife Management Area: Tehama, Butte, Clenn, Colusa, Yuba, Sutter, Placer, Yolo, Solano, Contra Costa, and San Joaquin Counties, California, a component of the North American Waterfowl Management Plan's Central Valley Habitat Joint Venture*.

Sutter County Community Services Department. October 2001. *Draft Environmental Impact Report*. SCH. No. 2001032086. Contact: Tom Last.

Sutter County Community Services Department. August 1996. *General Plan 2015 Final Environmental Impact Report*. SCH. No. 96012026. Contact: Tom Last.

Sutter County Community Services Department. November 25, 1996. *General Plan 2015 Policy Document*.

Sutter County Community Services Department. October 2001. *Draft South Sutter County Specific Plan. Volume I.*

Swainson's Hawk Technical Advisory Committee (SHTAC). 2001. Nesting Swainson's Hawks (*Buteo swainsoni*) in the Natomas Basin Habitat Conservation Plan Area. *2001 Annual Survey Results.* Prepared for the Natomas Basin Conservancy. Sacramento, California.

SHTAC. 2000. Nesting Swainson's Hawks (*Buteo swainsoni*) in the Natomas Basin Habitat Conservation Plan Area. *2000 Annual Survey Results.* Prepared for the Natomas Basin Conservancy. Sacramento, California.

U.S. Army Corps of Engineers, Sacramento District, South Pacific Division. December 1991. *Feasibility Report Appendices: American River Watershed Investigation, California, Vol. 6 - Appendix S, Part I.*

_____. December 1991. *Feasibility Report Appendices: American River Watershed Investigation, California, Vol. 7 - Appendix S, Part 2.*

U.S. Department of the Interior, Fish and Wildlife Service. February 1991. *American River Watershed Investigation, a detailed report on Fish and Wildlife Resources.*

U.S. Department of the Interior, Fish and Wildlife Service. *Preliminary Draft Handbook for Habitat Conservation Planning and Incidental Take Permit Processing*. Sept. 15, 1994.

U.S. Fish and Wildlife Service. 1991. *Sacramento River Swainson's hawk nesting population study, 1990*. Unpubl. Rep. dated June 1991. Fish and Wildlife Enhancement Field Office, Sacramento, California. 59 pp.

U.S. Fish and Wildlife Service. 1993. *Sacramento River Swainson's hawk nesting population study, 1991*. Unpubl. Rep. dated February 1993. Fish and Wildlife Enhancement Field Office, Sacramento, California. 64 pp.

U.S. Fish and Wildlife Service. 1994a. *Final Rule on Determination of Endangered Status for the Conservancy Fairy Shrimp, Longhorn Fairy Shrimp, and the Vernal Pool Tadpole Shrimp; and Threatened Status for the Vernal Pool Fairy Shrimp,* Federal Register Volume 59, Number 180, Monday Sept. 19, 1994.

U.S. Fish and Wildlife Service. 1994b. *Sacramento River Swainson's hawk nesting population study, 1992*. Unpubl. Rep. dated April 1994. Fish and Wildlife Enhancement Field Office, Sacramento, California. 70 pp.

U.S. Fish and Wildlife Service. 1999. *Draft Recovery Plan for the Giant Garter Snake (Thamnopsis gigas).* U. S. Fish and Wildlife Service, Portland, Oregon. ix+ 192 pp.

U.S. Fish and Wildlife Service (USFWS). 2001. *Final Environmental Impact Statement for the Metro Air Park Habitat Conservation Plan.* Sacramento, California. July.

U.S. Fish and Wildlife Service (USFWS). 1999. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle*. Updated July 9.

U.S. Fish and Wildlife Service (USFWS). 1997a. *Environmental Assessment for the Issuance of an Incidental Take Permit Under Section 10(a)(1)(B) of the Endangered Species Act for the Natomas Basin Habitat Conservation Plan*. Sacramento, California. June.

U.S. Fish and Wildlife Service (USFWS). 1997b. *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relative Small Effects on the Giant Garter Snake within Butte, Colusa,Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California*. Sacramento Fish and Wildlife Office. November.

U.S. Fish and Wildlife Service (USFWS) 1996b. *Programmatic Formal Endangered Species Act Consultation on Issuance of 404 Permits for Projects with Relatively Small Effects on Listed Vernal Pool Crustaceans Within the Jurisdiction of the Sacramento Field Office, California.* Sacramento, California. February 28, 1996.

U.S. Fish and Wildlife Service (USFWS). 1991b. *Aleutian Canada Goose Recovery Plan*. U.S. Fish and Wildlife Service, Anchorage, Alaska.

U.S. Fish and Wildlife Service (USFWS). 1984. *Recovery Plan for the Valley Elderberry Longhorn Beetle*. Endangered Species Program. Portland, Oregon.

U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). 1996. *Habitat Conservation Planning Handbook*. November.

University of California Agricultural Issues Center. April 1994. *Maintaining the Competitive Edge in California's Rice Industry (Revised).*

University of California Cooperative Extension. 1992. *Sample Costs to Produce Rice in Sutter, Yuba, Placer and Sacramento Counties.*

University of California Cooperative Extension. Division of Agricultural and Natural Resources. *Rice Irrigation Systems for Tailwater Management*

USA Rice Council. *Facts About USA Rice*.

Western Ecological Services Company, Inc. (WESCO). December 10, 1991. *Environmental Attributes of Rice Cultivation in California*. Prepared for California Rice Promotion Board. CRPB 9001.

Western Ecological Services Company, Inc. (WESCO). May 1992. *Special Status Wildlife Species Use of Rice Cultivation Lands in California's Central Valley*. CRIA 9201.

The Wildlife Society, Chapter 14, *Habitat Manipulation Practices* (¥oakum, J., and Dasmann, W.P.). 1969. Pages: 215-221.

Wylie, Glenn D. U.S. Geological Survey. *Investigations of Giant Garter Snakes in the Natomas Basin: 2000 Field* Season. December 21, 2000.

Wylie, G. D. and M. L. Casazza. 2000. *Investigations of Giant Garter Snakes in the Natomas Basin: 1998-1999.* USGS, Western Ecological Research Center, Dixon Field Station. Dixon, California.

Wylie, G. D., M. Cassaza, and J. K. Daugherty. 1997. *1996 Progress Report for the Giant Garter Snake Study*. Preliminary report, U.S. Geological Survey, Biological Resources Division.

Zeiner, D. C., W. F. Laudenslayer, and K. E. Mayer, eds. 1988. *California's Wildlife. Vol. I. Amphibians and Reptiles*. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game. Sacramento, CA.

Zeiner, D. C., W. F. Laudenslayer, K. E. Mayer, and M. White, eds. 1990a. *California's Wildlife. Volume III. Mammals*. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game. Sacramento, CA.

Zeiner, D. C., W. F. Laudenslayer, K. E. Mayer, and M. White, eds. 1990b. *California's Wildlife. Vol. II. Birds*. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game. Sacramento, CA.

B. PERSONS AND ORGANIZATIONS CONSULTED

Congressman Vic Fazio

Congressman Robert Matsui

Colette Johnson-Schulke

Law Offices of Gregory D. Thatch
- Greg Thatch
- Michael Devereaux

U.S. Fish and Wildlife Service
- Cay Goude
- Mike Horton
- William Lehman
- Steve Morey
- Peter Sorenson
- Tara Wood
- Kelly Hornaday
- Lori Rinek
- Vicki Campbell
- Wayne White

U.S. Department of the Interior
- Lynn Cox
- Regular Solicitor

National Biological Survey
- Tim Graham
- Glenn Wylie

U.S. Army Corps of Engineers
- Tom Cavanaugh

California Department of Fish and Game
- Dave Zezulak
- John Brode
- Edward Ohara
- Terry Roscoe
- Jeff Finn

Jenny Marr
John Mattox

City of Sacramento
Terry Moore
Bill Carnazzo
Carol Shearly
Thomas Lee
Grace Hovey

Sacramento County Metropolitan Airport
Larry Kozub
Rob Leonard
John Febo

Sutter County
Larry Combs
Rich Hall
Jeff Pemstein
Paul Junker

Natomas Central Mutual Water Company
Peter Hughes

Reclamation District No. 1000
Jim Clifton

Metro Air Park
Bob Klagge
Gerry Kamilos

Cribbs and Associates
Hal Cribbs

Remy-Thomas
Tina Thomas

AKT Development
Eleni Tsakopoulos

Pacific-Teal Development

Terry Teeple

Bennett Brothers Ranch
Frank Bennett

Montna Farms
Alfred Montna

California Rice Industry
Robert Herkert
Kati Buehler

Ducks Unlimited, Inc.
Fredreric A. Reid, Ph.D.

National Audubon Society
Glen Olson

Set Wings, Ltd.
Ilson New

Downey, Brand, Seymour & Rohwer
Patrick Mitchell
Wendy Anderson

Swainson's Hawk Technical Advisory Committee
Jim Estep

U.S. Geological Survey
Glenn D. Wylie

Jones and Stokes
Jim Estep

Morrison and Foerster
Alicia Guerra
Clark Morrison

Planning and Dynamics Group
Trish Davey

C. REPORT PREPARERS

1. Document Revision and Preparation

Pacific Municipal Consultants
10411 Old Placerville Road, Suite 210
Sacramento, CA 95827
Tel: (916) 361-8384
Fax: (916) 361-1574

City of Sacramento
1231 I Street, Room 300
Sacramento, CA 95816
Tel. (916) 264-5381
Fax: (916) 264-0151

Planning Dynamics Group
2576 6th Avenue
Sacramento, CA 95818

2. Public Review and Agency Coordination

City of Sacramento
Sutter County

3. Technical Analysis

2001:
CH2MHill
Jim Estep
Glenn Wylie

1997:
Thomas Reid Associates

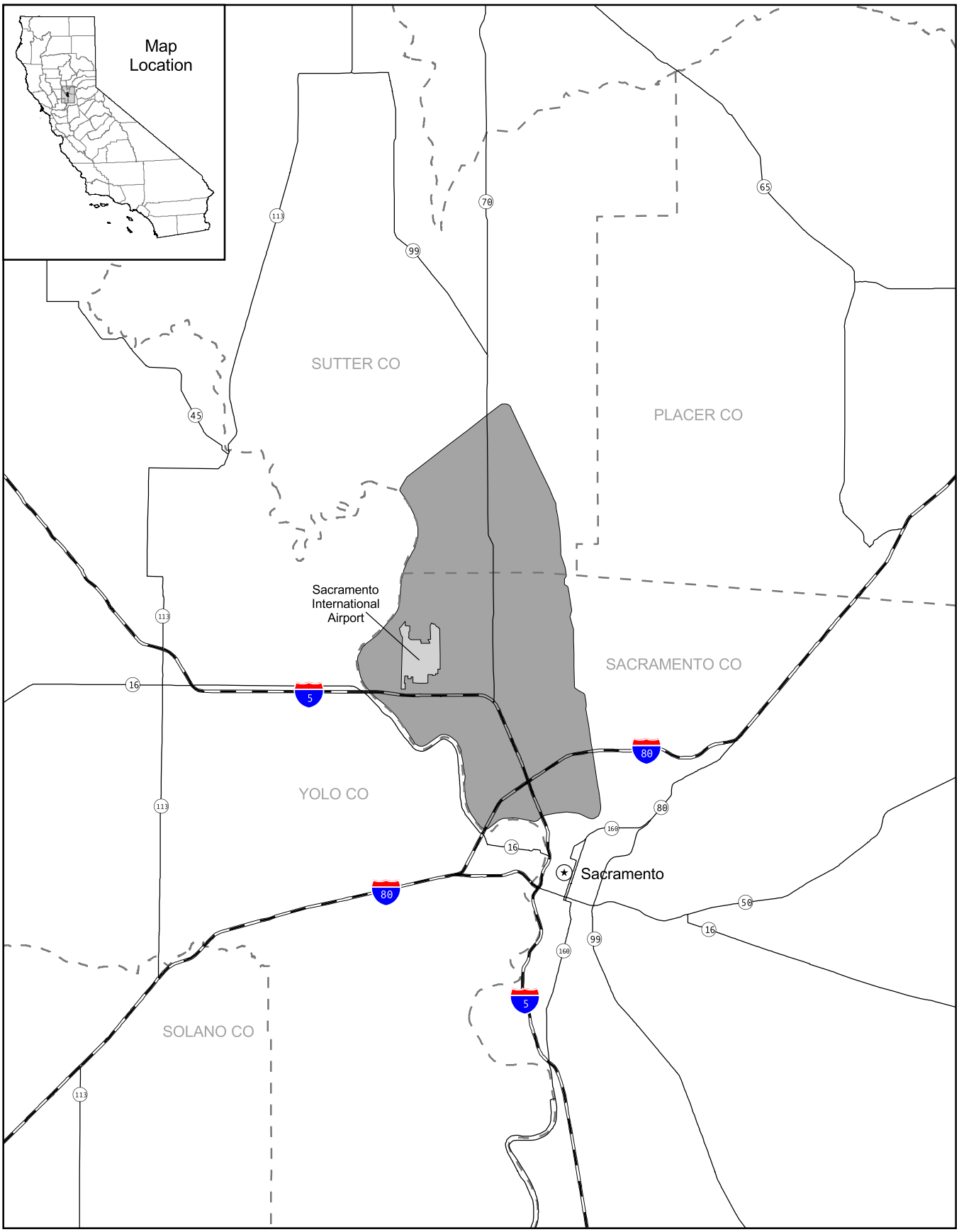
4. Biological Consultant

May and Associates
Loran May
Brent Helm

5. Economic Analysis

Economic and Planning Systems
1750 Creekside Oaks Drive, Suite 290
Sacramento, CA 95833-3640
Tim Youmans
Georgette Lorenzen

Figures



LEGEND

Natomas Basin

N

0 5 Miles

1 Inch = 5 Miles

FIGURE 1
REGIONAL LOCATION
REVISED NATOMAS BASIN HCP

CH2MHILL

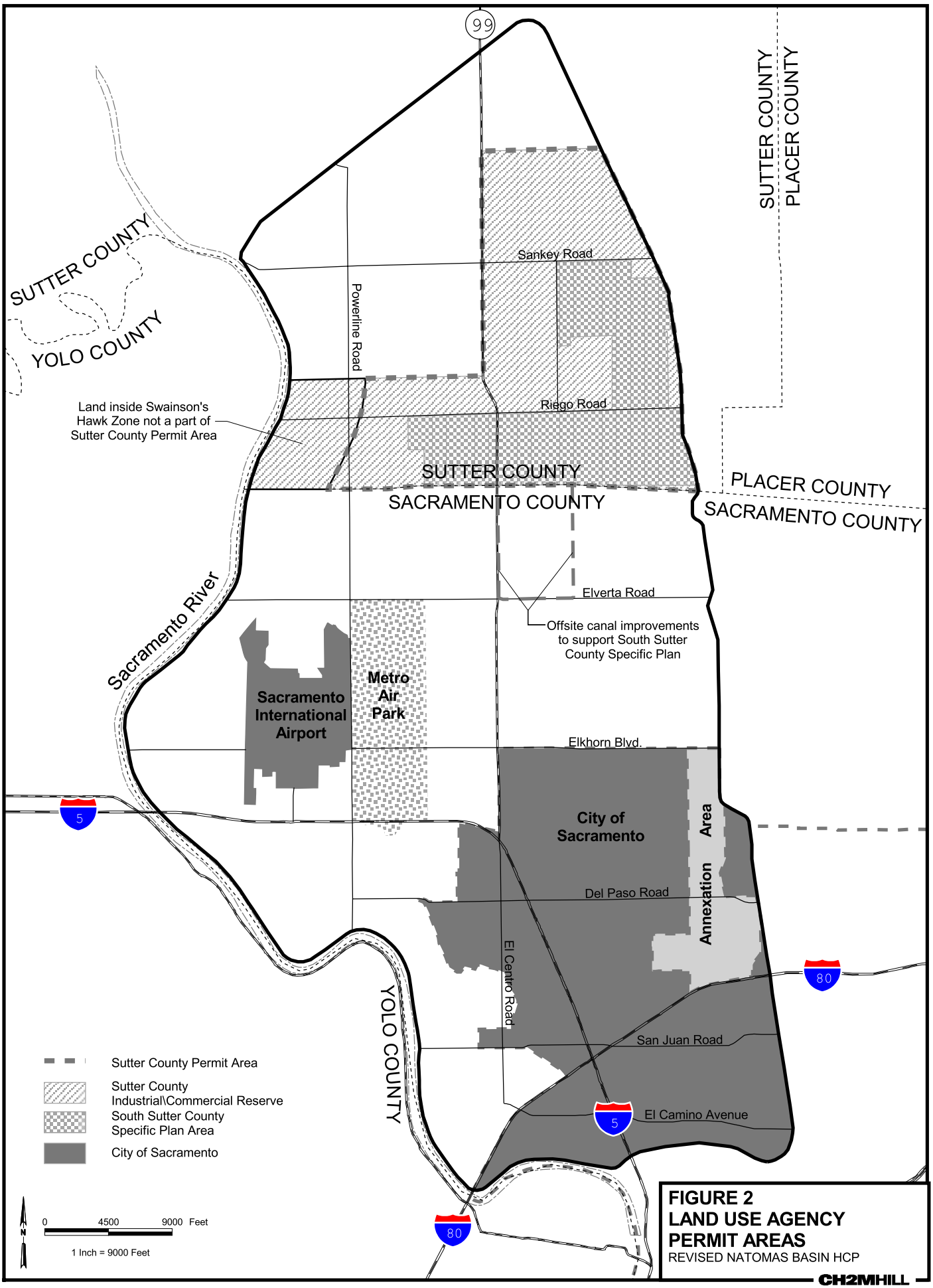


FIGURE 2
LAND USE AGENCY PERMIT AREAS
REVISED NATOMAS BASIN HCP

CH2MHILL

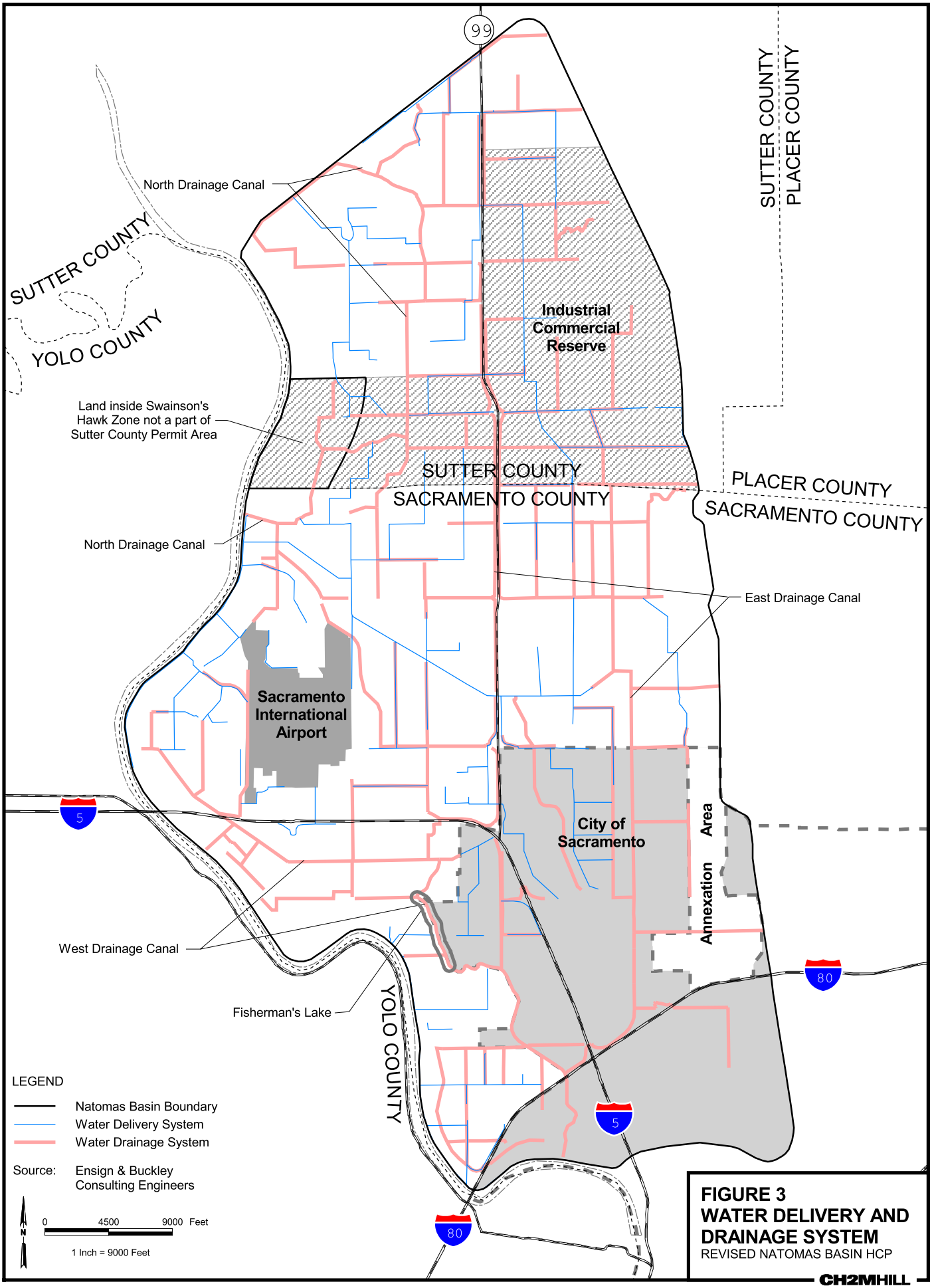


FIGURE 3
WATER DELIVERY AND DRAINAGE SYSTEM
REVISED NATOMAS BASIN HCP

CH2MHILL

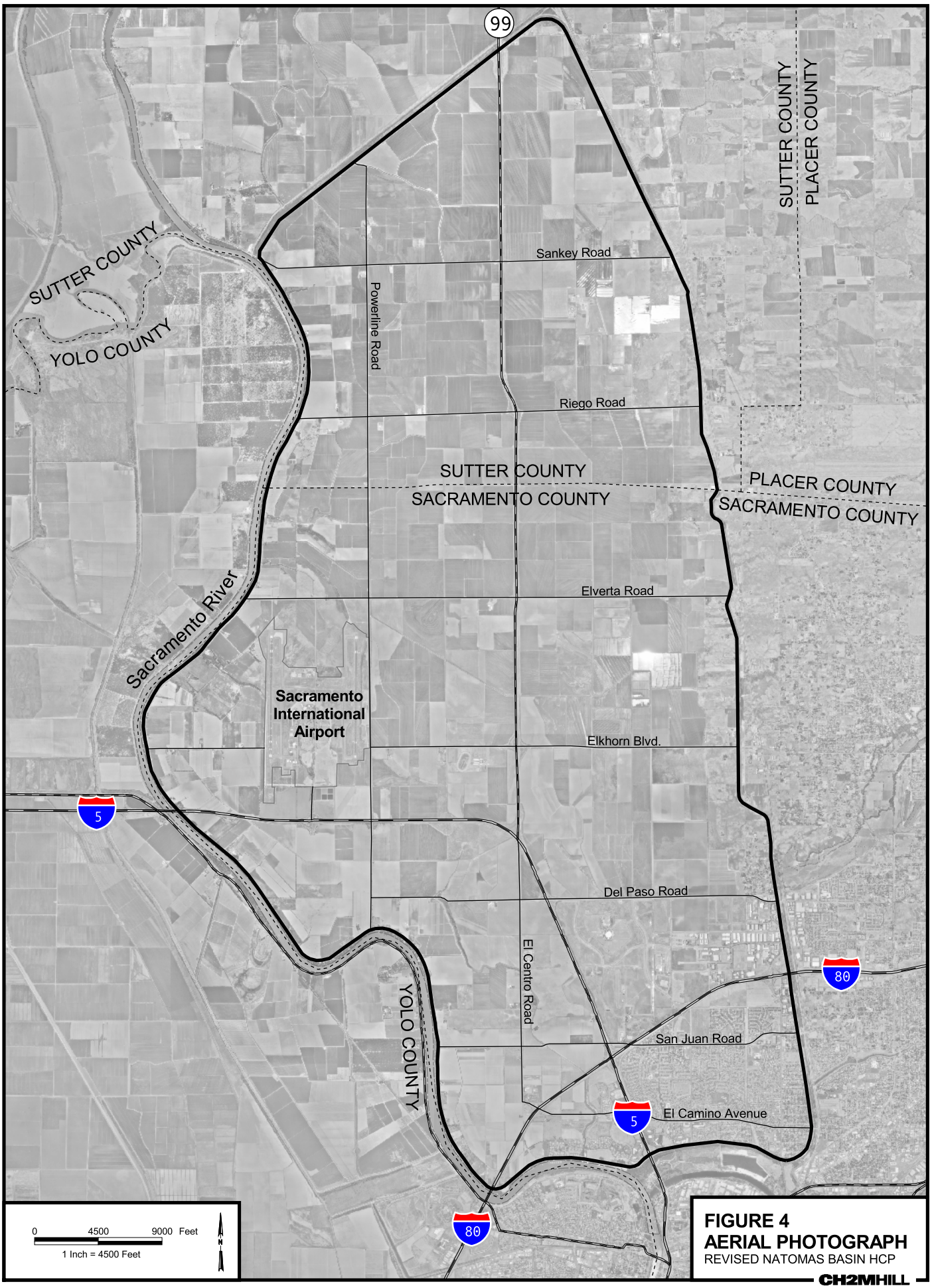
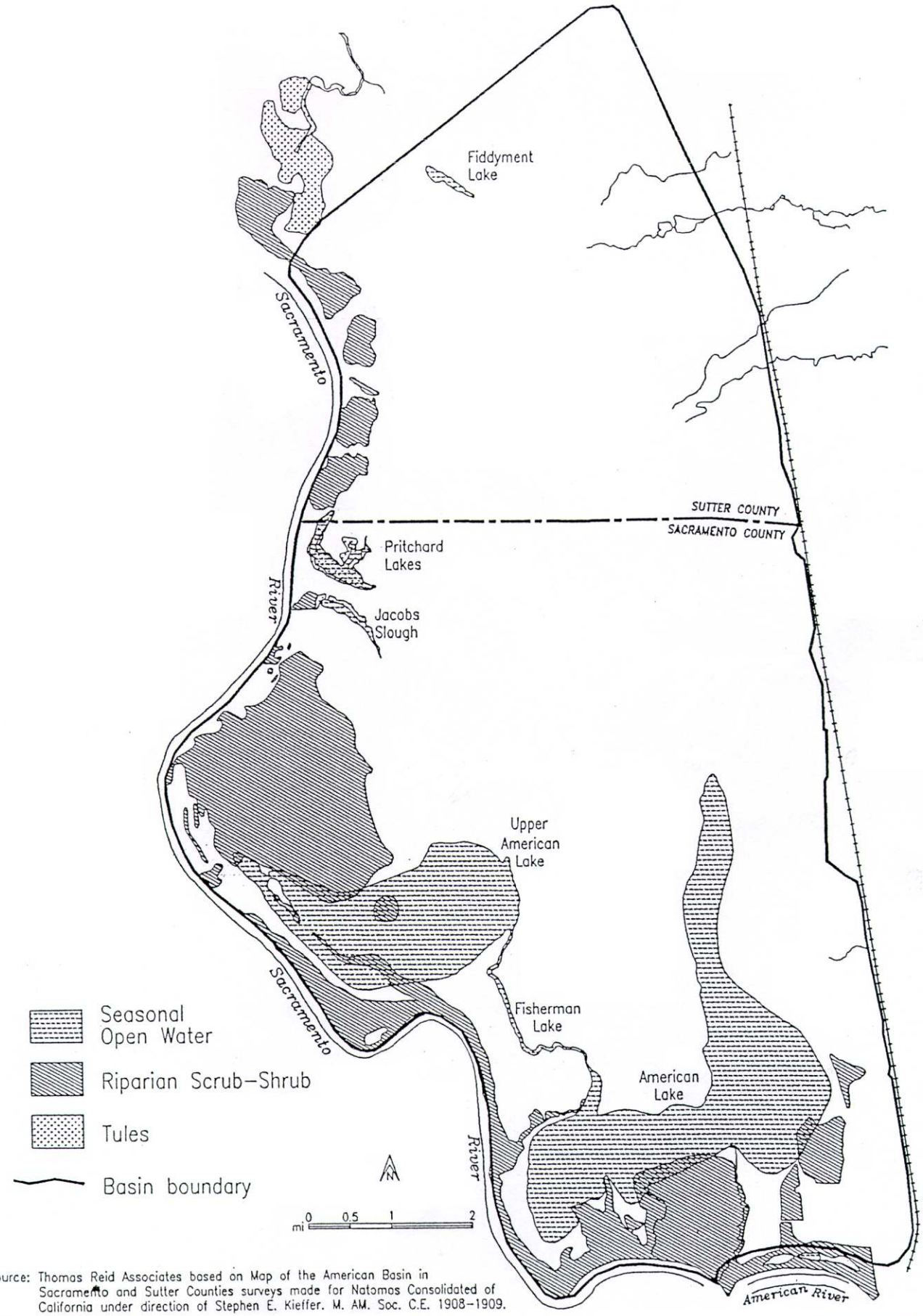


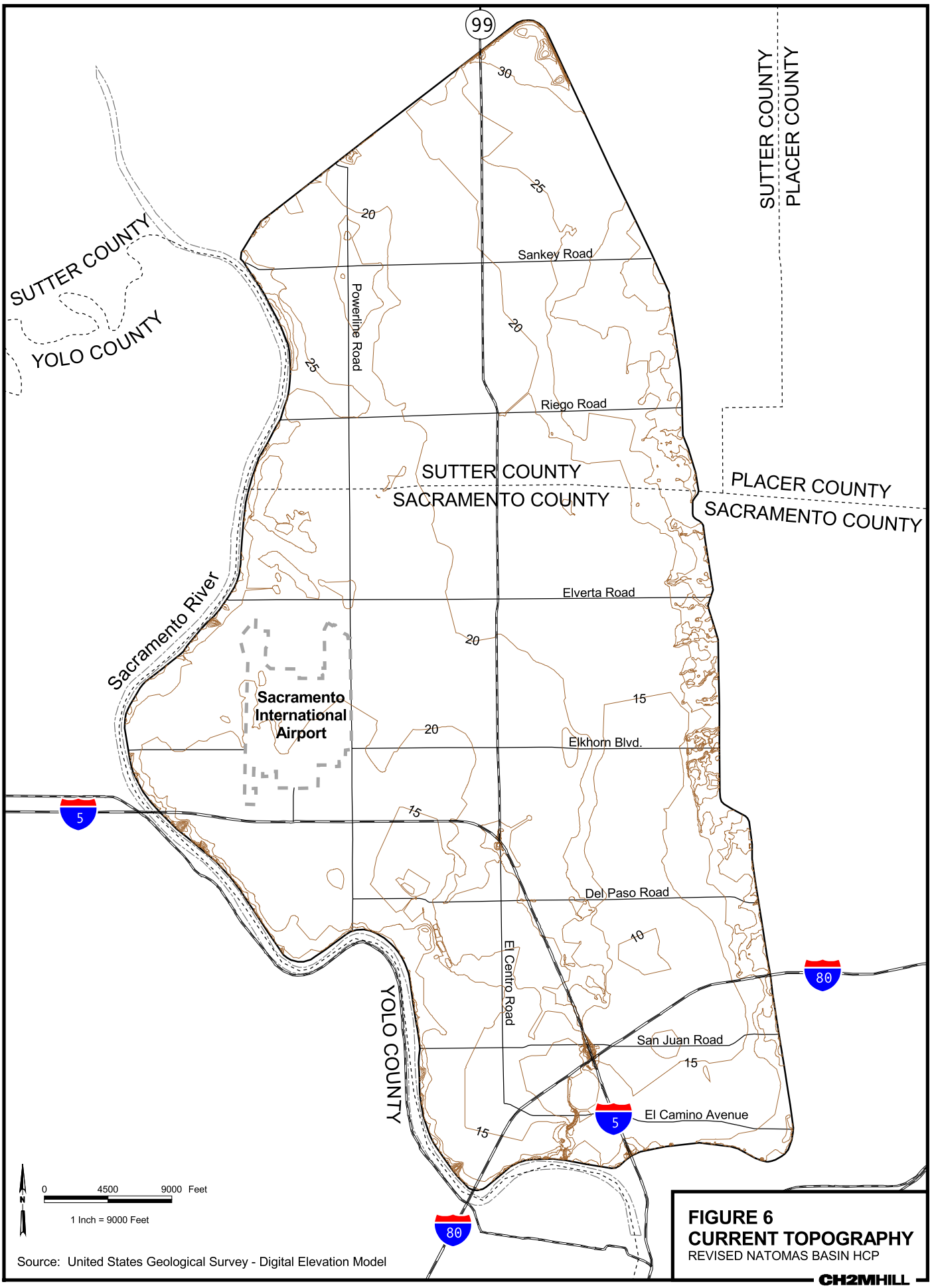
FIGURE 4
AERIAL PHOTOGRAPH
REVISED NATOMAS BASIN HCP

CH2MHILL



Source: Thomas Reid Associates based on Map of the American Basin in Sacramento and Sutter Counties surveys made for Natomas Consolidated of California under direction of Stephen E. Kieffer. M. AM. Soc. C.E. 1908–1909.

FIGURE 5
1908 LAND COVER
REVISED NATOMAS BASIN HCP



Source: United States Geological Survey - Digital Elevation Model

FIGURE 6
CURRENT TOPOGRAPHY
REVISED NATOMAS BASIN HCP

CH2MHILL

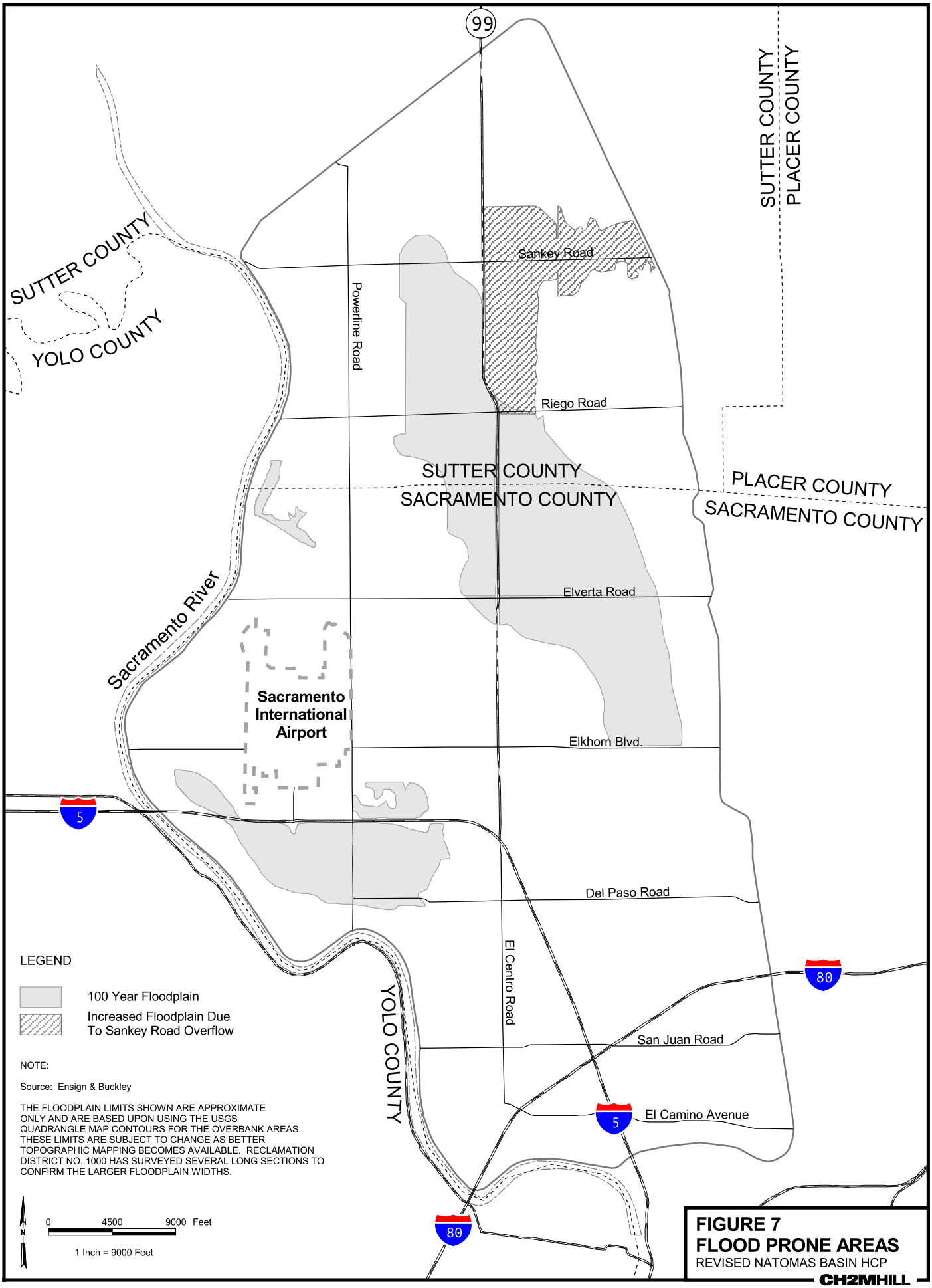
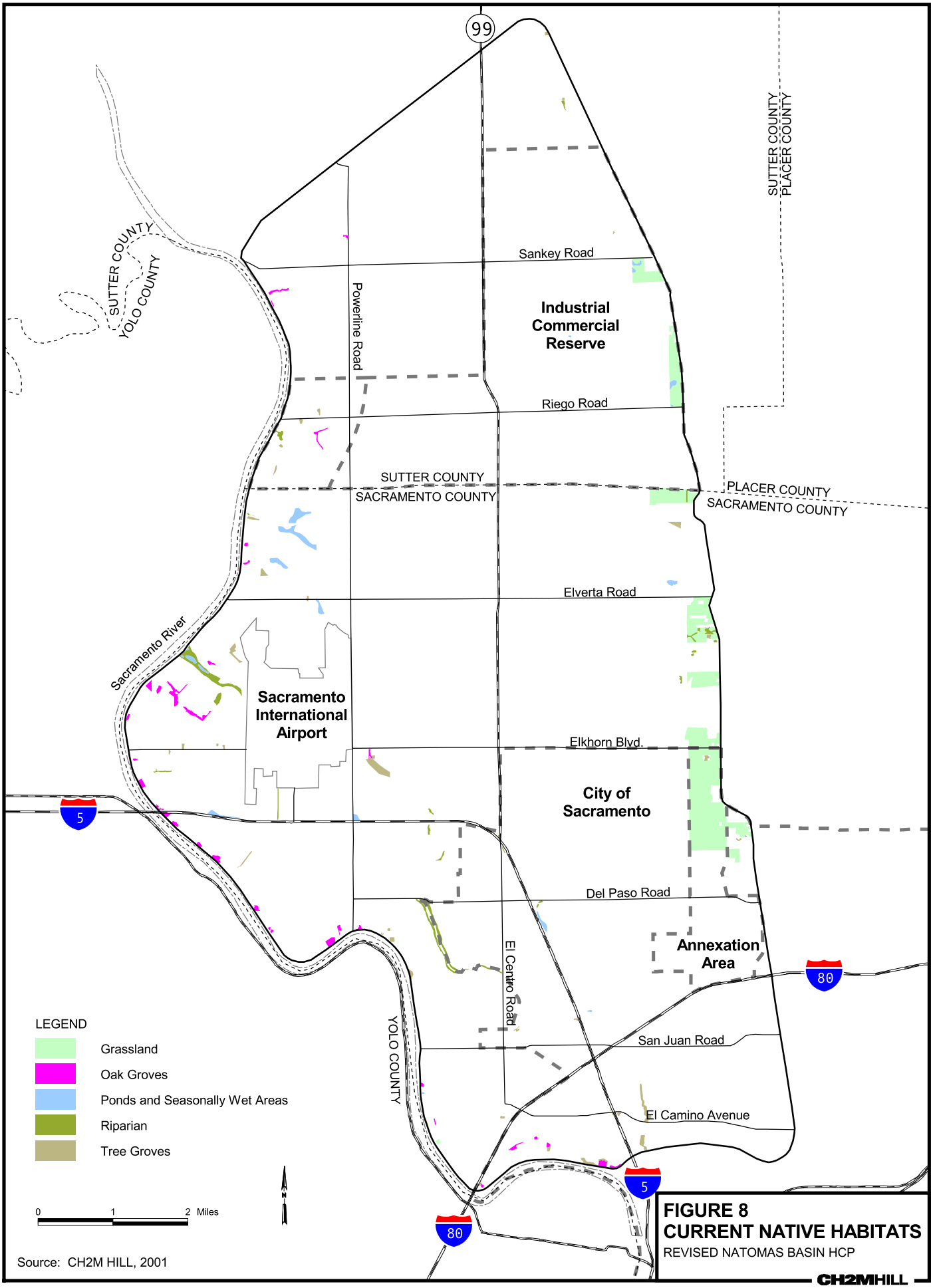


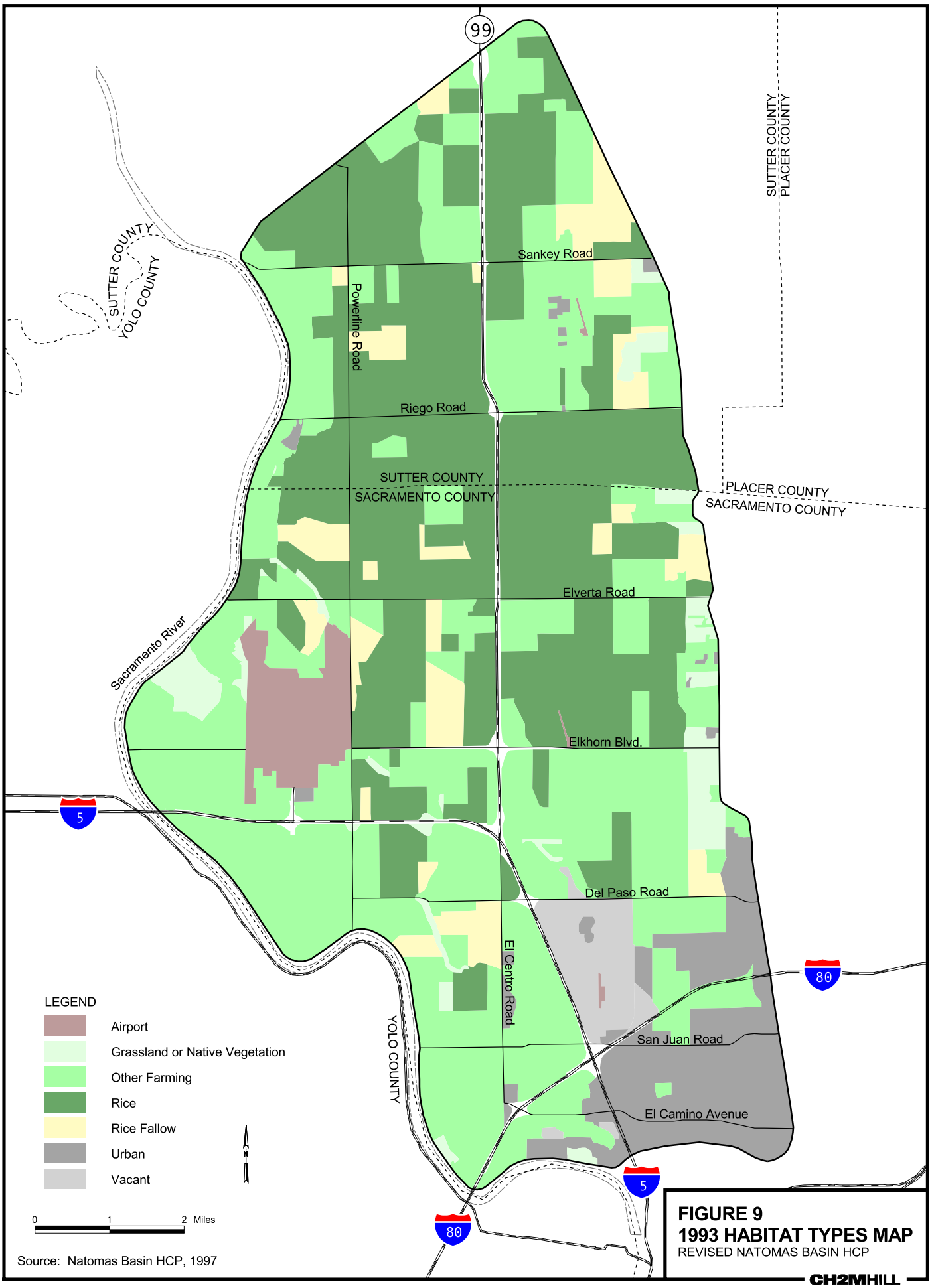
FIGURE 7
FLOOD PRONE AREAS
REVISED NATOMAS BASIN HCP



Source: CH2M HILL, 2001

FIGURE 8
CURRENT NATIVE HABITATS
REVISED NATOMAS BASIN HCP

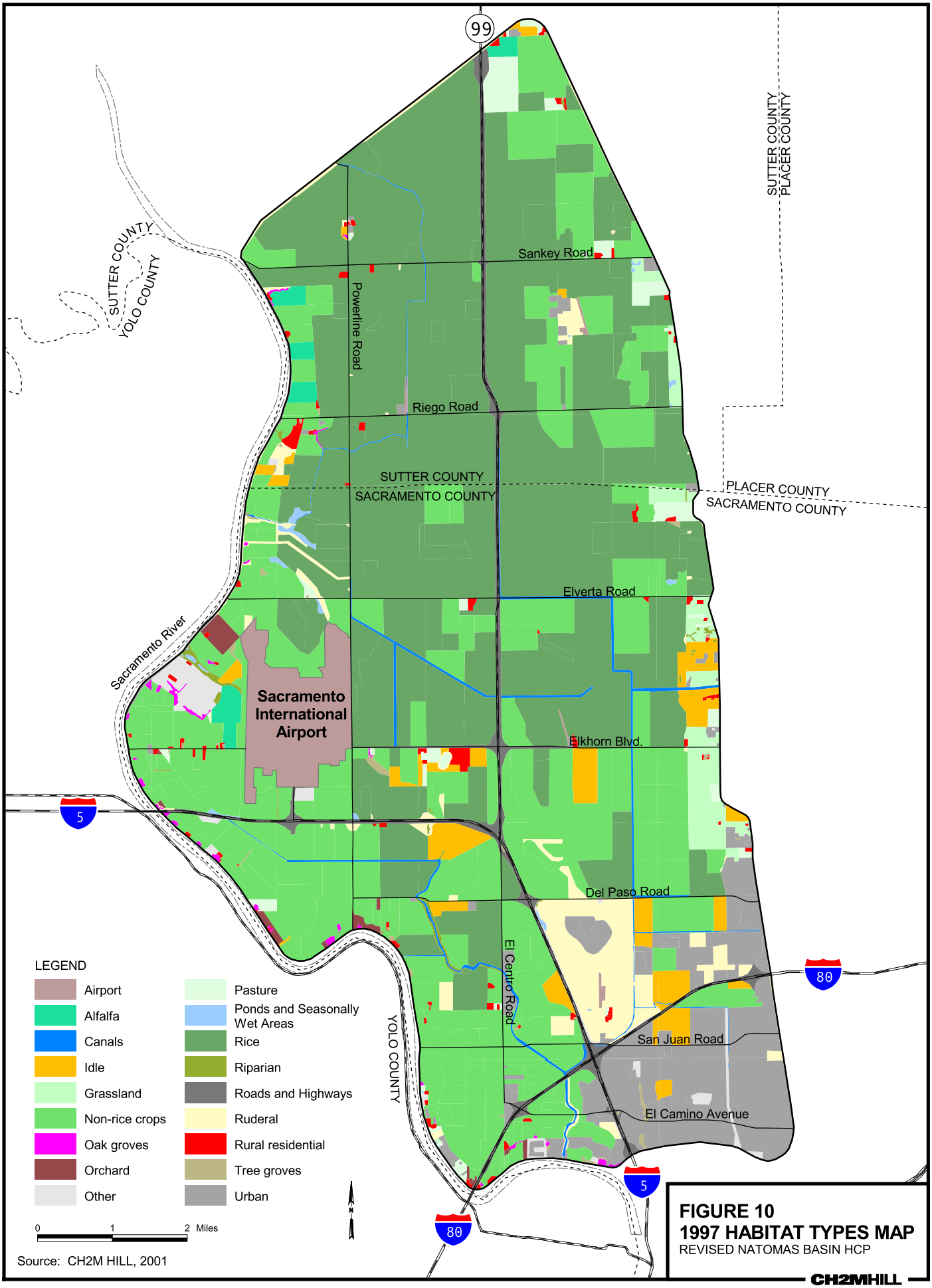
CH2MHILL



Source: Natomas Basin HCP, 1997

FIGURE 9
1993 HABITAT TYPES MAP
REVISED NATOMAS BASIN HCP

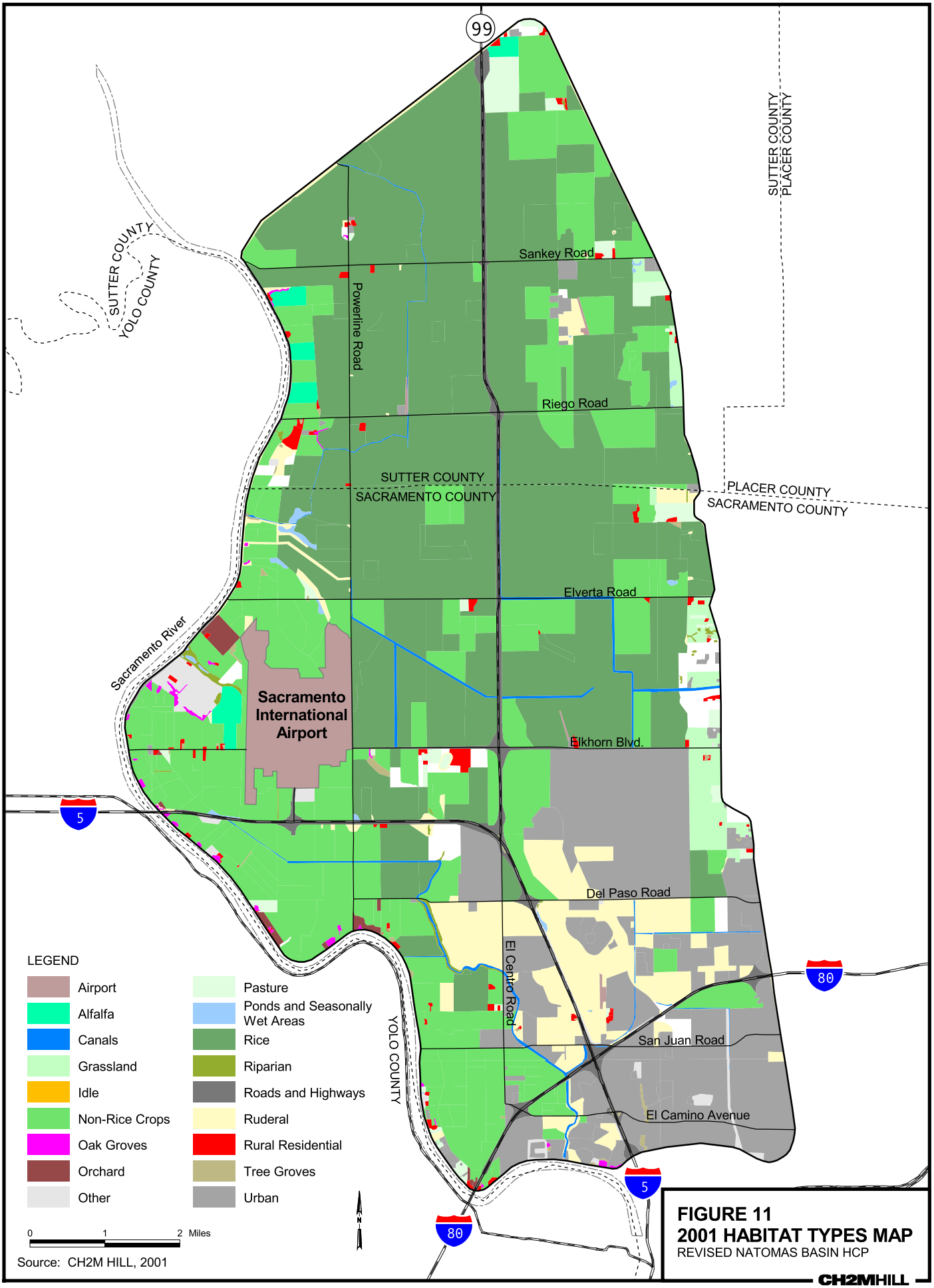
CH2MHILL



Source: CH2M HILL, 2001

FIGURE 10
1997 HABITAT TYPES MAP
REVISED NATOMAS BASIN HCP

CH2MHILL



Source: CH2M HILL, 2001

FIGURE 11
2001 HABITAT TYPES MAP
REVISED NATOMAS BASIN HCP

CH2MHILL

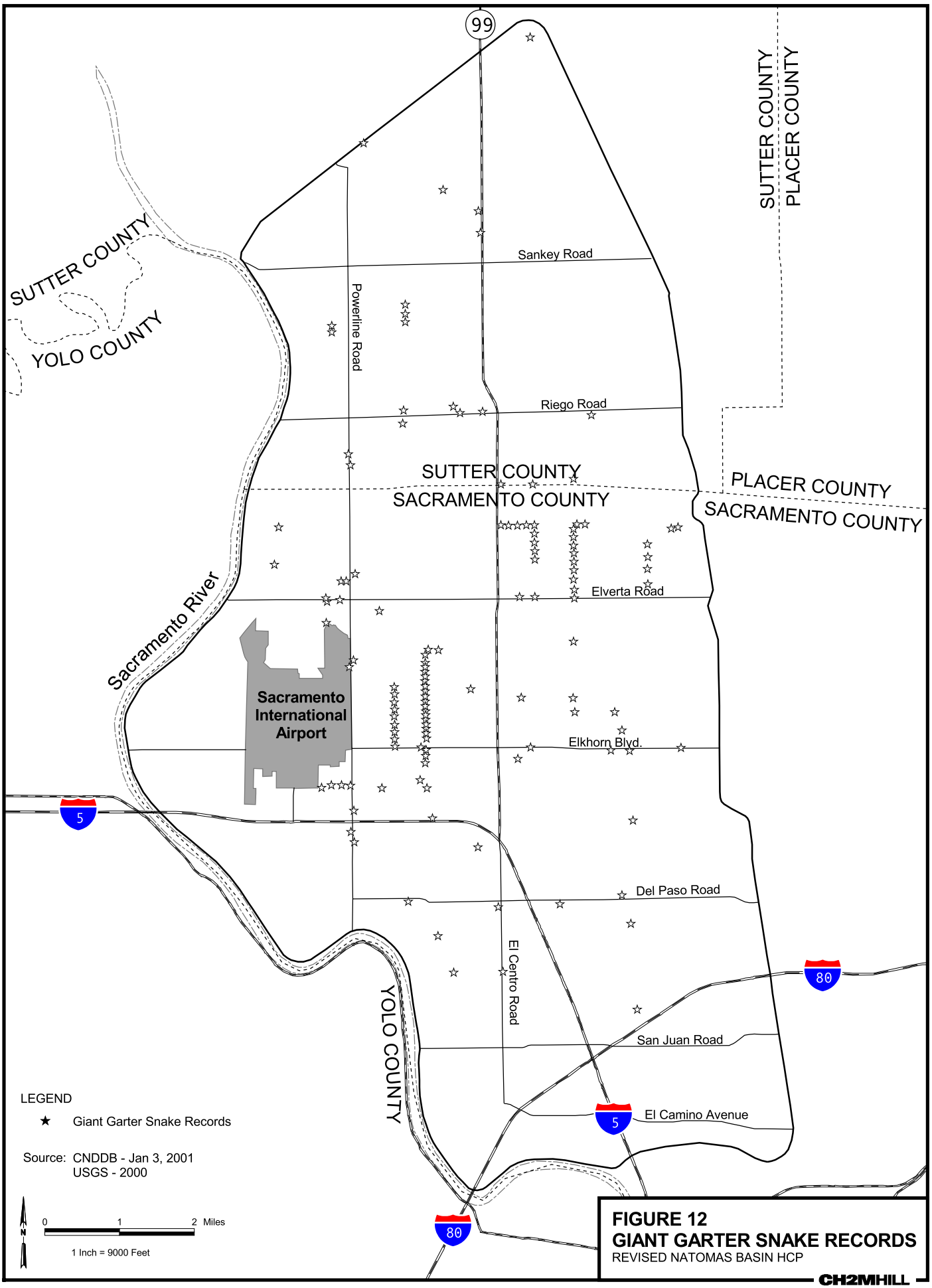


FIGURE 12
GIANT GARTER SNAKE RECORDS
REVISED NATOMAS BASIN HCP

CH2MHILL

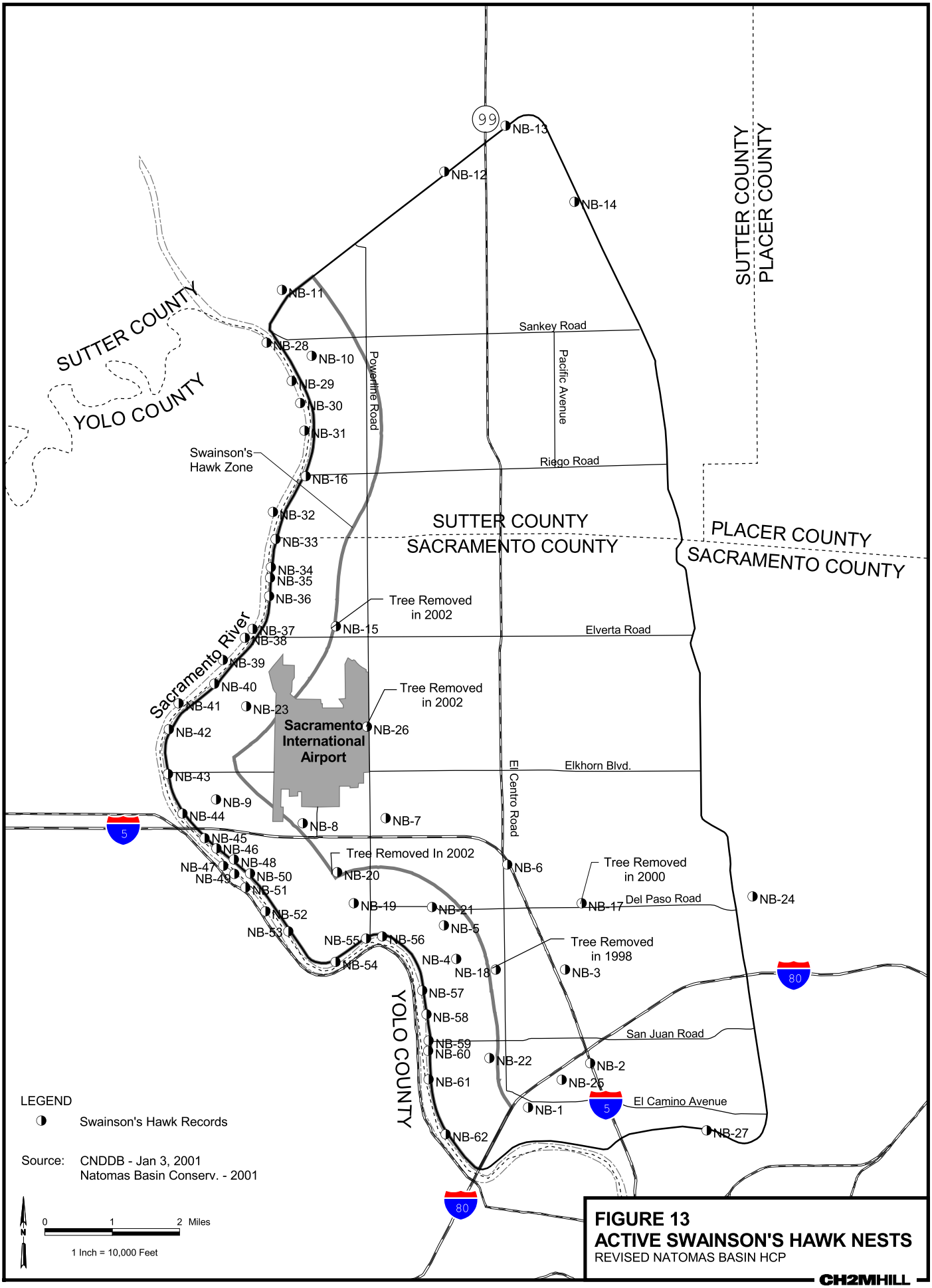


FIGURE 13
ACTIVE SWAINSON'S HAWK NESTS
REVISED NATOMAS BASIN HCP

CH2MHILL

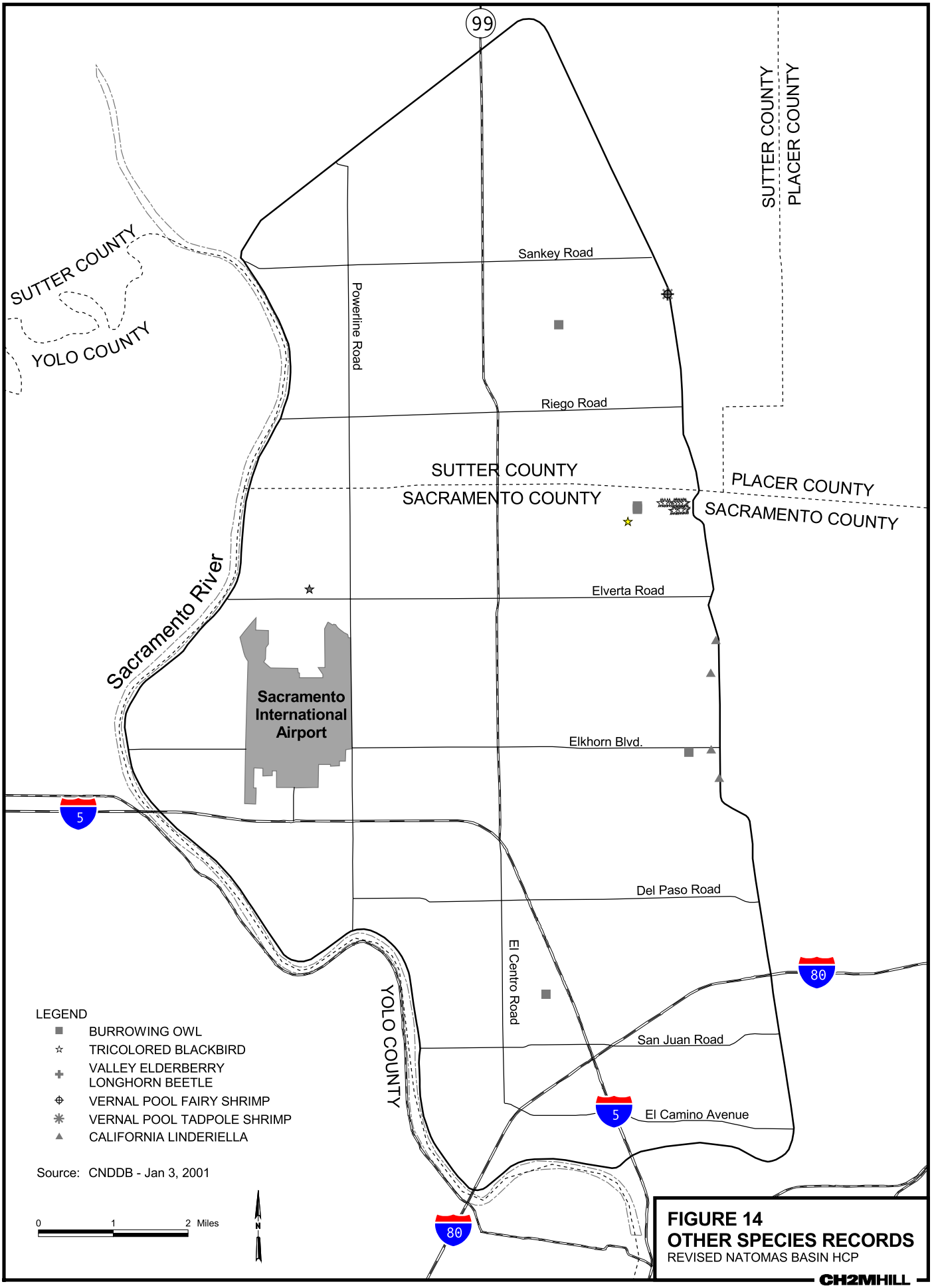


FIGURE 14
OTHER SPECIES RECORDS
REVISED NATOMAS BASIN HCP

CH2MHILL

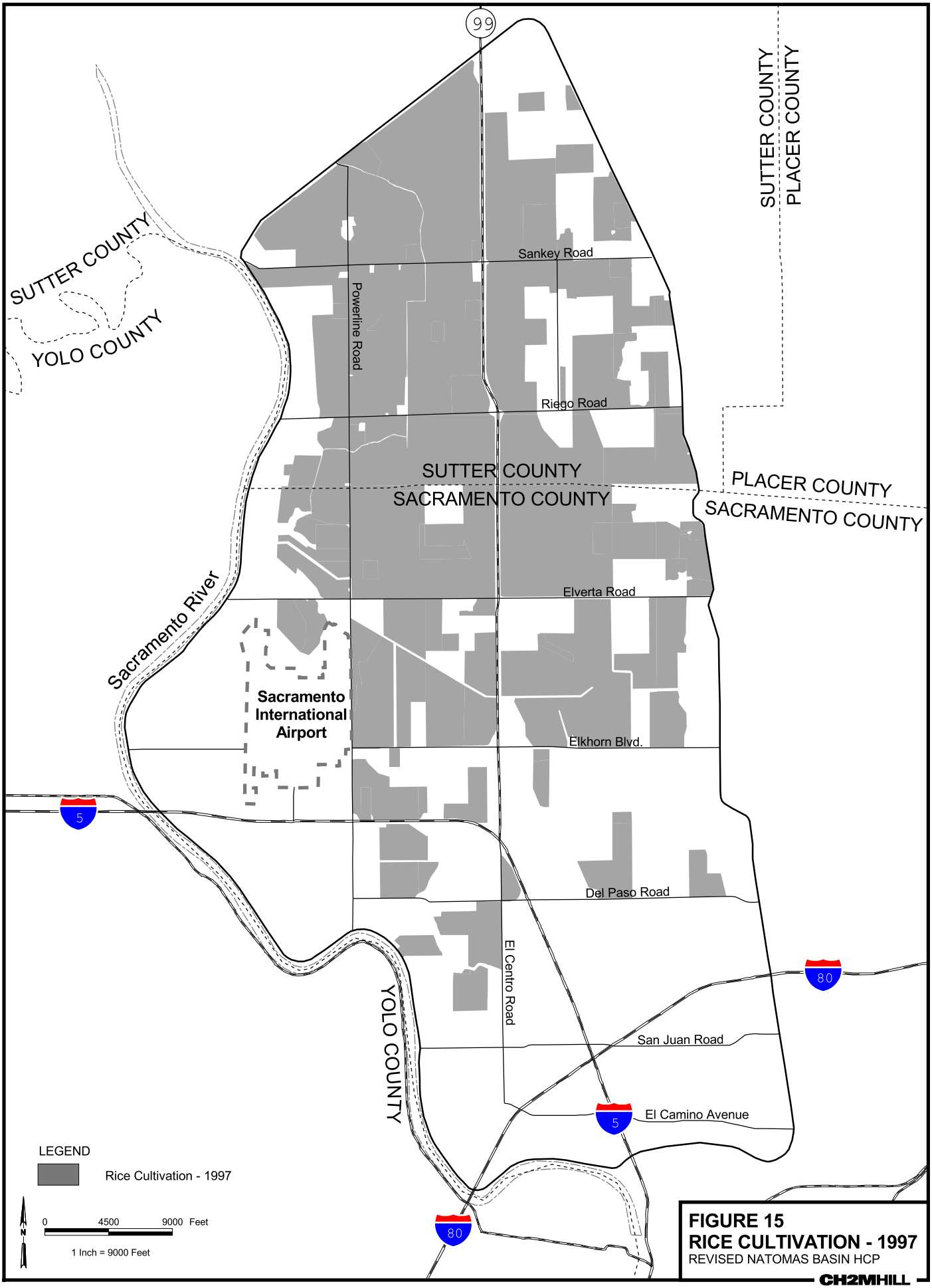
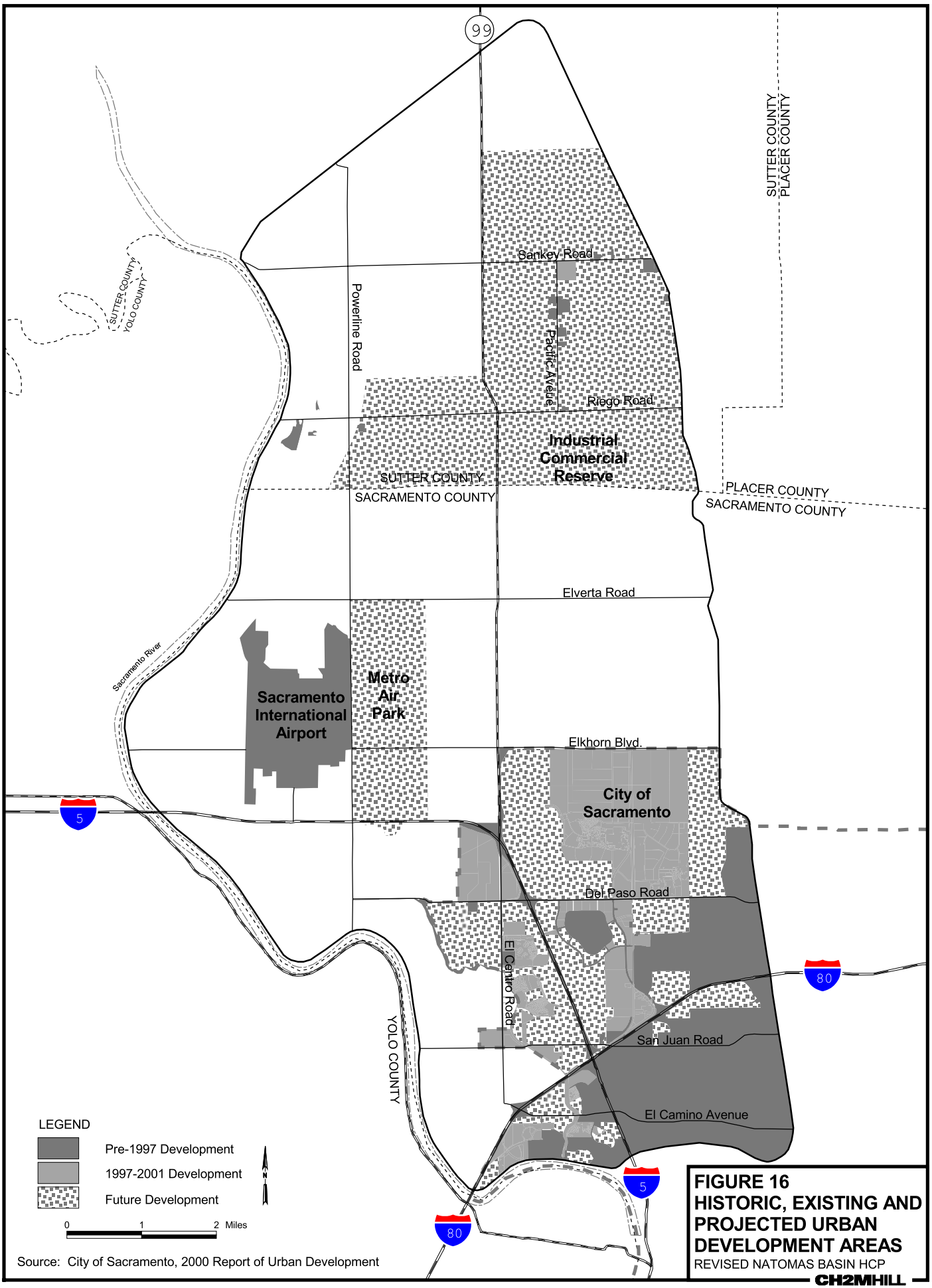


FIGURE 15
RICE CULTIVATION - 1997
REVISED NATOMAS BASIN HCP

CH2MHILL



Source: City of Sacramento, 2000 Report of Urban Development

FIGURE 16
HISTORIC, EXISTING AND PROJECTED URBAN DEVELOPMENT AREAS
REVISED NATOMAS BASIN HCP
CH2MHILL

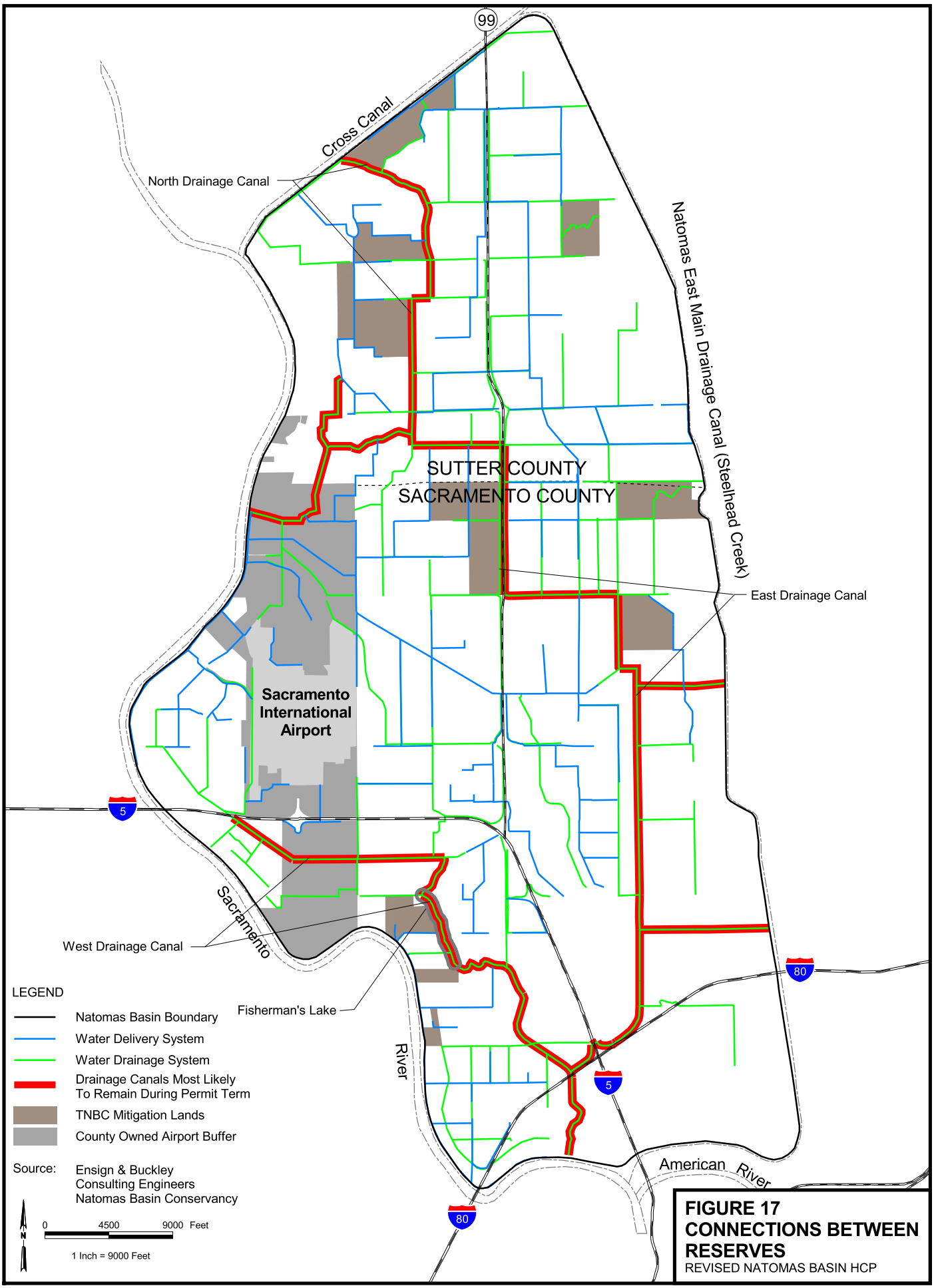
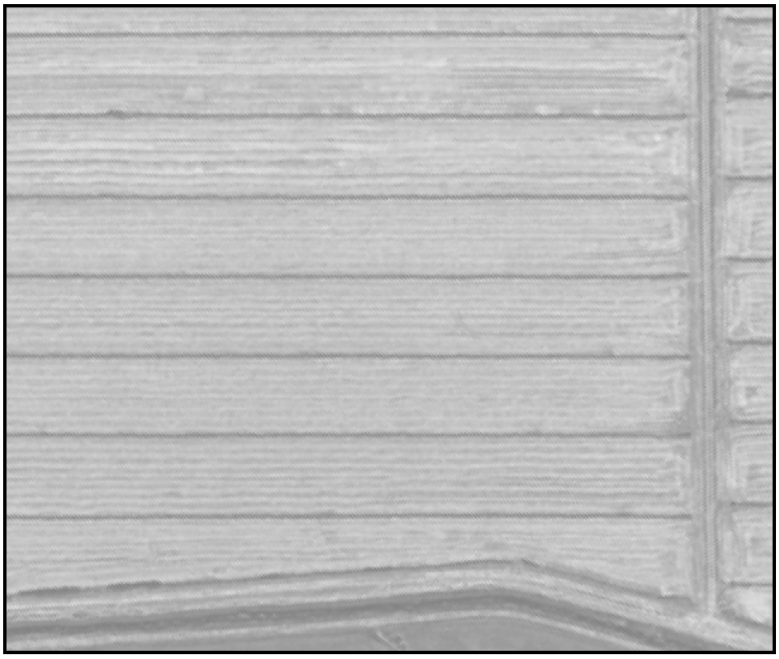
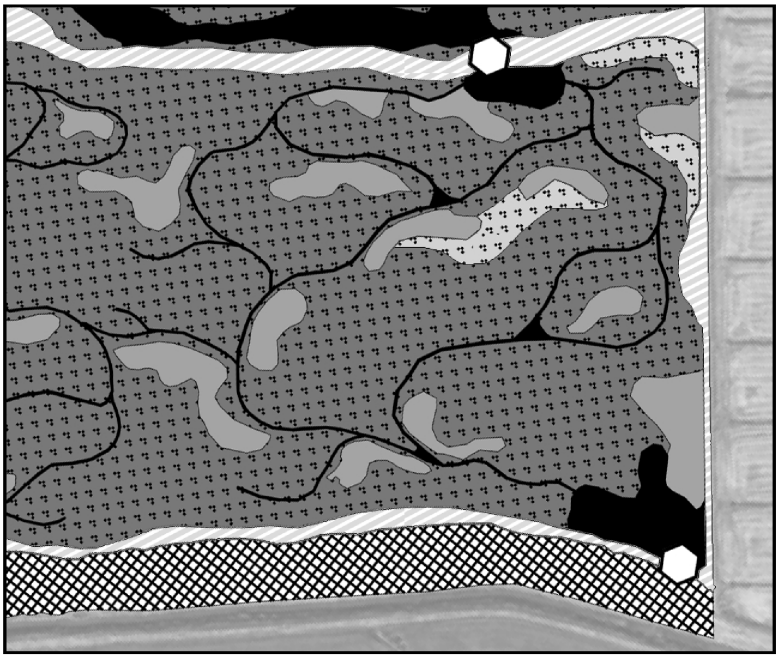


FIGURE 17
CONNECTIONS BETWEEN RESERVES
REVISED NATOMAS BASIN HCP

Conventional Rice Field

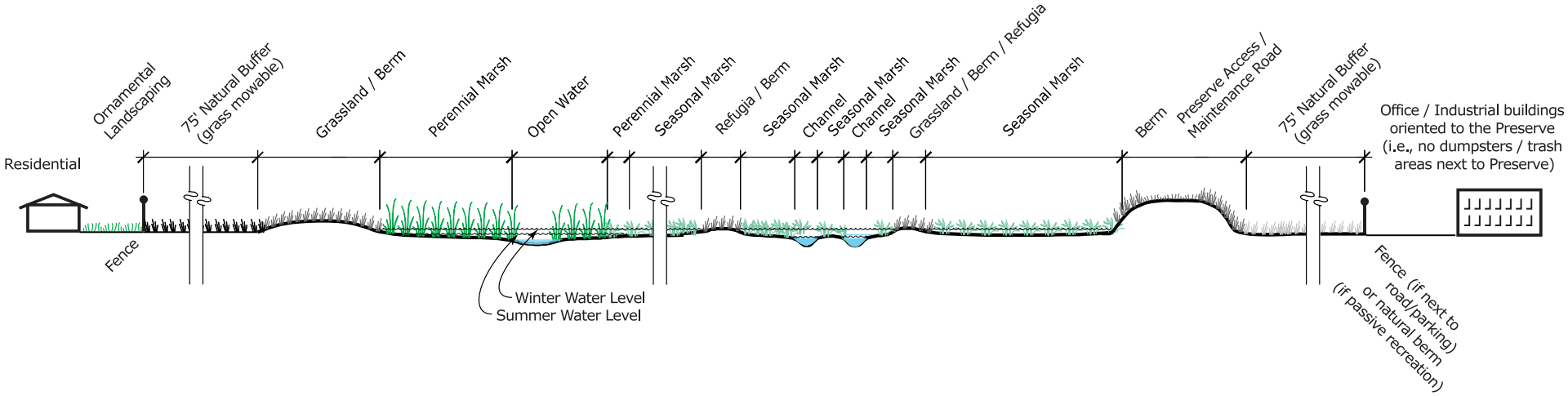


Conventional Rice Field deleveled to create Managed Marsh Habitat



Slough/Channel
Open Water
Perennial Marsh
Seasonal Marsh
Water Control Structure
Low Berm (Basking Island)
High Berm
Upland Buffer

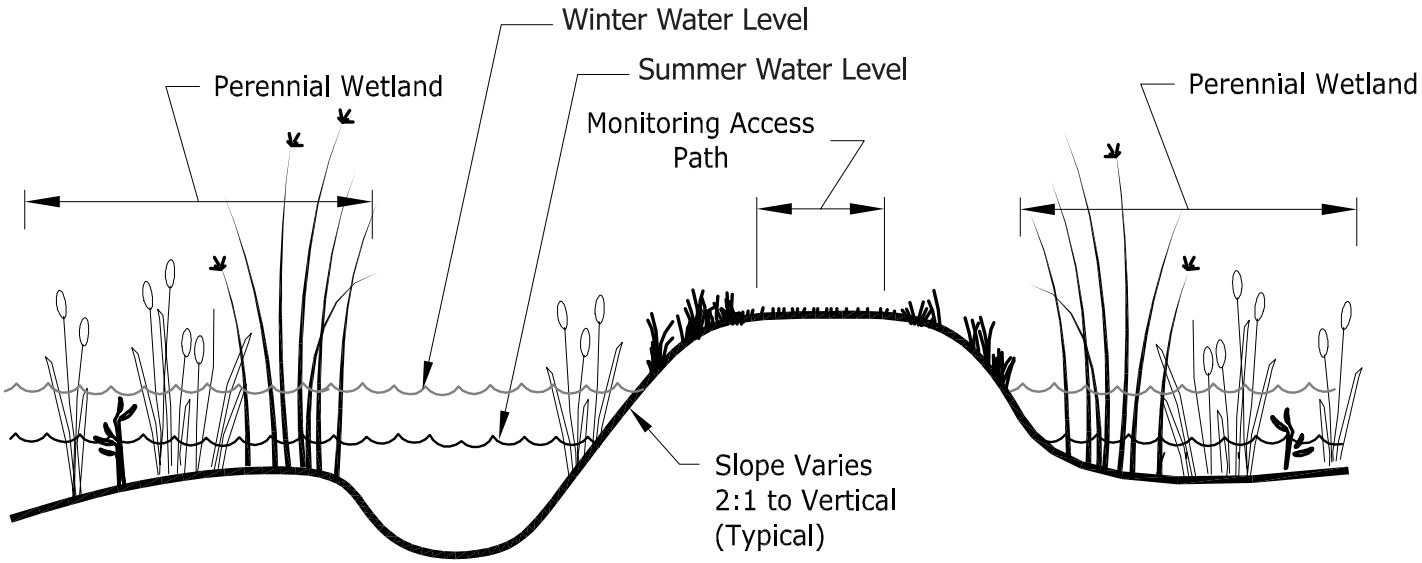
FIGURE 18
COMPARISON OF A RICE FIELD TO MANAGED MARSH
REVISED NATOMAS BASIN HCP



Not to Scale

Figure 19.1

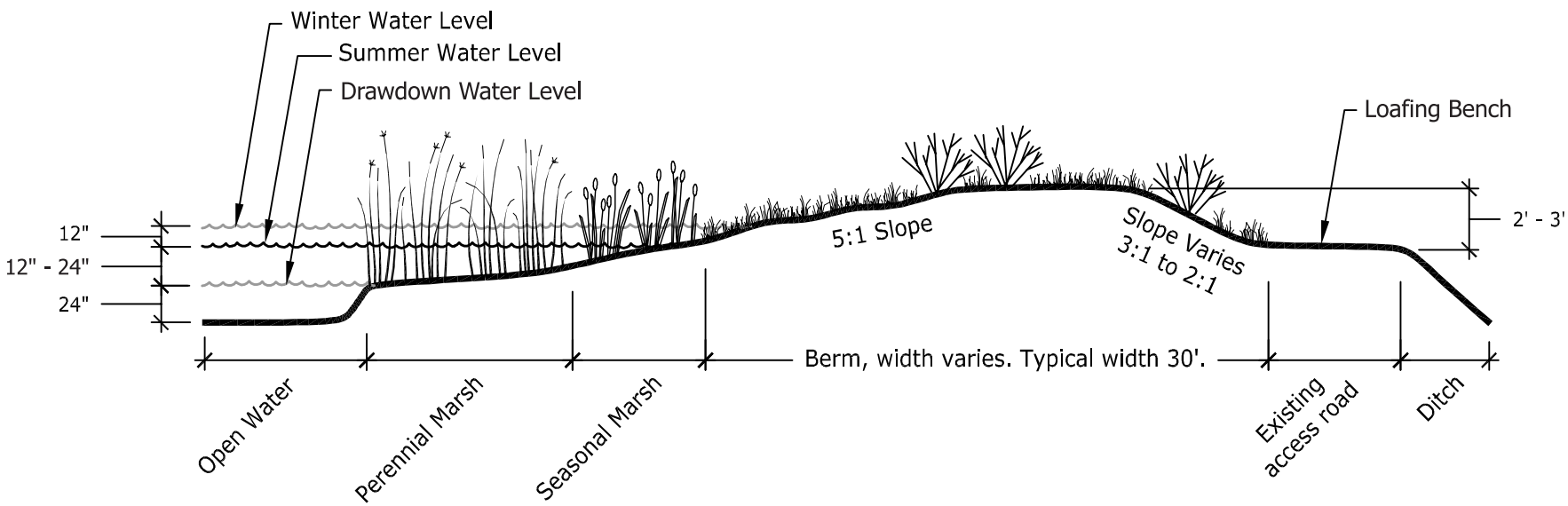
Typical Section
Giant Garter Snake Habitat Preserve



Not to Scale

Figure 19.2

Narrow Berm (& Refugia)
for Permanent Impoundments



Not to Scale

Figure 19.3

Typical High Berm

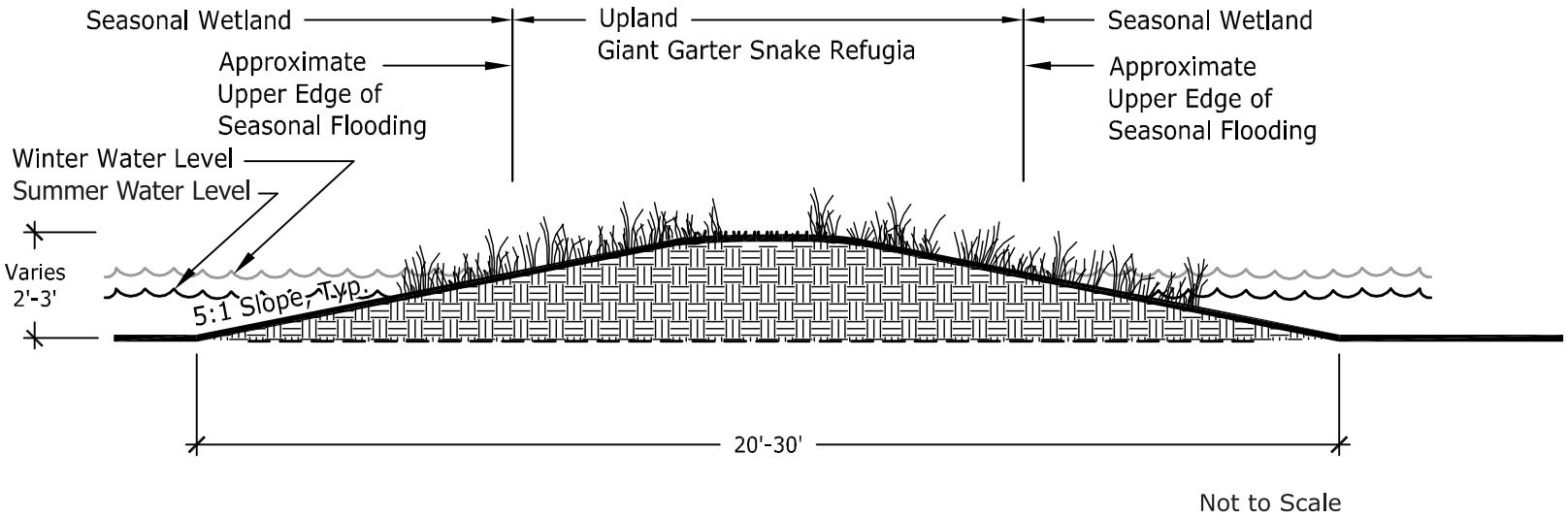


Figure 19.4
Berm for Permanent Impoundments

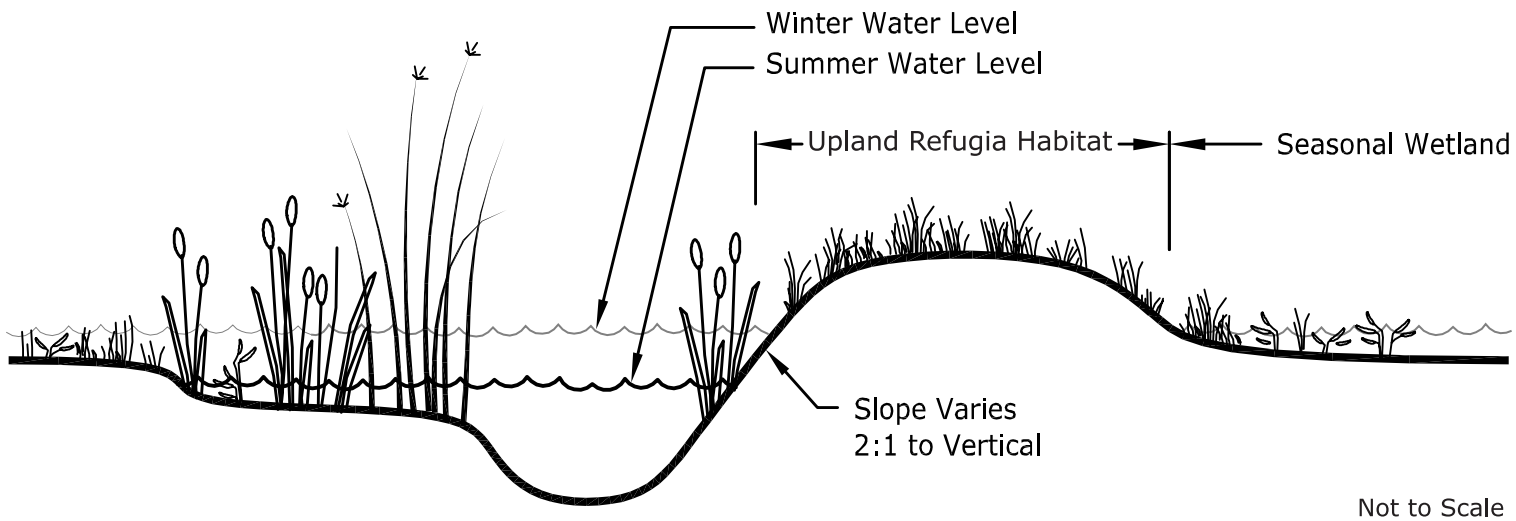


Figure 19.5

Typical Low Berm (Basking Island)
For Seasonal Impoundments

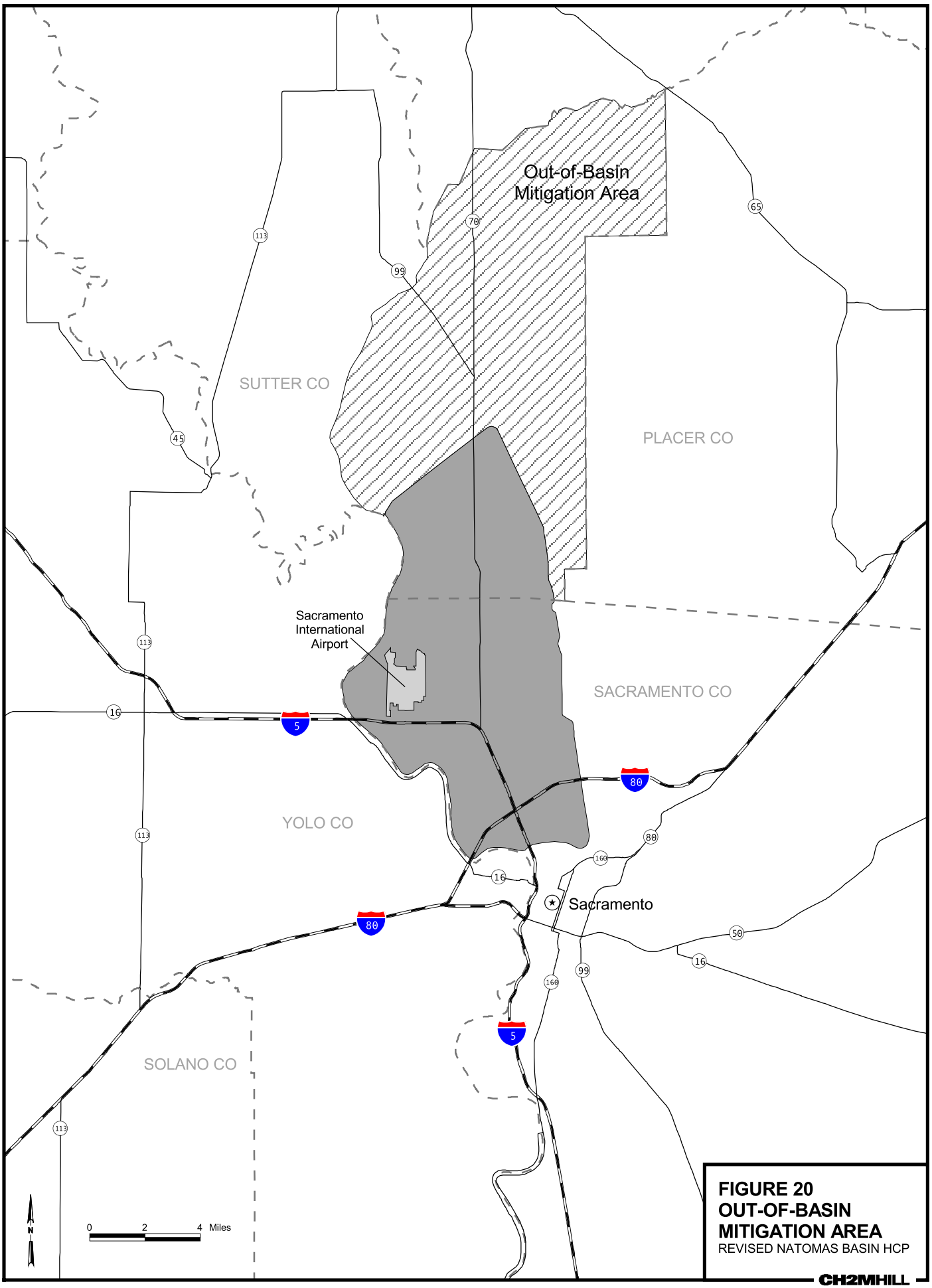


FIGURE 20
OUT-OF-BASIN MITIGATION AREA
REVISED NATOMAS BASIN HCP

CH2MHILL

IMPLEMENTATION AGREEMENT FOR THE

NATOMAS BASIN HABITAT CONSERVATION PLAN

TABLE OF CONTENTS

Page

1 Recitals and Purposes 1
1.1 Purpose 1
1.2 Parties' Intent 1
1.3 Coordination 1
1.4 Habitat 1
1.5 Mitigation 2
1.6 Integrity and Viability of NBHCP 2
1.7 Reliance 2
1.8 Local Land Use Authority 2
1.9 City, Sutter and TNBC as Permittees 2
1.10 USFWS Authorities 2
1.11 CDFG Authorities 2
2 Definitions 3
3. Obligations of the Parties 3
3.1 City and Sutter 3
3.1.1 Limitation on Total Development in Natomas Basin and Individual Permit Areas . 3
3.1.2 Exclusion of Development from Swainson's Hawk Zone 4
3.1.3 Timing of Mitigation 4
3.1.5 Restriction on Urban Development/Mitigation Alternatives 4
3.1.6 Determination of Compliance 4
3.1.7 Urban Development Permit Conditions 4
3.1.8 Full Compliance with the NBHCP 5
3.1.9 Transfer of Mitigation Fees 5
3.1.10 Enforcement 5
3.1.11 Relationship of TNBC to City and Sutter 5
3.1.12 Certification of Urban Development Permittee 6
3.1.13 Public Works Projects 6
3.1.14 Assistance 6
3.1.15 Annual Report of Authorized Development 6
3.1.16 Adaptive Management 6
3.1.17 Overall Program Review/Independent Mid-Point Reviews 6
3.1.18 City and Sutter Liaison 6
3.1.19 Implementation of other NBHCP Components 6
3.12 The Natomas Basin Conservancy 7
3.2.1 Establish Mitigation 7
3.2.2 Acceptance of Mitigation Fees 6
3.2.3 TNBC Land Management; Site Specific Management Plan/NBHCP Biological Monitoring Plans/Surveys 6
3.2.4 Implementation Annual Report 6
3.2.5 Implementation Annual Meeting 6
3.2.6 Funding 6
3.2.7 Budgeting and Planning 6
3.2.8 Successor 6
3.2.9 Transfer to CDFG 8
3.2.10 Operation in Perpetuity 8
3.2.11 Conflicts of Interest 8
3.2.12 TNBC Proceedings Open to Public 8
3.2.13 Implementation of Other NBHCP Components 8
3.3 USFWS 8
3.3.1 Oversight 8
3.3.2 Technical Assistance 8
3.3.3 Newly Listed Uncovered Species 9

3.3.4 Issuance of Section 10(a) Permits 9
3.3.5 Permit Findings 9
3.4 CDFG 9
3.4.1 Oversight 9
3.4.2 Assistance 10
3.4.3 New Species 10
3.4.4 CDFG Land Management 10
3.4.5 Issuance of Section 2081(b) Permit 10
3.4.6 Section 2081(b) Permit Findings 10
4 Mitigation 11
4.1 Mitigation Lands 11
4.2 Respective Permit Areas 11
4.3 Existing Development Exempt 11
4.4 Mitigation Ratio 11
4.5 Calculation of Mitigation Requirement for Authorized Development Projects 11
4.6 Satisfaction of Mitigation Requirement 12
4.7 Jurisdictional Wetlands 12
4.8 Rivers, Streams or Lakes 12
4.9 Funding for Operating Conservation Program 13
4.9.1 Mitigation Fees 13
4.9.2 Adjustments to the Mitigation Fee for Purposes of Funding the Operating Conservation Program Other than Changes to the Managed Marsh Component 13
4.9.3 Adjustments tot he Mitigation Fee for Purposes of Funding the Changes to the Managed Marsh Component 14
4.9.4 Fee Adjustments for General Inflation 14
4.9.5 Failure to Adjust Mitigation Fees 14
5 Mitigation Lands 14
5.1 Location of Mitigation Lands 14
5.2 Setbacks and Buffers 15
5.3 In-Basin Acquisition 15
5.4 Coordinating Mitigation Land Acquisition with Agency Acquisitions 15
5.5 Timing of Mitigation Land Acquisition 16
5.6 Acquisition of 400 and 2,500-Acre Blocks 16
5.7 Accounting for Mitigation Lands 16
5.7.1 Managed Marsh 16
5.7.2 Rice Land 16
5.7.3 Uplands 16
5.7.4 Proportion of Mitigation Lands as Marsh 16
5.8 Conservation Measures 17
6 Assurances 17
6.1 USFWS 17
6.1.1 No Surprises Assurances 17
6.1.2 Migratory Bird Treaty Act (MBTA) 18
6.1.3 Beneficial Effects with Respect to Future Listings 19
6.1.4 Critical Habitat 19
6.1.5 ESA Listing of Currently Unlisted Covered Species 19
6.2 CDFG 19
6.2.1 CESA Compliance 19
6.2.2 Adequate Mitigation under CESA 19
6.2.3 Assurances 19
6.2.4 CESA Listing of Currently Unlisted Covered Species 20
6.2.5 Changed Conditions 20
6.3 Limits on Future Revisions to NBHCP 20
6.4 Reservation of Rights Re: Subsequent Listing of Species 21
6.5 Land Use Authority 21
6.6 No Liability 21
7 Amendments and Remedies 21

7.1 Revisions and Amendments to the NBHCP 21
7.2 Amendments to Agreement 21
7.3 Land Use Changes 21
7.4 Remedies in General 22
7.5 Third Party Enforcement 22
7.6 Suspension or Revocation 22
7.6.1 Suspension or Revocation by USFWS 22
7.6.2 Suspension or Revocation by CDFG 22
7.6.3 Status of Urban Development Permittees after Suspension or Revocation 22
7.6.4 No Further Approvals by Permittees 22
7.6.5 Severability 23
8 Miscellaneous 27
8.1 Term of Agreement 23
8.2 Termination 23
8.2.1 Termination by Mutual Consent 23
8.2.2 Termination by USFWS or CDFG 23
8.2.3 Termination by TNBC 23
8.2.4 Effect of Termination 23
8.2.5 Status of Mitigation Lands Upon Termination 24
8.3 Binding Effect 24
8.4 Notices 28
8.5 Captions 25
8.6 Counterparts 25
8.7 Governing Law 25
8.8 Complete Agreement 25
8.9 Federal Section 7 Consultations 25
8.10 Conflict with NBHCP 26
8.11 Other Permittees 26
8.12 Federal Appropriations 26
8.13 State Appropriations 26
8.14 References to Regulations 26
8.15 Applicable Laws 26
8.16 No Partnership 26
8.17 Elected Officials Not to Benefit 26

LIST OF EXHIBITS

Exhibit A - Definitions

Exhibit B - CITY's Baseline Map

Exhibit C - SUTTER's Baseline Map

Exhibit D - List of Covered Species in Permit Area

IMPLEMENTATION AGREEMENT FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN

THIS IMPLEMENTATION AGREEMENT FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN is entered into as of the _____ day of _____, 2003 (the "Effective Date") by and among the UNITED STATES FISH AND WILDLIFE SERVICE, an agency of the Department of the Interior of the United States of America ("USFWS"), the CALIFORNIA DEPARTMENT OF FISH AND GAME, a subdivision of the Resources Agency of the State of California ("CDFG"), the CITY OF SACRAMENTO, a chartered city ("CITY"), the COUNTY OF SUTTER ("SUTTER"), a political subdivision of the State of California, and The Natomas Basin Conservancy, Inc. ("TNBC", or "Conservancy"), a California nonprofit public benefit corporation, (hereafter collectively referred to as "Parties"). The CITY, SUTTER and TNBC are hereafter also referred to collectively as "Permittees" and each is individually referred to as "Permittee."

1. RECITALS AND PURPOSES

The Parties have entered into this Agreement in consideration of the following facts and assumptions, intentions and expectations:

1.1 Purpose. This Implementation Agreement ("Agreement") describes the mechanisms for implementation of the Natomas Basin Habitat Conservation Plan ("NBHCP" or "Plan") a cooperative federal, state and local program for the conservation of those plant and animal species listed on Exhibit D (collectively the "Covered Species") and their habitats in the Natomas Basin. The purposes of this Agreement are: a) to ensure the implementation of each of the terms of the NBHCP; b) to describe remedies and recourse should any party fail to perform its obligations as set forth in this agreement; and c) to provide assurances to the Permittees that as long as the terms of the NBHCP are properly implemented, no additional mitigation will be required of them except as provided for in this Agreement or required by law. This Agreement also establishes terms and conditions that support issuance of Permits by the USFWS under Section 10(a)(1)(B) of the Endangered Species Act ("ESA") and CDFG under Section 2081 of the California Fish and Game Code to allow the taking of the Covered Species within the Permit Area a) by the CITY and SUTTER, and third persons under the CITY's and SUTTER's direct control, incidental to Authorized Development and b) by TNBC, and third persons under TNBC's direct control, incidental to management activities for a period of fifty (50) years.

1.2 Parties' Intent. The intent of the Parties, in addition to the purposes set forth above, is that a comprehensive conservation program be established, and be implemented under the auspices of TNBC for the conservation of the Covered Species and their habitats, to provide an opportunity for individual Authorized Development project proponents to obtain incidental take authorization, through CITY's and SUTTER's Take Permits, for a broad array of Covered Species under the ESA and CESA including both currently listed species and species that may be listed in the future; to minimize the review of individual projects by the USFWS and CDFG; and to standardize take mitigation and onsite take avoidance and minimization measures for projects covered by the NBHCP.

1.3 Coordination. The NBHCP will be implemented by the Parties through execution of this Agreement, subject to and in accordance with the Permits.

1.4 Habitat. The Covered Species may use or inhabit portions of the Natomas Basin area which is situated northeasterly of the confluence of the American River and Sacramento River. Consequently, Planned Development of 17,500 acres, including CITY and SUTTER Authorized Development and Metro Air Park's 1,983 acres of authorized development, related infrastructure, and government public works planned in this area over the next fifty (50) years may result in a loss of habitat and takings of the Covered Species, incidental to the normal course of this Planned

Development.

1.5 Mitigation. Implementation of the NBHCP through this Agreement is intended to avoid, minimize and mitigate to the maximum extent practicable, and minimize and fully mitigate, the individual and cumulative impacts of take of Covered Species resulting from Authorized Development within the CITY's and SUTTER's respective Permit Areas in the Natomas Basin. All required mitigation is specified in the NBHCP.

1.6 Integrity and Viability of NBHCP. While the NBHCP was developed as a comprehensive multi-species habitat conservation plan to avoid, minimize and mitigate for the expected loss of habitat values and incidental take of the Covered Species that could result from urban development, operation and maintenance of irrigation and drainage systems, and certain activities associated with TNBC management of its system of reserves within the Natomas Basin when it is fully implemented, the biological viability of the NBHCP is not compromised by the failure of other Potential Permittees to participate in the NBHCP and execute this Agreement. The mitigation strategies provided in the NBHCP are designed to allow for separate and independent implementation of NBHCP mitigation measures by CITY, SUTTER or other Potential Permittees, and may be adjusted under the terms of the Plan if fewer than all land use jurisdictions or other Potential Permittees participate, so that the NBHCP is viable and will minimize and mitigate the impacts associated with take of Covered Species resulting from Covered Activities carried out within the Natomas Basin by each Permittee , even if the Plan is not implemented by other Potential Permittees.

1.7 Reliance. In reliance upon this Agreement, CITY and SUTTER are making long range plans and financial investments in public infrastructure improvements necessary for the preservation of the public health, safety and welfare. Without the assurances identified in this Agreement, they would not enter into, support or approve any such plans or financial commitments.

1.8 Local Land Use Authority. The parties to this Agreement intend that nothing in the NBHCP or in this Agreement shall be interpreted to mean or operate in a manner that expressly or impliedly diminishes or restricts the local land use decision making authority of CITY or SUTTER, provided that the Parties acknowledge that should either CITY or SUTTER exercises its respective land use authority in a manner that conflicts with the terms of the NBHCP, this Agreement or the Permits, the Service and/or CDFG may suspend or revoke CITY's or SUTTER's Permits pursuant to Section 7.4 of this Agreement and applicable laws and regulations.

1.9 CITY, SUTTER and TNBC as Permittees. This Agreement also establishes the conditions under which the incidental take granted to CITY and SUTTER under their respective Permits will apply to landowners and developers within their respective Permit Areas in the Natomas Basin as of the Effective Date (as depicted on Exhibits B and C attached hereto and incorporated herein) in order to allow the taking of the Covered Species incidental to Authorized Development. TNBC's Permit will authorize incidental take of the Covered Species by TNBC anywhere within its Permit Area with respect to the management and other activities and responsibilities that TNBC or third parties under its control assumes on behalf of CITY and SUTTER under the NBHCP.

1.10 USFWS Authorities. USFWS is authorized to enter into this Agreement pursuant to the ESA (16 U.S.C. 1531 et seq.), the United States Fish and Wildlife Coordination Act (16 U.S.C. 661-666c) and the Fish and Wildlife Act of 1956 (16 U.S.C. 742(f) et seq.).

1.11 CDFG Authorities. CDFG is authorized to enter into this Agreement pursuant to CESA sections 2080 and 2081.

AGREEMENT

FOR AND IN CONSIDERATION of the recitals set forth above, which are incorporated by reference herein, the covenants set forth herein, and other considerations, the receipt and adequacy of which is hereby acknowledged, the Parties hereto agree as follows:

2 DEFINITIONS

Terms used in this Agreement with reference to the ESA shall have the same meaning as those same terms have under the ESA, or in regulations adopted by the USFWS, and terms used in this Agreement with reference to CESA, shall have the same meaning as those same terms have under CESA, or regulations adopted by CDFG. Capitalized terms used in this Agreement shall have the defined meanings specified in the NBHCP as attached hereto as Exhibit A and incorporated herein into this Agreement. Where additional terms are used in this Agreement, definitions are included within the applicable text. Any amendments to the definitions contained in this Agreement shall be deemed automatically to be amendments to the definitions contained in the NBHCP.

3 OBLIGATIONS OF THE PARTIES

3.1 CITY and SUTTER.

3.1.1 Limitation on Total Development in Natomas Basin and Individual Permit Areas. The NBHCP anticipates and analyzes a total of 17,500 acres of Planned Development in the Natomas Basin, 15,517 acres of which constitutes Authorized Development within CITY and SUTTER. (An additional 1,983 acres of development is allocated to the Metro Air Park project in Sacramento County under the Metro Air Park Habitat Conservation Plan and is analyzed within the NBHCP.) CITY agrees not to approve more than 8,050 acres of Authorized Development and to ensure that all Authorized Development is confined to CITY's Permit Area as depicted on Exhibit B to this Agreement). SUTTER agrees not to approve more than 7,467 acres of Authorized Development and to ensure that all Authorized Development is confined to SUTTER's Permit Area as depicted on Exhibit C to this Agreement). The Parties further agree:

(a) Because the effectiveness of the NBHCP's Operating Conservation Program is based upon CITY limiting total development to 8,050 acres within the CITY's Permit Area, and SUTTER limiting total development to 7,467 acres within SUTTER's Permit Area, approval by either CITY or SUTTER of future urban development within the Plan Area or outside of their respective Permit Areas would constitute a significant departure from the Plan's Operating Conservation Program. Thus, CITY and SUTTER further agree that in the event this future urban development should occur, prior to approval of any related rezoning or prezoning, such future urban development shall trigger a reevaluation of the Plan and Permits, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional development, and/or possible suspension or revocation of CITY's or SUTTER's Permits in the event the CITY or SUTTER violate such limitations.

(b) For purposes of the NBHCP and this Agreement, CITY agrees that although the West Lakeside Annexation area is proposed by the landowners to be annexed to the CITY, this area currently is located within Sacramento County and is outside of the County's Urban Services Boundary and the City's Sphere of Influence, and it is not included in the 8,050 acres of Authorized Development or within the CITY's Permit Area. Thus, CITY agrees that in the event this annexation occurs, it shall, prior to approval of any rezoning or prezoning associated with such annexation, trigger a reevaluation of the Plan, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the City for that additional urban development, and/or possible suspension or revocation of CITY's Permit in the event the CITY violates such limitations without

completing such reevaluation, amendment, or revision or new conservation strategy for that additional urban development.

3.1.2 EXCLUSION OF DEVELOPMENT FROM SWAINSON's HAWK ZONE. With the exception of 252 acres included as Authorized Development by CITY in the NBHCP, the Parties agree that the CITY's and SUTTER's Permit Areas shall exclude a one mile wide strip of land adjacent to the Sacramento River within their respective jurisdictions known as the Swainson's Hawk Zone (SHZ). The Parties further agree as follows:

(a) CITY and SUTTER shall not approve any future urban development within their respective portions of the Swainson's Hawk Zone beyond the 252 acres of Authorized Development identified by CITY in the NBHCP.

(b) Within One Hundred and Eighty (180) days of the Effective Date, SUTTER shall initiate a General Plan Amendment to remove all land within SUTTER's portion of the Swainson's Hawk Zone from the Industrial/Commercial Reserve designation in the Sutter County General Plan and to redesignate such land for agricultural uses.

(c) Because the effectiveness of the NBHCP to adequately minimize and mitigate the effects of take of the Covered Species depends, in part, on the exclusion of urban development from both the CITY and SUTTER's portions of the Swainson's Hawk Zone, approval by either CITY or SUTTER of future urban development in the Swainson's Hawk Zone, except as otherwise explicitly allowed under the NBHCP, would constitute a significant departure from the Plan and would trigger a reevaluation of the Plan and Permits, a new effects analysis, potential amendments to the Plan and/or Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional development, and/or possible suspension or revocation of CITY or SUTTER's Permits in the event CITY or SUTTER violate such restrictions.

3.1.3 Timing of Mitigation. CITY and SUTTER agree to comply with the NBHCP Chapter VI requirements applicable to the timing of acquisition of Mitigation Lands, including, but not limited to, the requirement to maintain a 200-acre cushion of Mitigation Lands, and other timing restrictions on approval of Authorized Development as provided in Section 4 of this Agreement and Chapter VI of the NBHCP.

3.1.4 Baseline Map. CITY and SUTTER have prepared, and USFWS and CDFG have approved, the Baseline Maps set forth in Exhibits B and C, attached hereto and incorporated herein by this reference, which depict: (1) those land areas within their respective Permit Areas which are designated as "Exempt Area-Existing Development" and therefore not subject to the NBHCP, the Permits, or this Agreement; (2) those land areas designated as "Development Subject to 1997 HCP," within their respective Permit Areas for which Authorized Development projects have been approved between 1997 and 2002 and have been developed in compliance with the Mitigation Requirements of the NBHCP in effect in 1997; and (3) those undeveloped land areas designated as "Development Subject to 2002 HCP," within the Permit Areas which will be subject to the Mitigation Requirement of the NBHCP.

3.1.5 Restriction on Urban Development/Mitigation Alternatives. CITY and SUTTER shall not issue any Urban Development Permit for any Authorized Development project on a parcel of land in their respective Permit Areas, outside of those areas depicted as "Exempt Area-Existing Development" on the Baseline Map, unless the Authorized Development project proponent has satisfied the Mitigation Requirement specified in Chapters IV through VI of the NBHCP.

3.1.6 Determination of Compliance. CITY and SUTTER shall ensure that an Authorized Development project proponent has complied with the Mitigation Requirements of Chapters IV through VI of the NBHCP prior to issuing an Urban Development Permit for the Authorized Development project.

3.1.7 Urban Development Permit Conditions. CITY and SUTTER shall include in any Urban Development Permit the on-site Take avoidance, minimization and mitigation measures

specified in Chapter V of the NBHCP (the "Conservation Measures") to reduce or eliminate, the direct and indirect impacts of Authorized Development on the Covered Species and shall include in such Urban Development Permit notice of the need to comply with the requirements of other agencies applicable to the project.

3.1.8 Full Compliance with the NBHCP. The Parties agree that for purposes of CITY's and SUTTER's determination that an Urban Development Permittee is in full compliance with the NBHCP, the Urban Development Permittee must: (1) comply with the Mitigation Requirement, (2) implement the Conservation Measures including any such measures that are required to be conducted prior to commencement of grading and/or construction (e.g., pre-construction surveys, species avoidance measures, allowing USFWS or TNBC to conduct transplantation and relocation of Covered Species, etc.), and (3) implement any measures specified in or provided for in Chapter V of the NBHCP which are required to be implemented after commencement of grading and/or construction, including but not limited to, pre-construction surveys, retention of Swainson's Hawk nesting trees, and elderberry shrub preservation.

3.1.9 Transfer of Mitigation Fees. CITY and SUTTER shall promptly transfer all Mitigation Fees collected on account of Authorized Development to TNBC in accordance with the provisions of Chapter VI of the NBHCP.

3.1.10 Enforcement. CITY and SUTTER shall comply with the NBHCP, this Agreement and the Permits and, following their applicable land use permit enforcement procedures and practices, shall take all necessary and appropriate actions to enforce the terms of the Section 10(a)(1)(B) Permit, the Section 2081 Permit, the NBHCP, and this Agreement as to themselves and all third persons subject to their jurisdiction or control, including Urban Development Permittees, that are subject to the requirements established by the NBHCP, the Permits and this Agreement, specifically including the urban permitting and approval requirements set forth in this Section 3. Provided CITY and SUTTER take actions within their respective authorities to enforce compliance with the terms of the NBHCP, this Agreement and the Permits, a violation of the Permits by such third persons shall not be a basis to suspend or revoke the CITY or SUTTER Permits, unless USFWS or CDFG determine that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild or USFWS or CDFG determine that the violation renders CITY or SUTTER unable to implement successfully the NBHCP.

3.1.11 Relationship of TNBC to CITY and SUTTER. To comply with the requirements of the NBHCP, CITY and SUTTER have chosen to implement their Mitigation Requirement and other obligations under the NBHCP, including their reporting and monitoring obligations, in part, through the selection of TNBC as the Plan Operator. The Parties further agree:

(a) In the event that the Service determines pursuant to Section 7.6.1 of this Agreement, or CDFG determines pursuant to Section 7.6.2 that TNBC has violated the terms of the NBHCP, the Permits or this Agreement, such violation shall be considered a failure by CITY and SUTTER to implement their obligations of the Operating Conservation Program under the NBHCP. Provided, however, that if the violation by TNBC related to MAP mitigation acquisition or management requirements, or to other violations resulting from and solely pertaining to a violation of the MAP HCP, the provisions of this subsection shall not apply and neither City nor Sutter shall be considered to have failed to implement their obligations of the Operating Conservation Program under the NBHCP.

(b) Notwithstanding the foregoing in the event USFWS or CDFG make the determination set forth in Section 3.1.11(a), CITY's and SUTTER's Permits shall not be revoked or suspended, if CITY and/or SUTTER implement corrective measures, within the period specified by the USFWS and/or CDFG, to remedy TNBC's violation which may include, but shall not be limited to (1) replacing TNBC with another conservation entity qualified to serve as a Plan Operator, (2) transferring the Mitigation Lands to CDFG in accordance with Section 3.2.12 of this

Agreement, (3) implementation by TNBC of measures specified by the USFWS and/or CDFG as necessary to remediate the violation unless USFWS or CDFG determine that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild or USFWS or CDFG determine that the violation renders CITY or SUTTER unable to implement successfully the NBHCP; or (4) implementation by CITY and/or SUTTER of measures necessary to remediate the violation.

(c) Should the USFWS or CDFG determine that CITY or SUTTER has violated their separate obligations under the NBHCP, the Permits or this Agreement, such violation shall not be attributed to TNBC nor shall TNBC's Permits be affected, so long as TNBC continues to properly implement its obligations under the NBHCP with respect to the Mitigation Lands, including its obligations as the Plan Operator.

3.1.12 Certification of Urban Development Permittee. Urban Development Permits (i.e., the grading permit or notice to proceed) issued by CITY and SUTTER shall constitute a certification to the Urban Development Permittee that the Urban Development Permittee has complied with the Mitigation Requirements of the NBHCP and will be allowed to construct, maintain and operate a public or private project which may result in the Incidental Take of the Covered Species consistent with the conditions in the Permits and the Urban Development Permit, on the parcels for which the Urban Development Permit was issued. The issuance of such certifications shall be considered ministerial actions for the purposes of the laws of the State of California.

3.1.13 Public Works Projects. CITY and SUTTER shall apply the Mitigation Requirement and Conservation Measures set forth in this Section and in Chapters IV through VI of the NBHCP to all public works projects in their respective Permit Areas.

3.1.14 Assistance. CITY and SUTTER shall provide staff members to serve on the NBHCP Technical Advisory Committee.

3.1.15 Annual Report of Authorized Development. CITY and SUTTER shall each implement the Annual Report requirements described at Chapter VI of the NBHCP. In addition, at any other time during the Permit terms, CITY and SUTTER, at the request of USFWS or CDFG, shall provide within thirty (30) days, to the Wildlife Agencies additional information relevant to implementation of the NBHCP reasonably available to CITY and SUTTER.

3.1.16 Adaptive Management. CITY and SUTTER agree to abide by and implement all Adaptive Management provisions specified in, and subject to the limitations of, Chapter VI of the NBHCP, including, but not limited to, implementing revisions to management of Mitigation Lands, such as those which may be included in recovery plans for the Covered Species, in response to monitoring results in the Plan Area or to peer-reviewed new scientific information, in response to substantial land use changes in the Basin outside the Permit Areas and system of reserves, and Plan responses to Changed Circumstances.

3.1.17 Overall Program Review/Independent Midpoint Reviews. CITY and SUTTER agree to implement the Overall Program Review and Independent Mid-Point Reviews described in Chapter VI of the NBHCP to evaluate the performance and effectiveness of the NBHCP in achieving its biological goals and objectives.

3.1.18 CITY and SUTTER Liaison. CITY and SUTTER shall each designate a liaison to CDFG and USFWS for communications concerning this Agreement and the NBHCP. The CITY's and SUTTER's liaisons shall be responsible for reporting on their respective agency's implementation of and compliance with this Agreement, the NBHCP, and the Permits. CITY and SUTTER shall notify CDFG and USFWS of the name, address and telephone number of the liaison within 30 days of the Effective Date and shall subsequently notify CDFG and USFWS within 30 days in writing if the name, address or telephone number of the liaison is changed.

3.1.19 Implementation of other NBHCP Components. CITY and SUTTER agree to implement each of the other components of the NBHCP identified in the Plan or this Agreement, specifically including enactment of and periodic revisions to the Mitigation Fee ordinances and Catch Up Fee ordinances or through other funding mechanisms except for the CITY or SUTTER

general funds, as described in Chapter VI of the Plan as necessary to ensure the NBHCP is fully funded. The commitments set forth herein shall be subject to the limitation that implementation of such measures is within the CITY's or SUTTER's land use or other legal authority.

3.2 The Natomas Basin Conservancy.

3.2.1 Establish Mitigation. TNBC agrees that it will serve as the Plan Operator under the NBHCP, and will Acquire, locate, operate, manage, and maintain Mitigation Lands in accordance with Chapters IV through VI of the NBHCP and Section 5 of this Agreement. To the extent provided in the NBHCP, such activities shall be carried out in consultation with the TAC and with the approval of the Wildlife Agencies.

3.2.2 Acceptance of Mitigation Fees. TNBC agrees that it will accept Mitigation Fees from CITY and SUTTER and use them exclusively to implement its Acquisition, management, monitoring, reporting and other responsibilities identified in Chapters IV through VI of the NBHCP.

3.2.3 TNBC Land Management; Site Specific Management Plan/NBHCP Biological Monitoring Plans/Surveys. TNBC agrees that it shall be responsible for implementing the following management obligations within its Permit Area:

(a) TNBC, in consultation with the TAC and subject to the approval of the Wildlife Agencies as provided in the NBHCP, shall prepare a Site Specific Management Plan for each Mitigation Land site acquired by TNBC under the Plan. Each Site Specific Management Plan shall be completed in accordance with the timing requirements specified in Chapter IV and VI, of the NBHCP and shall contain each of the elements described in Chapters IV and VI, E. of the NBHCP. TNBC agrees to implement the Site Specific Management Plans in accordance with the NBHCP and upon approval.

(b) TNBC, in consultation with the TAC and subject to the approval of the Wildlife Agencies as provided in the NBHCP, shall prepare an overall Biological Monitoring Plan consistent with the provisions of Chapter VI of the NBHCP. Upon approval, TNBC agrees to implement the overall NBHCP Biological Monitoring Plan in accordance with the NBHCP.

(c) TNBC shall conduct annual surveys of the Covered Species on Mitigation Lands and periodic surveys of the Covered Species throughout the Plan Area as provided in the NBHCP, the Site Specific Management Plans and Plan-wide Biological Monitoring Plan.

3.2.4 Implementation Annual Report. TNBC shall provide the Parties with an Implementation Annual Report by May 1 of each calendar year the NBHCP is in effect. The Implementation Annual Report shall include all of the information identified in Chapter VI of the NBHCP, including the results of the Compliance Monitoring implemented by CITY, SUTTER and TNBC and the Effectiveness Monitoring implemented by TNBC during the prior calendar year, and provide an accounting of all Mitigation Fees collected, all Urban Development Permits Issued, and all Mitigation Lands Acquired.

3.2.5 Implementation Annual Meeting. On or before July 1 of each calendar year each Permittee, USFWS and CDFG shall meet to discuss the Implementation Annual Report submitted by the TNBC, and any concerns, comments or recommendations any of the Parties may have regarding implementation of the NBHCP.

3.2.6 Funding. At least annually, TNBC shall evaluate the adequacy of Mitigation Fees to fund implementation of the NBHCP and shall recommend to CITY and SUTTER adjustments to the Mitigation Fee as necessary to ensure the Plan is fully implemented.

3.2.7 Budgeting and Planning. Prior to the end of each calendar year, the TNBC shall prepare a budget and a plan for its proposed activities for the forthcoming year and provide copies to each Permittee, CDFG and USFWS.

3.2.8 Successor. With the prior written approval of CITY, SUTTER, USFWS and CDFG, the assets and obligations of TNBC may be transferred to any other non-profit corporation

provided that the successor corporation assumes each of the obligations of TNBC as set forth under the NBHCP the TNBC Permit, and this Agreement.

3.2.9 Transfer to CDFG. In the event TNBC is unable to meet its financial obligations and is dissolved, becomes insolvent or goes bankrupt, and no other suitable successor is found, then the ownership of the Mitigation Lands (including conservation easements), accumulated Mitigation Fees and other sums designated for enhancement and maintenance of those lands, shall be transferred to the CDFG or a non-profit association or corporation organized for conservation purposes that is approved by USFWS, CDFG, CITY and SUTTER, which shall hold the Mitigation Lands (including conservation easements) in perpetuity and use the Mitigation Fees for the acquisition and permanent management, operation, maintenance, monitoring, and conservation of the Mitigation Lands in accordance with the NBHCP. In the event the ownership of Mitigation Lands (including conservation easements), accumulated Mitigation Fees and other sums designated for enhancement and maintenance of those lands are transferred to CDFG, CDFG shall have the authority to seek adjustments to the Mitigation Fee consistent with the provisions of the NBHCP.

3.2.10 Operation in Perpetuity. Subject to the requirements of Chapters IV and VI of the NBHCP, Mitigation Lands acquired to meet the NBHCP's Mitigation Requirement shall function in perpetuity to provide Habitat Values for the Covered Species. TNBC shall establish a sufficient endowment from the endowment components of the Mitigation Fees adopted by CITY and SUTTER to permanently sustain management of the Mitigation Lands in accordance with the NBHCP following expiration or termination of the Permits.

3.2.11 Conflicts of Interest. TNBC shall establish and maintain by-laws which include, at a minimum, restrictions on interests in contracts by Board members and employees which are at least as stringent as those applied to government officers and employees by California Government Code §1090 and following, as well as restrictions on participation in decisions and requirements of financial disclosure which are at least as stringent as those applied to government officers and employees by the Political Reform Act of 1974 and any regulations promulgated pursuant thereto.

3.2.12 TNBC Proceedings Open to Public. TNBC agrees that its actions and proceedings shall be conducted in public, in a manner consistent with the Ralph M. Brown Act, California Government Code Sections 54950, et seq. TNBC may conduct closed sessions for real estate negotiations as permitted in its Bylaws, referenced in the NBHCP, as may be amended from time to time ("TNBC Bylaws"). Pursuant to the TNBC Bylaws, the provisions of the Ralph M. Brown Act regarding the disclosure of information with respect to real property transactions (including, but not limited to Government Code Sections 54954.5(b), 54956.8 and 54957.1(a)(1)), whether such transactions are pending or completed, shall not apply. As used herein, "real property transactions" shall include options to purchase or lease, purchases, and leases of real property, as well as farming contracts affecting real property that TNBC has acquired or is in negotiations to acquire.

3.2.13 Implementation of Other NBHCP Components. TNBC shall implement each of the other components of the NBHCP identified in the Plan or this Agreement, including but not limited to the conservation strategies and Take avoidance, minimization and mitigation measures, to the extent such measures fall under its authority and control.

3.3 USFWS.

3.3.1 Oversight. After issuance of each Section 10(a)(1)(B) Permit, the USFWS shall monitor the implementation of such Permit, this Agreement, and each Permittee's activities thereunder, to ensure compliance with the NBHCP, this Agreement and the Permits.

3.3.2 Technical Assistance. Subject to Section 8.12 of this Agreement, the USFWS shall provide staff to serve on the NBHCP Technical Advisory Committee (TAC), shall provide responses to TNBC as required under the NBHCP in a timely manner, and recommend, as appropriate, revisions to the NBHCP under the Plan's Adaptive Management, Overall Program and Independent Mid-Point Reviews, and other applicable provisions, to ensure the viability of the Plan.

USFWS shall also make available USFWS staff for informal consultations and meetings with the staffs, boards or councils of the Permittees to assist with implementation of the NBHCP. Consistent with its legal authorities, the USFWS shall cooperate with TNBC in obtaining additional funding from sources including, but not limited to, existing and future state and federal grant programs and bond issues to augment the conservation strategies of the NBHCP. Such funds are in addition to, and not in substitution of, the funding required to implement the NBHCP as described in this Agreement.

3.3.3 Newly Listed Uncovered Species. Coverage and authorization for Take of newly listed species which are not covered under the Permits shall require amendment of the NBHCP and the Permits. Until and unless the Section 10(a)(1)(B) Permits are amended to cover the newly listed species, the Permittees shall adhere to the Changed Circumstances provisions applicable to the listing of a new species as described in Chapter VI of the NBHCP. Modification of the NBHCP as necessary to amend the Permits to authorize take of new species not previously covered by the NBHCP shall be at the discretion of all parties to the NBHCP, this Agreement and the associated Permits.

3.3.4 Issuance of Section 10(a) Permits.

(a) Following execution of this Agreement, the Service will issue a Section 10(a) Permit to each signatory Permittee authorizing the Take of each listed Covered animal Species incidental to the Covered Activities, subject to and in accordance with the NBHCP, this Agreement and the Permits.

(b) For Covered animal Species not listed as an endangered species or threatened species under ESA as of the Effective Date, the Section 10(a) Permits shall become effective as to each such species concurrent with the listing of the species as a threatened species or endangered species under the ESA. The NBHCP also covers seven (7) plant species. Take of listed plants is not prohibited under the ESA and therefore will not be authorized under the Section 10(a) Permits. Plants are included as Covered Species under the NBHCP and will be listed on the federal permits in recognition of the conservation measures provided for them under the NBHCP. Plant species covered under the NBHCP will also be provided assurances under the federal “No Surprises” rule.

3.3.5 Permit Findings. USFWS, based on the best scientific and commercial data available and the terms and provisions of this Agreement and the NBHCP, has found that with respect to the Covered Species:

(a) The Taking of Covered Species will be incidental to otherwise lawful activities.

(b) Implementation of the NBHCP by the Permittees will, to the maximum extent practicable, minimize and mitigate the impacts of the Incidental Take of Covered Species.

(c) CITY and SUTTER will ensure that adequate funding for the NBHCP will be provided and the NBHCP and this Agreement provide procedures for addressing Changed Circumstances and Unforeseen Circumstances.

(d) The Take of Covered Species in accordance with this Agreement will not appreciably reduce the likelihood of the survival and recovery of the Covered Species in the wild.

(e) The measures agreed upon by the Permittees and the USFWS for purposes of the NBHCP will be met.

(f) Through this Agreement, the USFWS has received the required assurances that the NBHCP will be implemented.

3.4 CDFG.

3.4.1 Oversight. After issuance of the Section 2081 Permit to CITY and SUTTER, CDFG shall monitor the implementation of the Section 2081 Permit, this Agreement and TNBC’s activities thereunder, including but not limited to, the modification, enhancement, operation and maintenance of the Mitigation Lands in order to ensure compliance with this Agreement and

consistency with CDFG's trustee agency duties pursuant to CESA, and recommend any amendments to the NBHCP CDFG deems desirable, in the reasonable exercise of its discretion, under the Plan's Adaptive Management provisions as described in Chapter IV, Section E of the NBHCP or the Overall Program Review as described in Chapter IV, Section I of the NBHCP.

3.4.2 Assistance. CDFG shall provide staff to serve on the NBHCP TAC, and shall ensure the availability of its staff for informal consultations and meetings with TNBC and the staffs, boards or councils of the other Parties to this Agreement to ensure the appropriate monitoring of permitted activities which may lead to the Incidental Take of State Protected Species. CDFG will assist TNBC (to the extent authorized by the California Legislature) in obtaining additional funding from sources including, but not limited to, existing and future state and federal grant programs and bond issues to augment the conservation strategies of the NBHCP. Such funds are in addition to, and not in substitution of, the funding required to implement the NBHCP as described in this Agreement.

3.4.3 New Species. CDFG shall make available to Permittees information it has or acquires regarding new sightings or occurrences of any species in the Permit Areas which is state listed as threatened or endangered, is a candidate for listing as threatened or endangered, or is otherwise likely to be state listed, and which is determined to be dependent upon habitat in the Permit Area, if such species is not otherwise described in Exhibit D hereof. Once a year, upon the request of TNBC, CDFG shall provide TNBC with updated information from the California Natural Diversity Data Base ("CNDDB") covering new sightings and occurrences of any species not otherwise described in Exhibit D within the Permit Areas. At the same time, CDFG may propose any amendments to the NBHCP CDFG deems reasonably necessary to preserve Habitat Values for the benefit of such species.

3.4.4 CDFG Land Management. CDFG shall manage in perpetuity, in a manner consistent with the NBHCP, for the conservation of the Covered Species any Mitigation Lands conveyed to it by TNBC pursuant to the terms and provisions of this Agreement.

3.4.5 Issuance of Section 2081(b) Permit.

(a) Following execution of this Agreement, CDFG will issue a Section 2081(b) Permit or modification to an existing Permit to each Permittee authorizing the Take of each Covered Species incidental to Covered Activities, subject to and in accordance with the NBHCP and this Agreement.

(b) As to each Covered Species that is not currently listed under CESA, the Incidental Take Authorization under the Section 2081(b) Permits shall become effective consistent with Section 6.2.4 of this Agreement.

3.4.6 Section 2081(b) Permit Findings.

CDFG, based on the best scientific and other information that is reasonably available, and the terms and provisions of this Agreement and the NBHCP, has found that with respect to the Covered Species:

(a) Incidental Take. The authorized Take of Covered Species will be incidental to an otherwise lawful activity.

(b) Minimize and Fully Mitigate. The impacts of the authorized Take will be minimized and fully mitigated.

(c) Roughly Proportional. The measures required to minimize and fully mitigate the impacts of the authorized Take will be roughly proportional in extent to the impact of the authorized Take of Covered Species.

(d) Applicant's Objectives. The measures required to minimize and fully mitigate the impacts of the authorized Take will preserve Permittee objectives to the greatest extent possible, consistent with the obligation to minimize and fully mitigate the impacts of the authorized Take.

(e) Capable of Successful Implementation. All required measures will be capable of successful implementation.

(f) Adequate Funding. Permittees have ensured adequate funding to implement the required minimization and mitigation measures, and for monitoring compliance with, and effectiveness of, those measures.

(g) No Jeopardy. The issuance of the Section 2081(b) Permits will not jeopardize the continued existence of any Covered Species.

(h) Unlisted Species. Covered Species that are not currently listed as threatened or endangered under CESA have been treated in the NBHCP as if they were listed, and the NBHCP identifies measures to minimize and fully mitigate the impacts of the authorized Take of such unlisted species. The findings in this Section 3.4.5 apply to all Covered Species, including Covered Species that are not listed.

4 MITIGATION

4.1 Mitigation Lands. Mitigation Lands will be established and managed pursuant to the NBHCP.

4.2 Respective Permit Areas. Developers of all lands within the respective Permit Areas that are developed pursuant to an Urban Development Permit, shall provide mitigation pursuant to the NBHCP for the direct, indirect and cumulative impacts of development upon Covered Species and their habitat. CITY and SUTTER shall require an Urban Development Permittee to provide mitigation for the conversion of land to Authorized Development in the respective Permit Areas, in conformity with the NBHCP and the following sections.

4.3 Existing Development Exempt. Parcels of land within the respective Permit Areas that are shown as "Exempt Area-Existing Development" and "Development Subject to 1997 HCP" on the Baseline Maps depicted on Exhibits B and C of this Agreement are not covered by the NBHCP, this Agreement, or the Permits, provided, however, that nothing in this Agreement shall be construed to exempt such existing development from any applicable requirements of the ESA or CESA.

4.4 Mitigation Ratio. Mitigation for the conversion of land in the respective Permit Areas to Authorized Development will be required at the ratio of one half (½) acre of land protected or conserved for every one (1) acre of land converted to Authorized Development (the "Mitigation Ratio").

4.5 Calculation of Mitigation Requirement for Authorized Development Projects. The Mitigation Requirement for each public or private project is determined by applying the Mitigation Ratio to the land area converted to Authorized Development (the "Mitigation Requirement"). The land area converted to Authorized Development is determined as follows:

(1) For both private and public development projects, except as provided in (2) and (3) below, the gross area of a particular project is considered "land area converted to Authorized Development" whether the entire project is graded or not. The fees payable shall be calculated by multiplying the Mitigation Fees (in dollars per acre) times the land area converted to Authorized Development, prorated for fractional acres.

(2) For private development projects, a separate parcel or portion of a parcel which will be transferred to a public agency for a public use consisting of a park, school or other public building, is exempt. The Mitigation Requirement for such uses must be satisfied when the parcel of public use property is developed by the respective public agency owning the parcel. With respect to other lands designated for public use, the following criteria will apply: (a) Roads: where a road is included within the respective Land Use Agency's finance plan for purposes of financing, the land transferred or to be transferred by fee or easement to the agency for the road project is excluded; where a road is not one which is financed pursuant to the agency's finance plan, but is to be paid for entirely by the private landowner or developer of the project, even though ultimately it will be dedicated to the agency, the land transferred or to be transferred to the agency for the road is included; (b) Utilities: where the landowner or developer is required to transfer to the respective Land Use Agency or another public entity (e.g., Sacramento Municipal Utility District), by easement

or fee, land for a structure such as a pump station, outfall station, or similar structure, such land is excluded; where the landowner or developer is required to transfer to the agency non-exclusive easements for utility lines (water lines, sewer lines, and similar lines), the land covered by such easements is included; if the easement is exclusive, the land covered by the easement is excluded, but the transferee agency will be required to provide mitigation upon development of the transferred parcel. With respect to each parcel or portion of a parcel exempted or excluded pursuant to this section, the Mitigation Requirement shall be satisfied by CITY or SUTTER at the time such parcel or portion of land is converted to Authorized Development.

(3) For both private and public projects, excluded is any parcel or portion of the parcel approved as Mitigation Land by TNBC and the Wildlife Agencies in accordance with the NBHCP and which will be transferred in fee to TNBC or will be encumbered by a Conservation Easement in favor of TNBC for purposes of satisfaction of the Mitigation Requirement for the particular development project.

4.6 Satisfaction of Mitigation Requirement. A public or private project proponent may satisfy the Mitigation Requirement by: (1) payment of the Mitigation Fees; or (2) subject to the approvals required by the NBHCP, transfer of Mitigation Land to TNBC, together with payment of all components of the Mitigation Fee except the Land Acquisition Fee as specified in the NBHCP. Credit against the Land Acquisition Fee component of the Mitigation Fees is based on the number of acres of land being transferred and is not based on cost or perceived value of the land transferred. Where the proponent elects to transfer land to TNBC, TNBC and the Wildlife Agencies must approve the transfer of each parcel of Mitigation Land considering its location, proximity to urban uses and roads, current land condition, and all other factors specified in the NBHCP. If the amount of land transferred to TNBC is less than the Mitigation Land required for the public or private project, the landowner is obligated to pay the outstanding balance of the Land Acquisition Fee component of the Mitigation Fees. If the amount of land transferred to TNBC is greater than the amount of Mitigation Land required for the development project, the landowner may choose one of the following credit options: (i) receive credit from the excess amount of land toward required Mitigation Land under the NBHCP for future Authorized Development of property owned by the landowner; or (ii) transfer credit from the excess amount of land toward required Mitigation Land under the NBHCP for Authorized Development of property owned by another specified landowner. If either credit option is chosen, then prior to the transfer of Mitigation Land being finalized, the landowner shall inform CITY or SUTTER, as appropriate and TNBC in writing of the choice to receive or transfer credit and to whom the credit is to be transferred. Any transfer of fee title to lands or a Conservation Easement therein in order to satisfy the Mitigation Requirement shall be accomplished by a deed or grant of a conservation easement to TNBC in a form acceptable to USFWS and CDFG, in recordable form on or before issuance of an Urban Development Permit (i.e., a building permit, grading permit, or other permit which allows a disturbance of the surface of the earth for the public or private project). All land proposed to be transferred to TNBC in satisfaction of the Mitigation Requirement must meet the acquisition criteria specified in the NBHCP.

4.7 Jurisdictional Wetlands. Nothing in this Agreement shall relieve any Urban Development Permittee desiring to discharge any fill or other material into any jurisdictional wetlands, of any requirement to obtain a Clean Water Act Section 404 Permit from the U.S. Army Corps of Engineers and comply with all the terms and conditions thereof. Take of Covered Species related to jurisdictional wetlands by the Urban Development Permittee shall be authorized through the incidental take permits issued to CITY and SUTTER and shall be subject to the requirements of the NBHCP.

4.8 Rivers, Streams or Lakes. Nothing in this Agreement shall relieve any Urban Development Permittee desiring to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the CDFG, or use any material from the streambeds, of any requirement to comply with Fish and Game Code, Division 2,

Chapter 6, commencing with Section 1600 (concerning Streambed Alteration Agreements). This Agreement and implementation of the NBHCP are intended to satisfy only site-specific mitigation requirements for impacts of taking Covered Species as a result of an Authorized Development project which may be imposed under Chapter 6 of the California Fish and Game Code, with the exception of mitigation specifically directed at those vernal pool species included on the list of Covered Species.

4.9 Funding for Operating Conservation Program. CITY and SUTTER shall fund the Operating Conservation Program in accordance with Chapter VI of the NBHCP.

4.9.1 Mitigation Fees. Where an Urban Development Permittee selects payment of Mitigation Fees as its method of satisfying the Mitigation Requirement for the public or private project, the provisions of Section 4 shall govern the calculation and collection of such fees, and such Urban Development Permittee shall pay the Mitigation Fees as so calculated. The amount payable for the Mitigation Fee shall be the amount specified by ordinance or resolution adopted by the governing body of the CITY or SUTTER, including but not limited to the "catch-up fee" ordinances or other ordinances or resolutions adopted prior to or after the Effective Date.

4.9.2 Adjustments to the Mitigation Fee for Purposes of Funding the Operating Conservation Program Other than Changes to the Managed Marsh Component. Notwithstanding any other provision of this Agreement, upon request of TNBC or upon the written request of USFWS or CDFG as supported by documented evidence in the form of a written report and technical analysis, and as otherwise necessary, CITY and SUTTER shall review, and at the discretion of each, adjust the Mitigation Fees to take into account costs of land acquisition and TNBC operations, to maintain or meet the Mitigation Ratio specified in Section 4.4 of this Agreement, and to meet TNBC management, monitoring, adaptive management, or related costs required to fund the Operating Conservation Program as set forth in Chapters IV, V and VI of the NBHCP. The decision to adjust the Mitigation Fees may include but is not limited to consideration of the following factors: (1) the market price of land being acquired as Mitigation Land; (2) the necessity to maintain the 0.5 to 1 Mitigation Ratio; (3) the need to fund ongoing and permanent management and monitoring costs in accordance with the NBHCP; (4) the necessity to ensure the effectiveness of the NBHCP's Operating Conservation Program; and (5) the availability of other sources of revenues, including the sale of hunting rights on Mitigation Lands, proceeds from the cultivation of rice on Mitigation Lands and other funds and grants.

(a) Notwithstanding the foregoing and in accordance with, and subject to the limitations of, Chapter VI of the NBHCP, CITY or SUTTER shall be obligated to increase the Mitigation Fees to fund recommended changes to the Operating Conservation Program resulting from future recovery plans, monitoring results from the Plan Area or peer-reviewed new scientific information relevant to the Plan only when such recommendations:

(1) Relate to the physical management of Mitigation Lands;

(2) Would improve the effectiveness of the NBHCP's Operating Conservation Program by identifying relevant new information, approaches, techniques, or species protection needs;

(3) Can be implemented within the NBHCP Plan Area; and

(4) Fit within the overall intent and framework, are consistent with the NBHCP's biological goals and objectives and would not exceed the established Mitigation Ratio of the NBHCP; and

(5) Would not substantially sacrifice habitat values for Covered Species that are not addressed by the recovery plan, the monitoring results or other peer-reviewed new scientific information.

(b) Adjustment of the Mitigation Fees pursuant to this subsection is independent of adjustments made on account of inflation/deflation pursuant to Section 4.9.4 of this Agreement. Nothing in this Agreement shall be construed to diminish or otherwise affect the

discretionary authority of the Land Use Agencies with respect to fee adjustments under this Section 4.9.1.

4.9.3 Adjustments to the Mitigation Fee for purposes of Funding the Changes to the Managed Marsh Component. Upon written notification supported by documented evidence in the form of a written report and technical analysis by USFWS or CDFG to CITY and SUTTER of the adoption of a future Giant Garter Snake Recovery Plan, the availability of monitoring results from the Plan Area, or peer-reviewed new scientific information indicating an adjustment in the enhancement and management activities for managed marsh as specified in Chapter VI of the NBHCP, the CITY and SUTTER shall review, and at the discretion of each, adjust the Mitigation Fees to take into account increased costs of TNBC's enhancement and management of a higher proportion of managed marsh on Mitigation Lands acquired after adoption of the final Giant Garter Snake Recovery Plan by the USFWS, if the availability of peer-reviewed new scientific information or monitoring results from the Plan Area indicate an adjustment in the enhancement and/or management activities for managed marsh is warranted as specified and subject to the limitations contained in Chapter VI of the NBHCP. The obligation to adjust the Mitigation Fees shall be subject to the following limitations set forth in Chapter VI of the NBHCP:

(b) the obligation to increase the Mitigation Fees shall be applied prospectively to future Mitigation Lands acquired after adoption of the Recovery Plan, in response to monitoring results from the Plan Area or in response to peer-reviewed new scientific information.

(c) if the Recovery Plan, monitoring results collected from the Plan Area, or peer-reviewed new scientific information indicate a higher proportion of managed marsh (1) will improve the effectiveness of the NBHCP's Operating Conservation Program to meet its biological goals and objectives, (2) is beneficial to the snake, and (3) will not adversely affect any other listed Covered Species.

(d) the maximum levels of managed marsh which may apply to future Mitigation Land acquisitions which occur after the results of monitoring from the Plan Area or peer-reviewed new scientific information, or Giant Garter Snake Recovery Plan adoption shall not exceed seventy-five percent (75%) of such Mitigation Lands.

Adjustment of the Mitigation Fees pursuant to this subsection is independent of adjustments made on account of inflation/deflation pursuant to Section 4.9.4 of this Agreement. (Nothing in this Agreement shall be construed to diminish or otherwise affect the discretionary authority of the Land Use Agencies with respect to fee adjustments under this Section 4.9.2.)

4.9.4 Fee Adjustments for General Inflation. On or before January 1 of each year, CITY and SUTTER shall review and, at the discretion of each, adjust the dollar amount of the Mitigation Fees (as adjusted from time to time pursuant to Section 4.4.1), to take into account the effects of inflation/deflation generally. Adjustments will be calculated as follows: the current Mitigation Fee shall be multiplied by the index for October of the year prior to January 1, divided by the index for October of the preceding year [e.g., 2003 Fee = 2002 Fee x (October, 2002 CPI Index/October, 2001 CPI Index)]. For purposes of making this adjustment, the index utilized shall be the Consumer Price Index for All Urban Consumers, All Items, San Francisco–Oakland–San Jose (1982-1984=100), as published by the U.S. Department of Labor, or its successor. Technical adjustments made pursuant to this Section 4.9.4 shall be independent of, in addition to and not a part of adjustments to, the Mitigation Fee adjustments made pursuant to Section 4.9.2 and 4.9.3.

4.9.5 Failure to Adjust Mitigation Fees. CITY and SUTTER acknowledge that the failure of either CITY or SUTTER to adjust the Mitigation Fees as necessary to maintain the Mitigation Ratio and ensure implementation of each of the other requirements of the NBHCP identified in Chapters IV through VI of the NBHCP and/or in this Section 4 may result in suspension or revocation of their respective Permits as set forth in Section 7.6 of this Agreement.

5 Mitigation Lands

5.1 Location of Mitigation Lands. TNBC shall locate Mitigation Lands in accordance

with Chapters IV through VI of the NBHCP and this Section.

5.2 Setbacks and Buffers. All Mitigation Lands Acquired by TNBC shall conform to the buffer and setback requirements set forth in Chapters IV and VI of the NBHCP.

5.3 In-Basin Acquisition. A minimum of 80 percent of all Mitigation Lands shall be acquired within the Natomas Basin as provided in the NBHCP. Up to 20 percent of all Mitigation Lands may be acquired outside of the Natomas Basin in Area B if approved by TNBC and the Wildlife Agencies in accordance with the criteria provided in Chapter IV of the NBHCP.

5.4 Coordinating Mitigation Land Acquisition With Agency Acquisitions. Prior to the Acquisition of any parcel of Mitigation Land, TNBC shall provide written notice to the USFWS, CDFG, and both CITY and SUTTER of its intent to Acquire such lands. USFWS and CDFG agree that they will not knowingly interfere or compete with TNBC for the Acquisition or control of such lands and that they will consult with TNBC in formulating any Acquisition plans. As to those lands identified by USFWS or CDFG for acquisition, TNBC, likewise, shall not knowingly interfere with or compete with the affected agency for acquisition or control until TNBC is notified by that agency that it is no longer pursuing acquisition or control of the lands.

5.5 Timing of Mitigation Land Acquisition. TNBC shall comply with the requirements of the NBHCP relating to the Acquisition of Mitigation Lands in advance of approval of Authorized Development set forth in Chapter VI of the NBHCP. The Parties further agree that in order to ensure that Mitigation Lands are Acquired in an amount sufficient to meet the Mitigation Requirement that attaches to all Authorized Development under the NBHCP, TNBC shall establish a 200 acre cushion of Mitigation Lands prior to the approval of any Authorized Development by CITY or SUTTER under the Plan and shall maintain the 200 Acre Mitigation Land cushion until the approval of the last 400 acres of Authorized Development under the Plan. CITY, SUTTER and TNBC shall implement this requirement in accordance with the NBHCP, as follows.

(a) No Urban Development Permits for Authorized Development shall be issued by CITY or SUTTER after September 30 of each calendar year until TNBC notifies CITY and SUTTER that it has Acquired Mitigation Lands which equal the number of acres necessary to meet the Mitigation Requirement attached to all prior Urban Development Permits issued by CITY and SUTTER plus an additional 200 acres of Mitigation Land.

(b) Because TNBC is responsible for Acquiring Mitigation Lands for Planned Development, TNBC will credit mitigation fees collected under the Metro Air Park HCP (MAP HCP) along with all Mitigation Fees collected by CITY and SUTTER for Authorized Development. The collection of Mitigation Fees for Planned Development will be credited against the Mitigation Lands Acquired by TNBC, in chronological order, with priority given to the oldest project among those approved under the MAP HCP and the CITY's or SUTTER's Permits to have paid Mitigation Fees.

5.6 Acquisition of 400 and 2,500-Acre Blocks. TNBC shall comply with those provisions of the NBHCP relating to Acquisition of Mitigation Lands to ensure that the Mitigation Lands are consolidated in minimum 400-acre habitat blocks and at least one 2,500 acre habitat block prior to the expiration of the Permits. The 400 acre minimum block requirement and the 2,500 acre minimum block requirement shall be applied in the aggregate to all Permittees and to all other approved HCPs in the Natomas Basin that are based on the NBHCP, so that the plans as a whole must achieve the identified habitat block consolidation requirements set forth in the NBHCP upon Plan completion. Notwithstanding the above, CITY and SUTTER each retain the independent obligation to provide 400 acre minimum blocks and one 2,500 acre minimum block prior to the date their respective Permits expire in the event the other Permittees cease participation in the NBHCP, or in the event the Potential Permittees choose not to participate in the NBHCP. None of the provisions contained herein shall be construed to prohibit the USFWS or CDFG from authorizing Mitigation Land acquisitions that do not comply with the minimum 400-acre minimum block size in the event that TNBC identifies potential Mitigation Lands which otherwise provide opportunities for the preservation of important biological resources.

5.7 Accounting for Mitigation Lands

5.7.1 Managed Marsh. Mitigation Lands acquired and converted to and managed as seasonal or perennial marsh, and existing marsh lands acquired by TNBC and managed as seasonal or perennial marsh, will count fully toward the 0.5:1 Mitigation Ratio described in Section 4.4 of this Agreement.

5.7.2 Rice Land. Mitigation Lands in current rice production as Rice Lands will count fully toward the 0.5:1 Mitigation Ratio described in Section 4.4 of this Agreement.

5.7.3 Uplands. Mitigation lands providing upland habitats will count fully towards the 0.5:1 Mitigation Ratio described in Section 4.4 of this Agreement.

5.7.4 Proportion of Mitigation Lands as Marsh. Within three years of the approval of a Site Specific Management Plan a minimum of 25 percent of the Mitigation Lands must be in managed marsh as specified in the NBHCP. Thereafter, a minimum of 25 percent of the Mitigation Lands shall be in managed marsh until and unless that amount is increased up to a maximum of 75 percent of the Mitigation Lands in accordance with Section 4.9.3 of this Agreement and Chapter VI of the NBHCP. Pursuant to Section 4.9.3 of this Agreement and Chapter VI of the NBHCP, any

increase in the amount of Mitigation Lands required to be in managed marsh shall apply only to Mitigation Lands Acquired to satisfy the Mitigation Requirement for Authorized Development which are acquired after the USFWS or CDFG provide written notice and its accompanying documentation of Recovery Plan adoption, the availability of monitoring results from the Plan Area, or the availability of credible scientific information collected in the Plan Area. Provided the Wildlife Agency's requested increase in managed marsh complies with Chapter VI of the NBHCP, the failure of TNBC to adopt the increase in managed marsh as requested by either Wildlife Agency shall trigger a reevaluation of the Plan and possible suspension or revocation of the CITY and SUTTER's Permits as set forth under Section 7.6 of this Agreement.

5.8 Conservation Measures. CITY and SUTTER shall include in each Urban Development Permit the Conservation Measures provided ~~for~~ in Chapter V of the NBHCP.

6 ASSURANCES

6.1 USFWS

6.1.1 No Surprises Assurances.

(a) Unforeseen Circumstances. As provided in 50 C.F.R. 17.3, the term "Unforeseen Circumstances" shall mean changes in circumstances affecting a species or geographic area covered by the NBHCP that could not reasonably have been anticipated by the plan developers and USFWS at the time of the Plan's negotiation and development, and that results in a substantial and adverse change in the status of a Covered Species.

(1) "No Surprises" Assurances. Pursuant to the No Surprises Rule at 50 C.F.R. Sections 17.3, 17.22(b)(5) and 17.32(b)(5), and provided that CITY, SUTTER and TNBC are properly implementing the NBHCP, USFWS shall not require CITY, SUTTER or TNBC to provide additional land, water or other natural resources, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level provided for under the NBHCP, this Agreement and the Permits with respect to Covered Activities under the Permits without the consent of CITY or SUTTER. However, nothing in this Section or in the Assurances Rule shall be interpreted: (1) to restrict the authority of USFWS to take appropriate action under the ESA or applicable regulations to ensure that the NBHCP is properly implemented in accordance with this Agreement; (2) to apply to future Adaptive Management modifications for Mitigation Lands that are deemed necessary or appropriate by the USFWS or CDFG as determined in accordance with Chapter VI of the NBHCP and in consultation with CITY, SUTTER and TNBC, to respond to the results of monitoring in the Plan Area, or to new scientific information relevant to the NBHCP, (3) to apply to future modifications to the NBHCP as a result of future recovery plans as determined in accordance with Chapter VI of the NBHCP, (4) to apply to the NBHCP responses to Changed Circumstances identified in Chapter VI of the NBHCP, or (5) to apply to changes anticipated to occur as a result of the Urban Development activities anticipated by the Section 10(a)(1)(B) Permit, Section 2081(b) Permit, or as otherwise approved by the USFWS, provided that such actions, modifications and changes comply with the limitations and restrictions set forth in Chapter VI of the NBHCP. If USFWS makes a finding of unforeseen circumstances, during the period necessary to determine the nature and location of additional or modified mitigation, CITY, SUTTER and TNBC will avoid contributing to appreciably reducing the likelihood of the survival and recovery of the affected species and ensure that third persons under their control that are carrying out Covered Activities avoid contributing to appreciably reducing the likelihood of the survival and recovery of the affected species.

(2) Unforeseen Circumstances Finding. In the event that USFWS believes that Unforeseen Circumstances may exist in accordance with the "No Surprises" rule, it shall notify CDFG, CITY, SUTTER and TNBC in writing of the applicable specific facts described in Section 6.1.1 above. In the notification, USFWS shall clearly document the basis for the proposed finding regarding the existence of Unforeseen Circumstances in accordance with the requirements of 50 C.F.R. § 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C). Within fifteen (15) days of

receiving such notice, CITY, SUTTER and TNBC, USFWS and CDFG shall meet to consider the facts cited in the notice and potential changes to the NBHCP's Operating Conservation Program or management and operation of the Mitigation Lands. Pursuant to 50 C.F.R. § 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C), USFWS shall make an Unforeseen Circumstances finding based on the best scientific evidence available, after considering any responses submitted by any other Parties pursuant to this section, and USFWS shall have the burden of demonstrating that Unforeseen Circumstances exist.

(3) Effect of Unforeseen Circumstances Finding. Pursuant to 50 C.F.R. 17.22(b)(5) and 17.32(b)(5), in the event that USFWS makes a finding of Unforeseen Circumstances and additional conservation and mitigation measures are deemed necessary to respond to such Unforeseen Circumstances, USFWS may require additional measures from CITY, SUTTER or TNBC where the NBHCP is being properly implemented, but only if such measures are limited to modifications within the Mitigation Lands and the NBHCP's Operating Conservation Program for the affected species and maintain the original terms of the NBHCP to the maximum extent possible. Additional conservation and mitigation measures shall not involve the commitment of additional land, water or other natural resources without the consent of CITY and SUTTER.

(b) Changed Circumstances.

(1) Changed Circumstances Defined. As provided in 50 C.F.R. 17.3, the term "Changed Circumstances" means changes in circumstances affecting a species or geographic area covered by the NBHCP that can reasonably be anticipated by CITY, SUTTER or TNBC and that can be planned for in the NBHCP (e.g. the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events.) Changed circumstances and planned responses to those circumstances are described in Chapter VI of the NBHCP.

(2) Permittee-Initiated Response to Changed Circumstances. CITY, SUTTER or TNBC, as appropriate, will immediately notify USFWS and all other Permittees upon learning that any of the Changed Circumstances listed in Chapter VI of the NBHCP has occurred, and shall provide written notice within seven (7) days. Permittees shall modify their activities and shall require third persons under the Permittees' control to modify their activities, as appropriate, in accordance with Chapter VI of the NBHCP, to the extent necessary and feasible to minimize and mitigate the effects of the Changed Circumstances. CITY, SUTTER and TNBC and will report to USFWS on their actions. Such modifications will be initiated without awaiting notice from USFWS. Such changes are provided for in the NBHCP, and hence do not constitute unforeseen circumstances or require amendment of Permits or the NBHCP.

(3) USFWS-Initiated Response to Changed Circumstances. If USFWS determines that Changed Circumstances have occurred and that CITY, SUTTER or TNBC have not responded in accordance with Chapter VI of the NBHCP, the USFWS in coordination with CDFG will so notify CITY, SUTTER and TNBC and, as appropriate, direct them to make the required changes. Within thirty (30) days after receiving such notice, CITY, SUTTER or TNBC, as appropriate, will make the required changes and report to USFWS on their action. Such changes are provided for in the NBHCP, and hence do not constitute unforeseen circumstances or require amendment of Permits or of the NBHCP.

6.1.2 Migratory Bird Treaty Act (MBTA). The Section 10(a)(1)(B) Permits issued pursuant to this Agreement also constitute Special Purpose Permits under 50 C.F.R. Section 21.27 for the "take" (for purposes of this Section, as that term is understood under the MBTA) of those Covered avian Species which are listed as threatened or endangered under the ESA and which are also protected by the MBTA. The take of such species in conjunction with any Authorized Development Project, in accordance with the terms of this Agreement, the NBHCP and CITY's, SUTTER's or TNBC's Permits, will not be in violation of the MBTA. Such Special Purpose Permits shall be valid for a period of three (3) years from the Effective Date of this Agreement provided that CITY's, SUTTER's or TNBC's Section 10(a)(1)(B) Permit remains in effect for that period. Such Special Purpose Permit shall be renewed as to each Permittee, provided that Permittee continues

to fulfill its obligations under this Agreement. Each such renewal shall be valid for the maximum period of time allowed by 50 C.F.R. Section 21.27 or its successor at the time of renewal.

6.1.3 Beneficial Effects With Respect to Future Listings. To the extent permitted by the ESA and consistent with the provisions of the NBHCP, the USFWS shall consider the NBHCP and this Agreement in any future determination by the USFWS with regard to the listing of one or more of the currently unlisted Covered Species as an endangered species or threatened species pursuant to the ESA.

6.1.4 Critical Habitat. The USFWS further agrees that it will consider the NBHCP in its preparation of any proposed designation of critical habitat concerning any Covered Species and agrees that, consistent with 50 C.F.R. 424.12, the NBHCP incorporates those special management considerations necessary to manage the Covered Species and their habitats in a manner that will provide "for the conservation of the species involved" within the CITY, SUTTER's and TNBC's respective Permit Areas in the Natomas Basin. Consistent with the No Surprises Rule set forth in Section 6.1.2(a), in the event that a critical habitat designation is made for any Covered Species and upon a determination that CITY, SUTTER and TNBC are properly implementing the NBHCP, no additional mitigation in the form of land, land restrictions or financial compensation, beyond that required by the NBHCP, shall be required of any Permittee in connection with Urban Development in its Permit Area as a result of such critical habitat designation without the consent of that Permittee.

6.1.5 ESA Listing of Currently Unlisted Covered Species. In the event that one or more of the Covered animal Species that are not currently listed as an endangered species or threatened species are so listed pursuant to the ESA, the Section 10(a)(1)(B) Permit shall become effective to permit the Incidental Take of such species in connection with Urban Development within each Permittee's Permit Area as of the date the species is listed provided the CITY, SUTTER and TNBC are properly implementing the NBHCP. The Parties expressly acknowledge that it is the intent of this Agreement that the Mitigation Lands will be administered so as to conserve and enhance the habitat values for all listed and unlisted Covered Species reasonably expected to be found in Natomas Basin , to the extent provided for in the NBHCP.

6.2 CDFG

6.2.1 CESA Compliance. CDFG shall consider adherence to the terms of this Agreement to be compliance with the CESA and the California Native Plant Protection Act for the impacts of Authorized Development on State Protected Species in the Permit Area. Take of Fully Protected Species is not authorized by this Agreement.

6.2.2 Adequate Mitigation Under CESA. CDFG shall consider adherence to the terms of the Section 2081 Permit, the NBHCP and this Agreement to minimize and fully mitigate the impacts associated with the Incidental Take of State Protected Species in the Permit Areas as authorized by the Section 2081 Permit and this Agreement pursuant to CESA.

6.2.3 Assurances. Except as otherwise required by law, no further mitigation from Urban Development Permittees and/or CITY and SUTTER consisting of land, additional land restrictions, or financial compensation beyond that described herein and provided for in the NBHCP, will be required by CDFG to address the impacts of Authorized Development within the respective Permit Areas on the State Protected Species, Covered Species which become listed in the future as State-protected species, or their habitats pursuant to the CESA.

6.2.4 CESA Listing of Currently Unlisted Covered Species. In the event that one or more of the Covered Species that are not State Protected Species are listed as an endangered species or threatened species or candidate species pursuant to the CESA ("Additional State Protected Species"), the Section 2081 Permit shall become effective to permit the Incidental Take of such species in connection with Authorized Development within each Permittee's Permit Area as of the date the species is accepted and designated as a candidate species pursuant to California Fish and Game Code section 2074.2, upon confirmation by CDFG that substantial evidence demonstrates that the Section 2081 Permit will continue to meet the standards in California Fish and Game Code Section 2081(b) and Title 14 of the California Code of Regulations, Section 783,4 for the Additional State Protected Species. In the event CDFG determines that such standards will not be met, and the Section 2081 Permit does not become effective upon the designation of an Additional State Protected Species as a candidate, threatened, or endangered species under CESA, CDFG shall accept and give due consideration to the minimization and mitigation measures in the NBHCP and this Agreement in support of an application for a permit amendment or for a separate Section 2081 Permit authorizing Incidental Take of any such Additional State Protected Species. CDFG shall make reasonable efforts to review and process the application for an amendment to the Section 2081 Permit or a new Section 2081 Permit to authorize Incidental Take of an Additional State Protected Species to ensure, to the extent consistent with CESA, that the Incidental Take authorization is effective at the time the Covered Species is accepted and designated as a candidate species under CESA.

(a) The Parties expressly acknowledge that it is the intent of this Agreement that the Mitigation Lands will be administered so as to enhance their Habitat Values for all the Covered Species reasonably expected to be found in the Permit Areas.

(b) To the extent permitted by the CESA, the CDFG shall consider the NBHCP and this Agreement in any future determination by the CDFG with regard to the listing of one or more of the currently unlisted Covered Species as an endangered species or threatened species pursuant to the CESA.

6.2.5 Changed Conditions. For the purposes of this Agreement, the term "Changed Conditions" shall have the same meaning as expressed in CESA and its related implementing regulations in Title 14 of the California Code of Regulations, commencing with section 783.0. Prior to making a finding of Changed Conditions, CDFG shall provide notice to CITY, SUTTER, TNBC and other Parties hereto of any proposed amendments to this Agreement which CDFG proposes to remedy the Changed Condition. CDFG shall, to the extent feasible, meet with CITY, SUTTER, TNBC, and other Parties hereto at least ninety (90) days prior to making a finding of Changed Conditions to provide such parties with an opportunity to submit their comments and suggested revisions to the proposed amendment.

6.3 Limits on Future Revisions to NBHCP. The Parties acknowledge that the NBHCP expressly provides for revisions to the Plan's Operating Conservation Program and Mitigation Lands as a result of monitoring results collected from the Plan Area, peer-reviewed new scientific information, or future recovery plans for the Covered Species, as part of the Adaptive Management program, in response to Changed Circumstances and for any other cause identified in Chapter VI of the NBHCP, provided that such revisions comply with Chapter VI of the NBHCP. Such revisions are provided for under the Plan and are therefore not subject to the restrictions on additional Mitigation contained in USFWS's No Surprises Rule or agreed to by CDFG, nor do such revisions require amendment of the Plan or the Permits. Notwithstanding the above, such revisions shall be subject to the following limitations unless such limitations are waived in writing by CITY, SUTTER and TNBC.

(a) The modifications shall not require more than 75 percent of the Mitigation Lands to be converted to or maintained as managed marsh; and

(b) The modifications shall not require the Mitigation Ratio to be greater than 0.5 acre mitigation to 1.0 acre development.

(c) The modifications shall comply with the requirements, limitations and restrictions specified in Chapter VI of the NBHCP.

6.4 Reservation of Rights Re: Subsequent Listing of Species. This Agreement shall not be construed as a waiver of any rights or objections that any of the Parties hereto or Urban Development Permittees may have with respect to the proposed listing of any Candidate Species under the ESA or CESA or of any of the other Covered Species described in this Agreement. The Permittee and the Urban Development Permittees reserve their right to oppose any formal listing of any Candidate Species or other Covered Species pursuant to the ESA or CESA. Likewise, nothing in this Agreement is intended, nor shall be construed to limit the authority of USFWS or CDFG to enforce or otherwise carry out their respective responsibilities under the federal or state Endangered Species Acts and other applicable federal and state laws.

6.5 Land Use Authority. Nothing in the NBHCP or in this Agreement shall be interpreted or operate in a manner that expressly or impliedly diminishes or restricts the local land use authority of CITY and SUTTER. Notwithstanding the foregoing sentence, CITY and SUTTER acknowledge that they have chosen to implement several of the commitments made by them under the NBHCP through the exercise of their respective land use authorities. Therefore, a failure of CITY or SUTTER to exercise their land use authorities in a manner consistent with their obligations under the NBHCP could compromise the effectiveness of the Plan, would trigger a reevaluation of the Plan and their respective Permits and could result in suspension or revocation of such Permits as set forth in Section 7.6 of this Agreement.

6.6 No Liability. All Parties hereto agree that under no circumstances shall CITY, SUTTER and TNBC have any liability whatsoever for any debts, liabilities or financial obligations incurred by another Permittee under the NBHCP. Notwithstanding the foregoing sentence CITY and SUTTER acknowledge that they are obligated under their Permits to fully implement the NBHCP, including funding each of the obligations assigned to TNBC as the Plan Operator under the NBHCP. Therefore, a failure of CITY or SUTTER to fully fund TNBC's obligation under the Plan could compromise the effectiveness of the Plan, would trigger a reevaluation of the Plan and CITY, SUTTER and TNBC's respective Permits and could result in suspension of revocation of such permits pursuant to Section 7.6 of this Agreement.

7 AMENDMENTS AND REMEDIES

7.1 Revisions and Amendments to the NBHCP. Revisions to the NBHCP shall be implemented in accordance with Chapter VI of the Plan. Revisions shall not require Amendment of the Plan or Permits. Amendments to the NBHCP shall require amendment of the Permits and shall be processed in accordance with the amendment provisions of Chapter VI of the Plan and all applicable laws and regulations.

7.2 Amendments to Agreement. This Agreement may be amended only by written document signed by all of the Parties.

7.3 Land Use Changes. The Parties to this Agreement agree that the adoption and amendment of General Plans, Specific Plans, Community Plans, zoning ordinances and similar ordinances, and the granting of implementing land use entitlement by CITY or SUTTER pertaining to land in their respective Permit Areas, shall be matters within the sole discretion of CITY and SUTTER, and shall not require amendments to this Agreement or the approval of the other Parties to this Agreement. No such action by CITY or SUTTER shall in any way alter or diminish its obligations under this Agreement and the NBHCP. Notwithstanding the foregoing sentences, CITY and SUTTER acknowledge that they have chosen to implement several of the commitments made by them under the NBHCP through the exercise of their respective land use authorities. Therefore,

a failure of CITY or SUTTER to exercise their land use authorities in a manner consistent with their obligations under the NBHCP could compromise the effectiveness of the Plan, would trigger a reevaluation of the Plan and their respective Permits and could result in suspension or revocation of such Permits as set forth in Section 7.6 of this Agreement.

7.4 Remedies in General. The Parties acknowledge that each of the Covered Species is unique and that the loss of any of the Covered Species would be irreparable and that therefore injunctive and/or temporary relief may be appropriate in certain circumstances involving a breach of this Agreement. Notwithstanding any other provision of this Agreement, the Parties shall not be liable in monetary damages to any Party or any person for any breach of this Agreement, in the performance or failure to perform a mandatory or discretionary obligation imposed by this Agreement, or any other cause of action arising from this Agreement. Subject to the foregoing, the Parties shall have all of the remedies available in equity (including specific performance and injunctive relief) and at law to enforce the terms of this Agreement and the Section 10(a)(1)(B) Permit and Section 2081 Permit and to seek remedies for any breach thereof, consistent with and subject to the terms of this Agreement. It is expressly understood by the Parties that monetary damages will not provide an adequate remedy for material breach of this Agreement.

7.5 Third Party Enforcement. This Agreement shall not create in the public, any member of the public, or any other person or entity, including any Urban Development Permittee, any rights under this Agreement, nor shall it authorize anyone not a signatory to this Agreement to maintain a suit (1) in equity or law to enforce the terms of this Agreement and/or the NBHCP, Section 10(a)(1)(B) Permit or Section 2081 Permit, or (2) for compensation or damages under the provisions of the Agreement, NBHCP, or Permits.

7.6 Suspension or Revocation.

7.6.1 Suspension or Revocation by USFWS. The Parties acknowledge that the USFWS has the authority to suspend or revoke any of the Section 10(a)(1)(B) Permits, in whole or in part, in the event of a material violation of the Section 10(a)(1)(B) Permit and pursuant to any applicable federal laws or regulations that govern the permitted activity. The regulations found at 50 C.F.R. §§13.27 - 13.29 and 17.22(b)(8), or any successor regulations, shall govern the suspension or revocation of the Section 10(a)(1)(B) Permit issued by the USFWS.

7.6.2 Suspension or Revocation by CDFG. The Parties acknowledge that CDFG shall have the authority to suspend or revoke the Section 2081 Permit in the event of a material breach or violation of the Section 2081 Permit or any applicable California laws or regulations governing the permitted activity.

7.6.3 Status of Urban Development Permittees after Suspension or Revocation. Notwithstanding the suspension or revocation of a Permittee's Permit, CITY and SUTTER shall remain liable under this Agreement to carry out all of their responsibilities under the Permits and this Agreement arising from any Authorized Development approved, authorized, or carried out by CITY or SUTTER, within their respective Permit Areas between the Effective Date of the Agreement and the date a Permittee's Permit is suspended or revoked. As to any Authorized Development project approved or authorized by CITY or SUTTER prior to the Permit suspension or revocation and that is in compliance with the Permit, but as to which construction activity has not commenced as of the suspension or revocation, so long as CITY or SUTTER and the Urban Development Permittee, if any, continue to fulfill their obligations under the Permit, the Permit shall continue in effect for that Authorized Development project until that project is completed.

7.6.4 No Further Approvals by Permittees. Subject to the provisions of section 7.6.3 above, if a Permit is suspended or revoked, CITY and SUTTER shall not have the authority to rely upon the Permit to approve or carry out any actions that would violate the ESA or CESA in the absence of such Permit. Notwithstanding the suspension or revocation, CITY and SUTTER shall remain fully liable under the Permits and this Agreement to carry out all of their responsibilities, including the Mitigation Requirement, under the NBHCP, the Permits and this Agreement arising from Authorized Development approved, authorized or carried out by an Urban Development

Permittee within the respective Permit Areas between the Effective Date and the date the Permit is suspended or revoked.

7.6.5 Severability. The violation by CITY or SUTTER of their respective Permits shall not adversely affect or be attributed to, nor shall it result in the loss or diminution of any right, privilege or benefit under a Permit held by a non-responsible Permittee. Nor shall CITY and SUTTER be deemed to have violated the Permits solely as a consequence of the actions of an Urban Development Permittee or other third person subject to CITY's or SUTTER's jurisdiction and control, so long as CITY or SUTTER takes all necessary and appropriate steps, if any are available, to halt and correct the violation in accordance with this Agreement and consistent with their police powers and local land use authority. However, the violation by TNBC of its Permits shall be considered a failure by CITY and SUTTER to implement their obligations of the Operating Conservation Program under the NBHCP. In such event, CITY and SUTTER's Permits shall not be revoked or suspended, if CITY and/or SUTTER implement corrective measures in accordance with Section 3.1.11 of this Agreement. Notwithstanding the above, to the extent that action or inaction by a Permittee, an Urban Development Permittee or other third party subject to CITY's or SUTTER's jurisdiction and control, or TNBC prevents proper implementation of the NBHCP or compliance by one or more of the remaining Permittees with their Permits or results in a determination by the USFWS or CDFG that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild, such Permits may be suspended or revoked in accordance with applicable USFWS and CDFG regulations.

7.6.6 Validity of Permits. In the event a court of competent jurisdiction invalidates either City, County's or TNBC's Section 10(a)(1)(B) or Section 2081 Permits with regard to one or more Covered Species, other than the Giant garter snake or Swainson's hawk, such action shall not be construed to invalidate the permits with regard to the remaining Covered Species. The requirements of the State and Federal Incidental Take Permits and the NBHCP shall continue to be implemented by each Permittee with regard to the remaining Covered Species.

8 MISCELLANEOUS

8.1 Term of Agreement. This Agreement shall remain in effect for a period of fifty (50) years from the Effective Date.

8.2 Termination

8.2.1 Termination by Mutual Consent. CITY or SUTTER may, by mutual agreement with the Wildlife Agencies, terminate this Agreement as to itself. In the event that such mutually agreed-upon termination occurs, a written termination agreement shall be executed to ensure that the mitigation required under the NBHCP and this Agreement for all Authorized Development approved, authorized or carried out prior to termination is carried out. Upon execution of such agreement, the Permits shall thereafter be null and void as to CITY or SUTTER, but not as to other Permittees or Urban Development Permittees or public or private projects for which the Mitigation Requirement has been completed or otherwise assured.

8.2.2 Termination by USFWS or CDFG. The USFWS or CDFG may terminate this Agreement upon revocation of the Section 10(a)(1)(B) Permit or the Section 2081 Permit in accordance with Section 7.6.

8.2.3 Termination by the TNBC. The TNBC may terminate voluntarily its participation under this Agreement only if it has an agreement to do so with the CITY, SUTTER, USFWS and CDFG. Any agreement allowing TNBC to terminate its participation and its status as Plan Operator, shall contain provisions for assuring that the provisions of the NBHCP will be implemented.

8.2.4 Effect of Termination. In the event this Agreement is terminated by the USFWS or CDFG with respect to a Permittee, that Permittee's Section 10(a)(1)(B) Permit or Section 2081 Permit, as applicable, shall, subject to Section 8.2.1 above, be void. CITY and SUTTER acknowledge that, although the NBHCP Operating Conservation Program would mitigate

for effects resulting from the Land Use Agencies' Covered Activities, because the percentage of uplands to wetlands differs between their respective Permit Areas, the NBHCP allows for the Operating Conservation Program provided for under the NBHCP to be reevaluated and revised in the event either CITY's or SUTTER's Permits are terminated or revoked to ensure that the configuration of Mitigation Lands provided for under the NBHCP continues to adequately mitigate for the impacts of Authorized Development in the remaining jurisdiction.

8.2.5 Status of Mitigation Lands Upon Termination. The Mitigation Lands are to be established in perpetuity. Management of the Mitigation Lands by TNBC in accordance with the NBHCP shall continue in perpetuity, notwithstanding termination, suspension or revocation of CITY's or SUTTER's Section 10(a)(1)(B) Permit or Section 2081 Permit for any reason, unless the suspension or revocation of CITY's or SUTTER's Permits is due to a violation by TNBC of its Permits. TNBC's management activities shall be funded from the Mitigation Fees collected on account of past Authorized Development under the Permits which includes endowment components to fund permanent management. None of the assets of the TNBC, including lands or interests in land may be transferred, conveyed, or assigned to any person or entity, except as specified in Sections 3.2.11 and Section 3.2.12 of this Agreement

8.3 Binding Effect. The terms, provisions and conditions of this Agreement shall be binding upon and inure to the benefit of the Parties hereto and their respective successors and assigns.

8.4 Notices. Any notice required or permitted to be given hereunder shall be in writing, shall be deemed made upon receipt, and shall be given by personal delivery or by certified mail/return receipt requested, addressed to the Parties as follows:

City of Sacramento
915 I Street, Room 109
Sacramento, CA 95814
Attn: City Manager

County Administrative Officer
County of Sutter
1160 Civic Center Blvd., Ste. A
Yuba City, CA 95993

United States Fish and Wildlife Service
Office of the Regional Director
Portland, OR 97232

with a copy to:

Field Supervisor
U.S. Fish and Wildlife Service
3310 El Camino Avenue, Suite 130
Sacramento, CA 95821-6340

California Department of Fish and Game Office of the Director
1416 9th Street, 12th floor
Sacramento, CA 95814

with copies to:

General Counsel
California Department of Fish and Game
1416 9th Street, 12th floor
Sacramento, CA 95814

and to:

Regional Manager
California Department of Fish and Game
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

The Natomas Basin Conservancy
1750 Creekside Oaks Dr., Suite 290
Sacramento, CA 95833
Attn: Executive Manager

Any Party may give notice to the others specifying a different address for notice purposes.

8.5 Captions. The headings of the various sections hereof are for convenience only, and shall not affect the meaning of any provisions of this Agreement.

8.6 Counterparts. This Agreement may be executed in multiple counterparts, all of which shall constitute but one and the same instrument.

8.7 Governing Law. This Agreement shall be governed by and construed in accordance with the ESA, the CESA, and other applicable state and federal laws. In particular, nothing in this Agreement is intended to limit the authority of USFWS to fulfill its responsibilities under the ESA or CDFG under CESA or other applicable law, including but not limited to seeking penalties against CITY, SUTTER or TNBC. Moreover nothing in this agreement is intended to limit the legal responsibilities of USFWS as an agency of the federal government or CDFG as an agency of the State of California.

8.8 Complete Agreement. This Agreement, together with the NBHCP, constitutes the full and complete agreement between the Parties concerning the subject matter hereof and supersedes any prior or contemporaneous agreements or understandings, whether oral or written, all of which shall be deemed to have been merged herein, it being the intention of the Parties that this be a completely integrated agreement. Specifically, this Agreement shall supercede the Implementation Agreement executed in December, 1997.

8.9 Federal Section 7 Consultations. Nothing in this Agreement is intended to eliminate or modify the obligation of a federal agency to consult with the USFWS pursuant to section 7(a) of the ESA (16 U.S.C. Section 1536(a)). To the maximum extent appropriate, in any consultation under said provision involving CITY or SUTTER or a prospective or other Urban Development Permittee with regard to Covered Species, the USFWS shall ensure that the biological opinion issued in connection with the proposed public or private Project which is the subject of the consultation is consistent with the biological opinion issued in connection with the NBHCP, provided that the proposed public or private Project is consistent with the NBHCP. Any biological measures included under the terms and conditions of the Section 7 biological opinion shall, to the maximum extent appropriate, be consistent with the Mitigation Requirement imposed by CITY or SUTTER under the NBHCP as implemented by this Agreement, provided that, unless otherwise required by law, the USFWS shall not impose additional mitigation measures on the project proponent in

excess of those that have been or will be required by the CITY or SUTTER pursuant to the NBHCP, this Agreement and the Permits.

8.10 Conflict with NBHCP. The NBHCP and each of its terms are intended to be, and by this reference are, incorporated herein. In the event of any contradiction, conflict or inconsistency between the terms of this Agreement and the NBHCP, the terms of this Agreement shall control. In all other cases, the terms of this Agreement and of the NBHCP shall be interpreted to be supplementary to each other. Where interpretation is required, this Agreement shall be interpreted as a vehicle for implementation of the NBHCP.

8.11 Other Permittees. The failure of other Potential Permittees identified in the NBHCP to obtain Permits shall not preclude this Agreement from going into effect within the geographical boundaries of each Permittee , or on lands Acquired by the NBC, nor preclude the issuance of the Permits to such other Potential Permittees or to subsequent signatories of this Agreement.

8.12 Federal Appropriations. USFWS's commitment to provide technical assistance under the NBHCP and to implement this Agreement, including the assurances provided herein, are subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this agreement will be construed by the parties to require the obligation, appropriation, or expenditure of any money from the U.S. Treasury. The parties acknowledge that the USFWS will not be required under this Agreement to expend any federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

8.13 State Appropriations. Implementation of this Agreement and the NBHCP and the assurances provided herein, is subject to the availability of appropriated funds. Nothing in this agreement will be construed by the parties to require the obligation, appropriation, or expenditure of any money from the Treasury of the State of California. The parties acknowledge that CDFG will not be required under this Agreement to expend any State of California agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

8.14 References to Regulations. Any reference in this Agreement, the NBHCP, or the Permits to any regulation or rule of USFWS or CDFG shall be deemed to be a reference to such regulation or rule in existence at the time the action is taken.

8.15 Applicable Laws. All activities undertaken pursuant to this Agreement, the NBHCP or the Permit must be in compliance with all applicable state and federal laws and regulations.

8.16 No Partnership. Neither this Agreement nor the NBHCP shall make or be deemed to make any party to this Agreement the agent for or the partner of any other party.

8.17 Elected Officials Not to Benefit. No member of or delegate to Congress shall be entitled to any share or part of this Agreement, or to any benefit that may arise from it.

IN WITNESS WHEREOF, the Parties have executed this Agreement to be effective as of the date first set forth above.

U.S. FISH AND WILDLIFE SERVICE,
An Agency of the Department of the Interior
of the United States of America

By:_____

Name:_____

Title:_____

CALIFORNIA DEPARTMENT OF FISH AND GAME,
A Subdivision of the Resources Agency
of the State of California

By:_____

Name:_____

Title:_____

CITY OF SACRAMENTO,
A Municipal Corporation

By:_____
Robert P. Thomas
City Manager

Approved as to Form:

_____
City Attorney

COUNTY OF SUTTER,
A Political Subdivision of the State of California

By:_____

County Administrative Officer

Approved as to Form:
_____
County Counsel

NATOMAS BASIN CONSERVANCY,
A Non-Profit Corporation

By:_____

Name:_____

Title:_____

[add signatories]

EXHIBIT A: DEFINITIONS

NBHCP Definitions

Terms used in this Plan shall have the same meaning as those same terms have under the ESA and CESA, except as set forth below. Capitalized terms used but not defined herein, but which are defined in the Plan, shall have the meanings specified in the Plan.

1. Adaptive Management. The term "Adaptive Management" means a method for examining alternative strategies for meeting measurable goals and objectives, and then, if necessary adjusting future conservation management actions according to what is learned to achieve those goals and objectives.

2. Amendment. The term "Amendment" shall refer to significant changes to the NBHCP, Implementation Agreement and/or Incidental Take Permit for circumstances as described in Chapter VI, Section 3(b) of the NBHCP. Amendments include activities which are more significant than and different from revisions (see also "Revisions").

3. Area B (Out of Basin Mitigation Area). Area B shall refer to lands identified on Figure 20 of the HCP in which TNBC may pursue acquisition of Mitigation Lands under the specific terms described in Chapter IV, Section 2.b of the HCP, with approval of USFWS and CDFG. TNBC shall account for all acreage acquired in Area B to ensure that the total amount of such lands does not exceed 20 percent of the total Mitigation Lands.

4. Authorized Development. The term "Authorized Development" means that development for which incidental take is authorized for the City of Sacramento and Sutter County under this NBHCP. Authorized Development is limited to a total of 15,517 acres of Planned Development (as further defined below in Section III.A) under the NBHCP. Included within the City's 8,050 acre portion of the Authorized Development are 28 acres of infrastructure development associated with the Metro Air Park (MAP) project in Sacramento County. Included within Sutter County's 7,467 acres of Authorized Development is 16.5 acres of proposed drainage channel improvements located within Sacramento County. Incidental take resulting from the 1,983 acre MAP project, including the 28 acres located in the City of Sacramento, is covered by separate incidental take permits issued by the Wildlife Agencies. The 15,517 acres of Authorized Development related incidental take within the City and Sutter County combined with the 1,983 acres of development related take within Sacramento County for the MAP project represent a total of 17,500 acres of potential urban development in the Natomas Basin which has been analyzed in the NBHCP as Planned Development, as further defined below. Any development within the City of Sacramento beyond the 8,050 acres to be covered under its incidental take permits, within Sutter County, beyond the 7,467 acres to be covered under its incidental take permits, or within Sacramento County beyond the MAP project, will not be covered under the respective incidental take permits and will trigger a reevaluation of impacts to and mitigation for biological and other resources in the Natomas Basin and amendment of the NBHCP and the incidental take permits or development of a new HCP and issuance of new incidental take permits to address such impacts and mitigation as appropriate.

5. Biological Monitoring. The term "Biological Monitoring" means the mandatory element of all HCPs that is designed and implemented to provide the information necessary to assess compliance and project impacts, and verify progress toward the biological goals and

objectives for the Plan's Covered Species and habitats.

6. Biological Monitoring Plan. Refers to specific monitoring requirements to be conducted in the Natomas Basin as specified in Chapter VI, Section E, Subsection 2, and includes both the overall NBHCP Biological Effectiveness Monitoring Program and the Site Specific Biological Monitoring Programs.

7. Changed Circumstances. This term "Changed circumstances" is defined in Title 50 of the Code of Federal Regulations, Section 17.3 as changes in circumstances affecting a species or geographic area covered by the NBHCP that can reasonalby be anticipated by Plan Participants and the USFWS, and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events.)" Changed circumstances addressed in NBHCP are outlined in Chapter VI, Section K of the HCP.

8. Compliance Monitoring. The term "Compliance Monitoring" means an itemized, task specific method of verifying that the Permittee is carrying out the terms of the NBHCP, Permit and IA.

9. Conservation Measures. The term "Conservation Measures" means that accepting and conveying developer mitigation fees, and possibly land dedications, as required under the NBHCP, the Land Use Agencies shall implement a variety of measures that will avoid, minimize or mitigate the take of Covered Species.

10. Covered Activities. The term "Covered Activities" means the Land Use Agencies Covered Activities and the TNBC Covered Activities.

11. Covered Activities, Land Use Agencies. The term "Land Use Agencies Covered Activities" refers to those specific activities identified at Chapter I, Section N.(1) of the NBHCP for which each Land Use Permittee shall be provided coverage under the federal Section 10(a)(1)(B) permits, and the State Section 2081 Permits. Covered Activities generally means the conversion from vacant land or agricultural uses to residential, commercial, and industrial uses, including related public and private infrastructure development and improvements by the City or Sutter County.

12. Covered Activities, TNBC. The term "TNBC Covered Activities" means those activities conducted by TNBC on behalf of the City, Sutter County and other Permittees who may obtain take authorization pursuant to the NBHCP or an HCP based on the NBHCP, within TNBC's Permit Area. These activities include acquisition, habitat creation, restoration, preservation, enhancement, management and monitoring activities within Conserved Habitat Areas. TNBC's Covered Activities are described at Chapter I, Section N (3) of the NBHCP.

13. Covered Activities, Water Agencies. The term "Water Agencies Covered Activity" refers to those specific activities identified in Chapter I, Section N (2) of the NBHCP for which each Water Agency Permittee shall be provided coverage under the federal Section 10(a)(1)(B) permits, and the State Section 2081 Permits. Such Covered Activities generally include physical maintenance and operation of the Water Agencies' existing facilities located within the Plan Area, including channel maintenance, vegetation control (where no herbicides are utilized), and construction or improvement of facilities where there is no increase to the footprint of the existing facility.

14. Covered Species. The term "Covered Species" means the Federally Protected Species, State Protected Species and the Other Species identified within Table I-1 hereto.

15. ESA and CESA. The term "ESA" means the Federal Endangered Species Act of 1973, as amended. The term "CESA" means the California Endangered Species Act, as amended.

16. Exempt Area. The term refers to areas within the Natomas Basin, within the City of Sacramento which are already approved for development or already developed and as shown on Exhibit B of the Implementation Agreement.

17. Federally Protected Species. The term "Federally Protected Species" means those plants and animals listed by the United States ("U.S.") under the provisions of ESA and shown as Covered Species on Table I-1 hereto that are found, or may be found, in the Permit Areas, as well as those other Covered Species listed on Table I-1 that the USFWS may list in the future.

18. Five Point Policy: The term "Five Point Policy" refers to an addendum to the HCP Handbook published by the Fish and Wildlife Service and the National Marine Service on June 1, 2000. The five point policy addendum provides clarifying guidance for conducting the incidental take permit program and for those applying for an incidental take permit under section 10(a)(1)(B) of the Endangered Species Act (ESA).

19. Habitat Values. The term "Habitat Values" means the capability of a land or water area or associated areas, where indigenous plant(s) or animal(s), individually or collectively, may occur and upon which the Covered Species are dependent, in whole or in part, to provide for some or all of their maintenance, growth and reproduction.

20. Implementation Annual Meeting. The term refers to the annual public meeting held jointly with TNBC, other Permittees, USFWS and CDFG to report on the progress of the HCP Conservation Strategy as described in Chapter VI.3.1 of the NBHCP.

21. Implementation Annual Report. The term refers to the annual report prepared by the TNBC describing the compliance and effectiveness monitoring processes and findings and the status of the progress in implementing the NBHCP in accordance with the requirements of Chapter VI, Section K of the NBHCP.

22. Incidental Take. The term "Incidental Take" means any taking of Covered Species that is incidental to, and not the purpose of, the carrying out of otherwise lawful activity.

23. Incidental Take Permits. The terms "Incidental Take Permits," "ITPs" and "Permits" mean the individual permits issued to each Permittee subject to Section 10(a)(1)(B) of the Endangered Species Act and Section 2081 of the California Endangered Species Act.

24. Independent Mid-Point Review. This term refers to the required review and evaluation of the effectiveness of the HCP by each of the land use agencies at a defined mid-point in the approval of Authorized Development and as more specifically defined in Chapter VI, Section J of the NBHCP.

25. Land Use Agencies. The term "Land Use Agencies"means the City of Sacramento and Sutter County. If and when Sacramento County submits and receives approval of its own

ITP, Sacramento County would be considered a Land Use Agency as defined herein.

26. MAP (Metro Air Park) Habitat Conservation Plan (MAP HCP). This term refers to final approved Habitat Conservation Plan for the Metro Air Park Project located in the unincorporated portion of the Natomas Basin within Sacramento County, specifically, "Habitat Conservation Plan for the Metro Air Park Project in the Natomas Basin, Sacramento County, California, Prepared by Metro Air Park Property Owner's Association, Dated 2001."

27. Mitigation Fees. As defined in Chapter VI, the term "Mitigation Fees" means the one time, up-front fees levied upon an Authorized Development site (in gross acres) that is used to pay for the Mitigation Land acquisition, enhancement, management, monitoring, and other activities required under the NBHCP. The Mitigation Fees must be paid prior to the issuance of an Urban Development Permit by the Land Use Permittee. The components of the Mitigation Fee include: Land Acquisition, Restoration/Enhancement/Monitoring, Administration O&M, O&M Endowment Fund, Supplemental Endowment Fund, and Fee Collection Administration as defined in Chapter VI.

28. Mitigation Lands. The term "Mitigation Lands" means the reserve lands acquired through collection and use of Mitigation Fees from Authorized Development, and in some cases land which has been accepted for dedication from Authorized Development, which will be set aside and managed at a ratio of one-half (½) acre of land protected or preserved for every one (1) acre of land converted to Authorized Development. The NBHCP Operating Conservation Program will result in 8,750 acres of Mitigation Lands to be established and managed by TNBC.

29. Mitigation Ratio. The term "Mitigation Ratio" means mitigation for the conversion of land in the respective Permit Areas to Authorized Development at a ratio of one-half (½) acre of land protected or preserved for every one (1) acre of land converted to Authorized Development.

30. Mitigation Requirement. The term "Mitigation Requirement" means the mitigation requirement for each public and private project is determined by applying the Mitigation Ratio to the land area converted to Authorized Development as calculated in accordance with the requirements set forth in Chapter VI, Section 1.

31. Natomas Basin. "Natomas Basin" or "Basin" means that geographical area depicted in Figure 2, Natomas Basin and Affected Jurisdictions.

32. Natomas Basin Habitat Conservation Plan. The terms "Natomas Basin Habitat Conservation Plan," "NBHCP" and "the Plan" mean the year 2002 version of the Natomas Basin Habitat Conservation Plan prepared for the City of Sacramento, Sutter County, The Natomas Basin Conservancy (TNBC), RD 1000 and Natomas Mutual.

33. Natomas Basin Habitat Conservation Plan, 1997. The terms "1997 NBHCP" and "1997 Plan" mean the previously approved City of Sacramento Natomas Basin HCP that was the original basis for this 2002 NBHCP.

34. No Surprises Rule. The term "No Surprises Rule" refers the terms and conditions specified in the February 28, 1998, the U.S. Fish and Wildlife final rule codifying its "No Surprises" policy into federal regulation (63 FR 8859). The "No Surprises" rule states, in part, that: "In

negotiating unforeseen circumstances, the [Service] will not require the commitment of additional land, water or financial compensation or other natural resources beyond the level otherwise agreed upon for the species covered by the conservation plan without the consent of the Permittee. If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the [Service] may require additional measures of the Permittee where the conservation plan is being properly implemented, but only if such measures are limited to modifications within conserved habitat areas, if any, or to the Conservation Plan's Operating Conservation Program for the affected species, and maintain the original terms of the Conservation Plan to the maximum extent possible. Additional conservation and mitigation measures will not involve the commitment of additional land, water or financial compensation or restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the conservation plan, without the consent of the Permittee." (50 C.F.R. Sections 17.22(b)(5)(iii) and 17.32(b)(5)(iii).) The No Surprises Rules is discussed in Chapter VI, Section K of the NBHCP.

35. Operating Conservation Program. The term "Operating Conservation Program" means the totality of the conservation and management measures provided for under the NBHCP to avoid, minimize, mitigate and monitor the impacts of take of the Covered Species as described in Chapters IV through VI of the Plan. The Operating Conservation Program includes totals the Permittees reporting obligations under the Permits and responses to Changed Circumstances described in Chapter VI.

36. Overall Program Review. This term refers to a required program review of the effectiveness of the Operating Conservation Program to be initiated at the point Urban Development Permits covering a total of 9,000 acres of development in the Natomas Basin have been issued by the Land Use Permittees and by Sacramento County for the Metro Air Park. The areas to be covered by the Overall Program Review are specified and described in Chapter VI, Section I of the NBHCP.

37. Permit Area, City of Sacramento. The term "Permit Area" as applied to the City of Sacramento means that area designated on Figure 2 of the NBHCP Implementation Agreement that totals 8,050 acres located within the City of Sacramento city limits and in certain locations (i.e., the Panhandle Annexation Area) within the unincorporated areas of Sacramento County. Incidental take authority for the City of Sacramento is limited to this Permit Area.

38. Permit Area, County of Sutter. The term "Permit Area" as applied to Sutter County means that area designated on Figure 2 of the NBHCP Implementation Agreement that totals 7,467 acres located within the unincorporated areas of Sutter County, and approximately 16.5 acres located within unincorporated Sacramento County. Incidental take authority for Sutter County is limited to this Permit Area.

39. Permit Area, Natomas Mutual. The term "Permit Area" as applied to Natomas Mutual means canals, ditches, waterways, ponds and open water areas, as well as roads, right-of-ways, facilities, maintenance yards, pumps, pipelines, and water detention facilities, under the direct jurisdiction of Natomas Mutual and inside the inner toe of levees surrounding the Natomas Basin, but not including the Sacramento River levees. Incidental take authority for Natomas Mutual is limited to this Permit Area.

40. Permit Area, RD 1000. The term “Permit Area” as applied to RD 1000 means canals, ditches, waterways, ponds and open water areas, as well as roads, right-of-ways, facilities, maintenance yards, pumps, pipelines, and water detention facilities, under the direct jurisdiction of RD 1000 and inside the inner toe of levees surrounding the Natomas Basin, but not including the Sacramento River levees. Incidental take authority for RD 1000 is limited to this Permit Area.

41. Permit Area, TNBC. The term “Permit Area” as applied to The Natomas Basin Conservancy (TNBC) consists of all lands within the Natomas Basin (the Plan Area), as well as the land bounding the Natomas Basin and extending to the edge of water immediately outside the Natomas Basin levees and Area B as depicted on Figure 20, Out of Basin Mitigation Areas.

42. Permittees. The term "Permittees" means the City of Sacramento, Sutter County, RD 1000, Natomas Mutual and The Natomas Basin Conservancy.

43. Plan Area. The term “Plan Area” means the entire 53,537 acres of land within the inside toe of levee of the Natomas Basin levees. The Plan Area refers to the portion of the Natomas Basin that is bounded on the west by the Sacramento River, on the north by the Natomas Cross Canal, on the east by Steelhead Creek (formerly known as Natomas East Main Drain Canal), and on the south by the Garden Highway.

44. Planned Development. The term “Planned Development” means the Authorized Development plus the development of the 1,983 acre Metro Air Park, which is subject to the Metro Air Park Habitat Conservation Plan (“MAP Authorized Development”).

45. Plan Operator. The term “Plan Operator” means The Natomas Basin Conservancy, the entity responsible for implementing the NBHCP.

46. Plan Participants. The term “Plan Participants” means parties actively involved in implementing the NBHCP, including the Wildlife Agencies (USFWS and CDFG), the Permittees (City of Sacramento, Sutter County, Natomas Mutual and RD 1000), and the Plan Operator (TNBC).

47. Potential Permittees. The term “Potential Permittees” refers to additional entities within the Natomas Basin that may decide to commit to the terms of the NBHCP and the Implementation Agreement and, through the issuance of Permits by the Wildlife Agencies, join as full Permittees at a future date.

48. Protected Species. The term "Protected Species" means those plants and animals listed under the State CESA and the Federal ESA.

49. Revisions. Refers to minor changes to the NBHCP as specified in Chapter VI, Section 3.a of the NBHCP. Revisions to the NBHCP are changes to the Plan provided for under the Operating Conservation Program, including Adaptive Management changes and Mitigation Fee adjustments. These revisions would not result in operations under the NBHCP that are significantly different from those analyzed in connection with the NBHCP as approved, result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the NBHCP as approved.

50. Section 10(a)(1)(B) Permits. The terms "Section 10(a)(1)(B) Permits" or "Permits" as used in

this Plan means the permits issued by the USFWS under Section 10 (a)(1)(B) of the ESA which authorize the incidental take of a Covered Species which may occur as a result of urban development activities, including public facilities projects, within the City of Sacramento and Sutter County, or as a result of the operation and/or maintenance, including the construction and improvements with no significant increase to the existing footprint, of flood control or water supply activities, water ditches, canals, pumphouses, maintenance facilities, or other ancillary facilities within the Natomas Basin, or as a result of habitat management, enhancement, or restoration activities on reserve lands. "Permit" may also be used in this Plan to collectively refer to the Section 10(a)(1)(B) Permits, and the Section 2081 Permits.

51. Section 2081 Permits. The terms "Section 2081 Permits" or "Permits" means the permits for the incidental take of threatened and endangered species, listed under the CESA, issued by the CDFG under Section 2081(b) and/or 2081.1 of the California Fish and Game Code, or any successor section to authorize the incidental take of a Covered Species which may occur as a result of urban development activities, including public facilities projects, within the City of Sacramento and Sutter County, or as a result of the operation and/or maintenance, including the construction and improvements with no significant increase to the existing footprint, of flood control or water supply activities, water ditches, canals, pumphouses, maintenance facilities, or other ancillary facilities within the Natomas Basin, or as a result of habitat management, enhancement, or restoration activities on reserve lands. "Permits" may also be used in this Agreement to refer collectively to the Section 10(a)(1)(B) Permits and/or the Section 2081(b) or 2081.1 Permits.

52. Site Specific Management Plan. The terms "Site Specific Management Plan" and "SSMP" mean those plans that TNBC is required to complete for each reserve unit that it acquires. SSMP's shall include operations plans that address on-site habitat restoration, enhancement, maintenance and management activities that will be presented to the NBHCP TAC for approval on a three year basis.

53. Swainson's Hawk Zone. This zone is defined as the lands which are not currently developed (excluding the 250 acres of land designated "Urban" on the City of Sacramento General Plan and the North Natomas Community Plan located within the City of Sacramento) and which are located within the Natomas Basin and within one mile east of the Sacramento River and extending from the Natomas Cross Canal on the north and Interstate 80 on the south. See also Figure 13 of the NBHCP.

54. System of Reserves. The term "system of reserves" means Mitigation Lands generally and includes all habitat conserved and managed for the Covered Species, including rice fields by TNBC.

55. Take or Taking. With regard to any activities subject to ESA, the terms "Take" or "Taking" shall have the same meaning as provided in the ESA. With regard to any activities subject to CESA, the terms "Take" or "Taking" shall have the same meaning as provided in CESA.

56. Technical Advisory Committee. The terms "Technical Advisory Committee" and "TAC" mean the advisory group of technical experts selected by the Permittees and the Wildlife Agencies to assist TNBC Board with directing the implementation of the NBHCP.

57. The Natomas Basin Conservancy. The terms "The Natomas Basin Conservancy," "the

Conservancy" or "TNBC" shall mean the independent entity established for the purpose of implementing the Natomas Basin Habitat Conservation Plan on behalf of the City, Sutter County and other Potential Permittees. The TNBC is also a Permittee for purposes of implementation of the reserve system.

58. TNBC Mitigation Land or Reserve Area. The term "TNBC Reserve Area" or "TNBC Mitigation Land" shall mean those areas where TNBC is authorized to acquire and manage wildlife reserves subject to the provisions of the NBHCP. Such areas shall include all lands within the Natomas Basin, as well as the land bounding the Natomas Basin and extending to the edge of water immediately outside the Natomas Basin levees and Area B as depicted on Figure 20, Out of Basin Mitigation Areas. The TNBC Reserve Area and the TNBC Permit Area are coterminous.

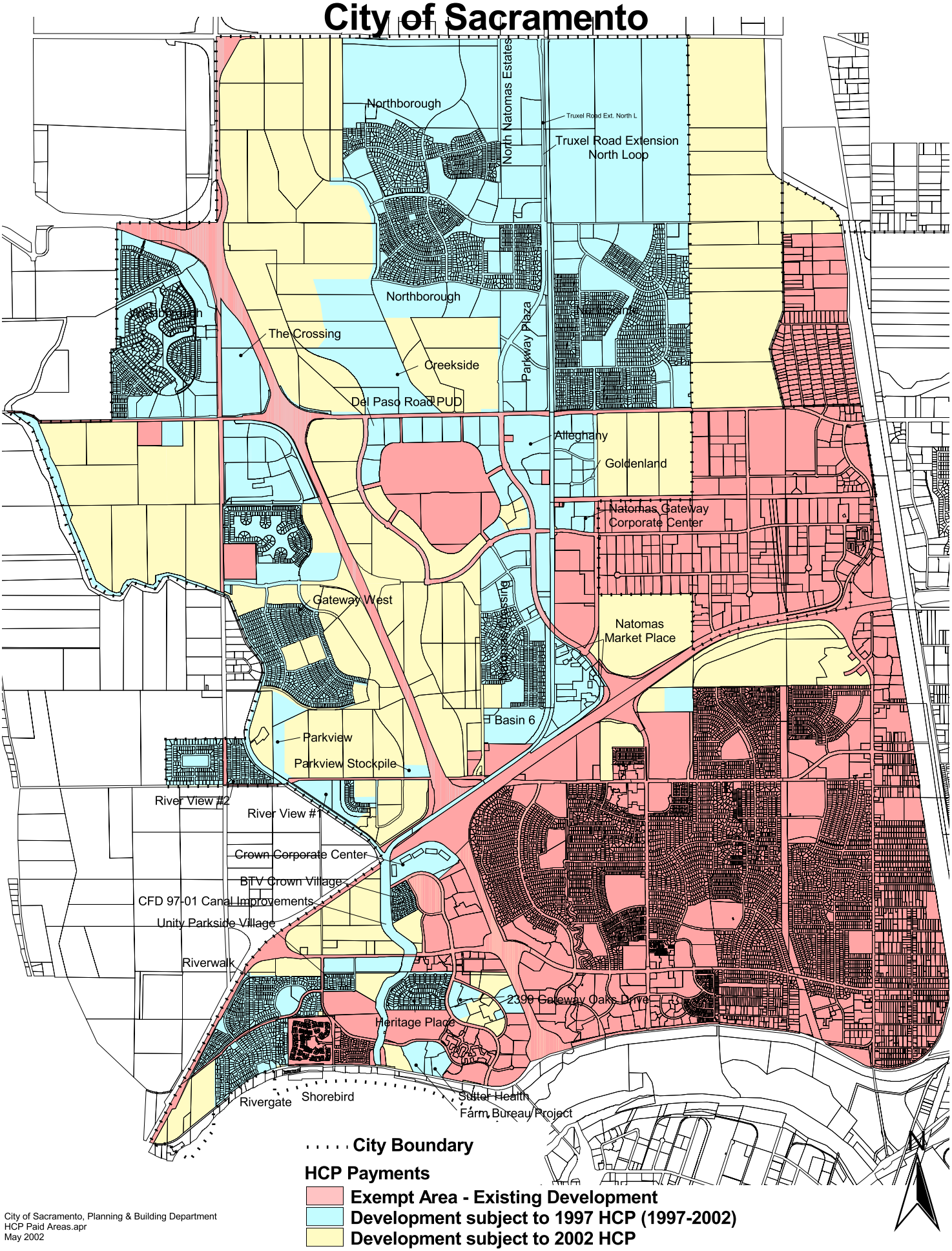
59. Unforeseen Circumstances. The term "Unforeseen circumstances" is defined at 50 C.F.R. 17.3 as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the USFWS at the time of the NBHCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species. Unforeseen circumstances are discussed in Chapter VI, Section K of the NBHCP.

60. Urban Development Permit and Urban Development Permittee. The term "Urban Development Permit" shall mean the final authorization granted by the Land Use Agencies prior to disturbance of undeveloped land in conjunction with a public or private development project. An Urban Development Permit may also be used to refer to a grading permit or notice to proceed. An "Urban Development Permittee" refers to the individual, agency or company applying for approval, or receiving approval of an Urban Development Permit from the Land Use Agencies.

61. Water Agencies. The term "Water Agencies" means RD 1000 and Natomas Mutual. Natomas Mutual is a private company and not a governmental agency.

62. Wildlife Agencies. The term "Wildlife Agencies" means the U.S. Fish and Wildlife Service and the California Department of Fish and Game.

Baseline Map - Exhibit B
City of Sacramento



City of Sacramento, Planning & Building Department
HCP Paid Areas.apr
May 2002

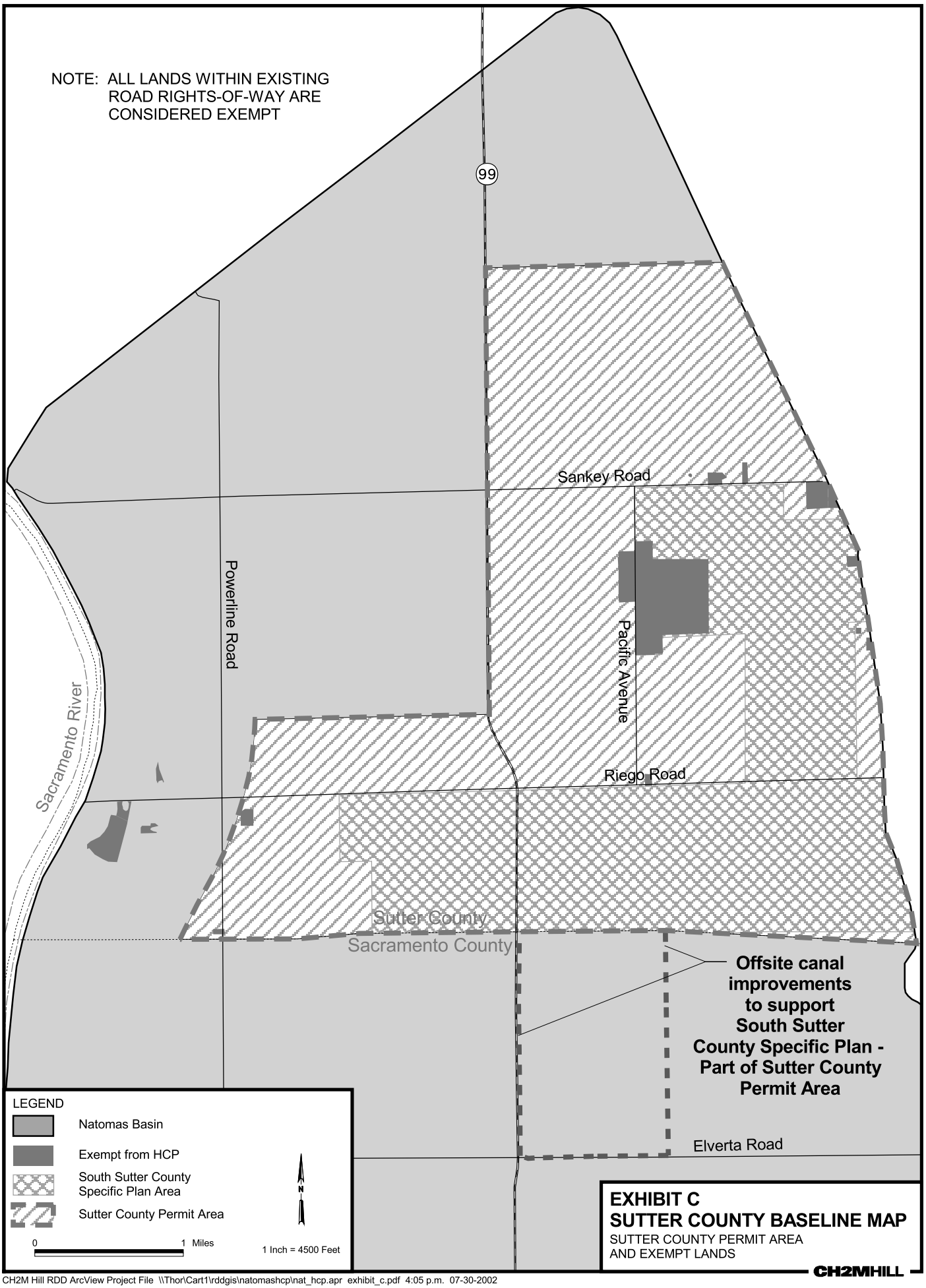


EXHIBIT C
SUTTER COUNTY BASELINE MAP
SUTTER COUNTY PERMIT AREA
AND EXEMPT LANDS

CH2MHILL

CH2M Hill RDD ArcView Project File \\Thor\Cart1\rddgis\natomashcp\nat_hcp.apr exhibit_c.pdf 4:05 p.m. 07-30-2002

Exhibit D -List of Covered Species in Permit Area

TABLE I - 1
LISTED, CANDIDATE, AND OTHER SPECIES ADDRESSED IN THE NBHCP AND COVERED BY ITS ASSOCIATED PERMITS

#	Species	Federal Status	State Status	Habitat Notes
1	Aleutian Canada goose *Branta canadensis leucopareia*	SC		Grazes in marshes and stubble fields, roosts on the water
2	bank swallow *Riparia riparia*		T	Nests in river banks, forages for insects over open water, croplands, and grasslands
3	burrowing owl *Athene cunicularia*		SSC	Prefers open, dry grassland and desert habitats
4	loggerhead shrike *Lanius ludovicianus*	SC	SSC	Prefers open habitats with scattered shrubs, trees, fences, and posts. Will use cropland.
5	Swainson's hawk *Buteo swainsoni*		T	Breeds in riparian forest; known nesting sites in trees along Sacramento River in Natomas Basin. Forages for small mammals in grasslands and croplands.
6	tricolored blackbird *Agelaius tricolor*	SC	SSC	Nests in marshes with bulrush, blackberry or cattails; three known occurrences in Natomas Basin. Forages on the ground in grasslands and croplands.
7	white-faced ibis *Plegadis chihi*	SC	SSC	Forages in flooded rice fields
8	giant garter snake *Thamnophis gigas*	T	T	Forages in marshes, low gradient open waterways and flooded rice fields, hibernates in canal berms and other uplands; several known occurrences in Natomas Basin
9	northwestern pond turtle *Clemmys marmorata marmorata*	SC	SSC	Lives in permanent bodies of water; requires floating vegetation, logs, rocks or banks for basking. Hibernates and lays eggs is uplands.
10	California tiger salamander *Ambystoma californiense*	C	SSC	Winters in ground squirrel burrows or other holes; breeds in vernal pools, stockponds , and other seasonal wetlands.
11	western spadefoot toad *Scaphiopus hammondii*	SC	SSC	Primary habitat is grasslands; breeds in shallow temporary pools
12	valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T		Lives and reproduces on elderberry shrubs found along rivers and canals.
13	midvalley fairy shrimp *Branchinecta mesovallensis n. sp.*			Vernal pool obligate often found in small pools; likely to occur in Plan Area
14	vernal pool fairy shrimp *Branchinecta lynchi*	T		Vernal pool obligate; widely distributed in Sacramento County
15	vernal pool tadpole shrimp *Lepidurus packardi*	E		Vernal pool obligate; widely distributed in Sacramento County
16	Boggs Lake hedge-hyssop *Gratiaola heterosepala*		E	Low-terrace species found in shallow water margins of vernal pools
17	Colusa Grass *Neostapfia colusana*	T		Occurs in large deep pools with substrates of adobe mud but also in smaller pools; known in Yolo County

#	Species	Federal Status	State Status	Habitat Notes
18	delta tule pea *Lathyrus jepsonii* ssp *jepsonii*	SC		Perennial twining vine occurs in both riparian and marsh habitats
19	legenere *Legenere limosa*	SC		Found in wet places or vernal pools below 400 feet in elevation
20	Sacramento Orcutt grass Orcuttia viscida	E	E	Found in relatively large, deep vernal pools in eastern Sacramento County
21	Sanford's arrowhead Sagittaria sanfordii	SC		Tuberose perennial likely to occur in drainage or irrigation ditches
22	slender Orcutt grass *Orcuttia tenuis*	T	E	Found in relatively large, deep vernal pools in eastern Sacramento County

Key to Abbreviations

Federal

E = Listed as endangered
T = Listed as threatened
C = Candidate for federal listing, data sufficient
SC = Species of Concern--informal category, formerly called candidate 2 species (data for listing insufficient)

State

E = Listed as Endangered
T = Listed as Threatened
R = Listed as Rare
SSC = Species of Special Concern

April 2003

Final Natomas Basin Habitat Conservation Plan

Volume 2 - Appendices

prepared by

City of Sacramento
Sutter County
Natomas Basin Conservancy
in association with
Reclamation District No. 1000
Natomas Central Mutual Water Company

prepared for

United States Fish and Wildlife Service
California Department of Fish and Game

Natomas Basin E042002017SAC cover_10.indd 04.18.03

APPENDICES

NATOMAS BASIN HABITAT CONSERVATION PLAN

CITY OF SACRAMENTO AND SUTTER COUNTIES, CALIFORNIA

July 2002

Prepared By:
City of Sacramento
Sutter County
The Natomas Basin Conservancy

In Association With:
Reclamation District No. 1000
Natomas Central Mutual Water Company

TABLE OF CONTENTS

LIST OF APPENDICES

Appendix A:	Economic Analysis of Natomas Basin Habitat Conservation Plan, dated March 2002, by Economic & Planning Systems, Inc.
Appendix B:	Draft "Revised Fee Estimate Based on the Draft (2002) NBHCP", dated October 11, 2002, prepared by Economic & Planning Systems, Inc.
Appendix C:	U.S. Fish and Wildlife Service (USFWS) Conservation Guidelines for the Valley Elderberry Longhorn Beetle, updated July 9, 1999.
Appendix D:	California Department of Fish and Game Staff Report on Burrowing Owl Mitigation, dated October 17, 1995.
Appendix E:	Federal Aviation Administration Advisory Circular dated May 1, 1997. Hazardous Wildlife Attractants On or Near Airports.
Appendix F:	The Natomas Basin Conservancy By-Laws.
Appendix G:	Pacific Region, USFWS and ACOE, Biological Opinion for 404 Permitted Projects with Relatively Small Effects to Vernal Pools, dated February 1996.
Appendix H:	Biological Resources Technical Memo, prepared by CH2MHill, dated February 25, 2002.
Appendix I:	NBHCP Fee Update - 2002, by Economic & Planning Systems, Inc., dated April 25, 2002.
Appendix J:	Documents Regarding Sacramento Area Flood Control Agency Army Corps of Engineers Permit Compliance.
Appendix K:	Addendum to the Biological Resources Technical Memo, prepared by CH2MHill, dated April 2003.
Appendix L:	Interim Survey Guidelines for Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for Listed Vernal Pool Branchiopods, USFWS, April 19, 1996.

Appendix A

Economic Analysis of Natomas Basin Habitat Conservation Plan, dated March 2002, by Economic & Planning Systems, Inc.

Economic &
Planning Systems

Public Finance
Real Estate Economics
Regional Economics
Land Use Policy

FINAL REPORT

ECONOMIC ANALYSIS OF NATOMAS BASIN HABITAT CONSERVATION PLAN

Prepared for:

City of Sacramento

Prepared by:

Economic & Planning Systems, Inc.

March 12, 2002

EPS #10365

SACRAMENTO
1750 Creekside Oaks Drive, Suite 290
Sacramento, CA 95833-3647
www.epsys.com
phone: 916-649-8010
fax: 916-649-2070

BERKELEY
phone: 510-841-9190
fax: 510-841-9208

DENVER
phone: 303-623-3557
fax: 303-623-9049

TABLE OF CONTENTS

PAGE

I. INTRODUCTION 1
Purpose of Habitat Conservation Plan 1
Judicial Ruling on Habitat Conservation Plan 2
Purpose of Economic Analysis of Habitat Conservation Plan 4
Revised HCP Draft EIR/ERS Alternatives 5
Natomas Mutual and RD 1000 6
Brief Summary of Findings 6

II. OVERVIEW & FUNDING OF NBC & NBHCP 10
Funding of the NBC & NBHCP 12

III. ECONOMIC ANALYSIS OF THE NBHCP 14

IV. ADEQUATE FUNDING 16
Scenarios 2 and 3 16
Land Acquisition Costs 17

V. ANALYSIS OF FINANCIAL PRACTICABILITY 19
Fee Comparisons 20
Total Burden Comparison 22

VI. OVERVIEW OF FINANCIAL MODEL 38
Important Considerations 38
Cash Flow Model Assumptions 38
Financial Modeling Discussion for Base Case 45

APPENDICES

Appendix A: Scenario 1 - Base Case
Appendix B: Scenario 2
Appendix C: Scenario 3
Appendix D: Scenario 4
Appendix E: Scenario 5

LIST OF FIGURES

PAGE

Figure 1 2001 Required Mitigation Fees - All Scenarios 7

Figure 2 NBHCP Mitigation Land Acquisition to Date 10

Map 1 Natomas Basin Conservancy Mitigation Lands 11

Figure 3 NBHCP Mitigation Fee Per Gross Acre (nominal $) 13

Figure 4 Comparison of Habitat Fees per Acre of Development 21

Figure 5 Comparison of Burden of Impact Fees on Residential Development - 1,800 Sqft Unit 26

Figure 6 Comparison of Total Backbone Cost as a Percentage of Average Home Prices - 1,800 sq. ft. Unit 27

Figure 7 Comparison of Burden of Impact Fees on Residential Development - 2,400 Sqft Unit 28

Figure 8 Comparison of Total Backbone Cost as a Percentage of Average Home Prices - 2,400 sq. ft. Unit 29

Figure 9 Comparison of Burden of Impact Fees on Non-Residential Development - Retail 30

Figure 10 Comparison of Total Backbone Cost as a Percentage of Average Sales Price per Sqft - Retail 31

Figure 11 Comparison of Burden of Impact Fees on Non-Residential Development - Light Industrial 32

Figure 12 Comparison of Total Backbone Cost as a Percentage of Average Sales Price per Sqft - Light Industrial 33

Figure 13 In-Basin Land Values for Habitat Lands 1995-2001 34

Figure 14 1997 Distribution of Acres by Land Use 34

Figure 15 2001 Distribution of Acres by Land Use 35

Figure 16 Distribution of Acres by Land Use at Buildout - 0.5:1 Mitigation Ratio .. 35

Figure 17 Distribution of Acres by Land Use at Buildout - 1:1 Mitigation Ratio 36

Figure 18 Projected Land Costs Over Time 37

Figure 19 Land Acquisition and Restoration/Enhancements Cost and Acquired Habitat Land Utilization Assumptions 40

Figure 20 Operations & Maintenance Assumptions 41

Figure 21 Estimated Annual Natomas Basin Conservancy Administrative Costs... 42

LIST OF FIGURES CONTINUED

PAGE

Figure 22 Summary of Habitat Acreage – Base Case 43

Figure 23 Cash Flow Summary - *Land Acquisition, Supplemental Endowment, and Restoration & Enhancement Funds* 47

Figure 24 Cash Flow Summary - *Administration/Operations & Maintenance Fund, Endowment Fund, and Ending Balances Summary for All Funds* 48

Figure 25 Land Acquisition Cash Flow Summary 49

Figure 26 Supplemental Endowment Cash Flow Summary 50

Figure 27 Restoration & Enhancement Cash Flow Summary 51

Figure 28 Operations & Maintenance/Administration Cash Flow Summary 52

Figure 29 Operations & Maintenance Endowmnet Cash Flow Summary 53

Figure 30 Operations & Maintenance Revenue – Changing Mix of Revenue Sources Over Time 54

I. INTRODUCTION

PURPOSE OF HABITAT CONSERVATION PLAN

The purpose of the Natomas Basin Habitat Conservation Plan (NBHCP or the "Plan") is to promote biological conservation in conjunction with economic and urban development within the permit areas. The NBHCP establishes a multi-species conservation program to minimize and mitigate the expected loss of habitat values and incidental take of covered that could result from urban development, operation and maintenance of irrigation and drainage systems, and certain activities associated with the Natomas Basin Conservancy (NBC, or "the Conservancy") management of its system of reserves established under the NBHCP. The goal of the NBHCP is to minimize incidental take of the covered species in the permit areas and to provide mitigation for the impacts of covered activities on the covered species and their habitat.

The NBHCP permit area applies to the 53,537-acre interior of the Natomas Basin, located in the northern portion of Sacramento County and the southern portion of Sutter County. The Natomas Basin contains incorporated and unincorporated areas within the jurisdictions of the City of Sacramento, Sacramento County, and Sutter County. The Sacramento International Airport is also located in the Natomas Basin. The southern portion of the Natomas Basin is urbanized, but the majority of the Basin is used for agriculture.

The Conservancy, a non-profit corporation, was established to implement the Plan to ensure that sufficient habitat land is acquired, restored/enhanced, and maintained in accordance with the provisions of the Plan. The terms acquired and restored/enhanced are also intended to reflect preservation and creation of habitat land. The NBHCP requires that urban development mitigate its impact on habitat loss by paying a mitigation fee that provides funds for land acquisition, habitat restoration/ enhancement, and continued operations and maintenance of habitat lands. Further, the Plan requires development to mitigate the impacts by complying with other take avoidance, minimization, and mitigation measures. The Plan covers incidental take resulting from urban development in portions of the City of Sacramento (South and North Natomas) and portions of Sutter County.

The Conservancy is responsible for collecting and managing mitigation fees, using the fees to acquire mitigation lands, and managing the mitigation lands for the benefit of the protected plant and animal species ("covered species") living within the Natomas Basin.

Although the NBHCP covers 26 plant and animal species, the Plan focuses on two listed species known to be widely distributed in the Basin that would be impacted by anticipated urbanization – the giant garter snake and the Swainson's hawk. The giant garter snake inhabits rice fields and drainage canals in the Basin (i.e., wetland habitats. The Swainson's hawk generally nests along the Sacramento River and forages in the

Basin (i.e., in upland habitats). Other species are more localized or believed to be present by association with particular habitats, such as vernal pools or elderberry bushes.

The primary goal of the NBHCP is to create a system of reserves that would support populations of the giant garter snake, Swainson's hawk, and other covered species at least through the life of a 50-year Incidental Take Permits (ITPs), which is required in order for development to continue in the Natomas Basin.

Funding for the Conservancy is provided through a combination of up-front mitigation fees and on-going revenues generated from operations of the NBHCP. By incidentally providing habitat for migratory wintering waterfowl, the NBC is also projected to generate revenues from the sale of waterfowl hunting rights. The NBC will also farm and lease "managed" rice lands (enhanced for giant garter snake habitat) to farmers for additional long-term revenues. Other revenue generating activities may also be considered by the NBC in the future. Income-generating activities on NBC lands will ensure long-term funding of the operations and maintenance of habitat lands.

COURT DECISION ON HABITAT CONSERVATION PLAN

The original HCP for the Natomas Basin was adopted in 1997 and an incidental take permit (ITP) was granted to the City of Sacramento and Sutter County. However, in early 1999 certain environmental groups filed suits in state and federal courts challenging the decision of the U.S. Fish & Wildlife Service (FWS) and the California Department of Fish & Game (DFG) to approve the Natomas Basin Habitat Conservation Plan and issue incidental take permits to the city. The permits provide project construction protection for public and private project proponents from civil and criminal liability for take of endangered species that inhabit the permit area. During the litigation the parties stipulated that NBC would have continued protection of the permits in conducting its duties as plan operator under the NBHCP.

In August of 2000, the federal court judge invalidated the federal permit, ruling that the findings made by the FWS prior to issuance of the permit were not supported by adequate evidence in the record. The court found the HCP itself to be valid.

The court required that the following issues be revisited:

1. **Adequacy of funding**. Because the mitigation fee as established assumes full build out of the entire 17,500 acres located within the basin, and the city need only a portion of that allowable acreage, there is an issue as to whether adequate funding will exist if only the city is designated a permittee. Additionally, if mitigation land acquisition costs rise, how can funding sufficient to acquire the last acreage required be assured given the diminishing base over which to spread the fee burden as development proceeds?

2. **Maximum extent practicable**. The evidence is insufficient on the question of whether the mitigation imposed will, to the maximum extent practicable, reduce or mitigate the impacts of development on the protected species.

3. **FWS "no jeopardy" opinion**. Assuming that the city will be the only permittee, evidence is lacking on the question of whether there are factors that would appreciably reduce the likelihood of survival and recovery of covered species.

4. **Adequacy of environmental review**. The environmental review conducted to support the issuance of the permit was inadequate; an Environmental Impact Statement should have been prepared.

In May of 2002, FWS, the environmental group plaintiffs, certain private development interests, and the city, entered into a comprehensive settlement agreement. The agreement establishes a procedure for preparation of a revised HCP, a revised incidental take permit, and a EIS/EIR. It also allows grading and development of 1668 acres in the interim.

As part of the implementation plan for the settlement agreement, the city adopted a revised mitigation fee, consisting of a base fee portion and a "settlement premium" portion. The base fee is consistent with the fee shown in this analysis under Scenario 1, described below. The settlement premium portion was added in order to compensate for anticipated preserve land acquisition cost.

The agreement also requires acquisitions in prioritized specified areas. This requirement has an inflationary effect on land prices in the targeted areas. That effect is worsened by the need to acquire preserve land so that development can proceed.

If land prices fall significantly following adoption of a revised HCP and issuance of a new permit, and if the economic studies demonstrate that it is appropriate to do so, the mitigation fee can be reduced.

PURPOSE OF ECONOMIC ANALYSIS OF HABITAT CONSERVATION PLAN

The purpose of the economic analysis of the HCP is to address the "adequate funding" issue and the "maximum extent practicable" issue. The "no jeopardy opinion" is being addressed by the Permittees through an analysis focusing on the biological issues. The fourth cause of action, the preparation of an EIS, is currently underway by CH2M HILL. The Habitat Conservation Plan is being revised to address the issues raised by the Judge. The financial analysis presented in this document is based on the revised NBHCP.

There are five scenarios presented in this economic analysis of the HCP. Scenario 1, also referred to as the Base Case, most closely resembles the previous financial analyses of the NBHCP. It assumes 17,500 acres of development and a mitigation

ratio of 0.5 mitigation acres to every gross acre of development. Four additional scenarios are considered to address the adequate funding issue and the maximum extent practicable issue. The five scenarios are summarized as follows:

Base Case

- *Scenario 1* – 17,500 acres of development, 0.5 to 1 mitigation ratio, 25 percent marsh (per revised NBHCP).

Adequate Funding

- *Scenario* 2 – 12,000 acres of development, 0.5 to 1 mitigation ratio, 25 percent marsh.
- *Scenario* 3 – 8,000 acres of development, 0.5 to 1 mitigation ratio, 25 percent marsh.

Maximum Extent Practicable

- *Scenario 4* – 17,500 acres of development, 1 to 1 mitigation ratio, 25 percent marsh.
- *Scenario* 5 – 17,500 acres of development, 0.5 to 1 mitigation ratio, 75 percent marsh.

All five scenarios are modeled over the 50-year permit period. A summary of findings is provided below.

REVISED HCP DRAFT EIR/EIS ALTERNATIVES

The Revised HCP Draft EIR/EIS analyzes five habitat mitigation Alternatives for the Natomas Basin. This section lists and describes these Alternatives and relates each to the Scenarios in this Economic Analysis as described above.

- **Alternative 1** – Increased Mitigation. The required mitigation ratio for land development would be increased from 0.5:1 to 1:1.

- **Alternative 2** – Habitat-Based Mitigation. Mitigation would be based on the habitat value of the land to be developed, and would include up to a 3:1 ratio for the highest-value habitat for giant garter snakes.

  Alternatives 1 and 2 are most similar to Scenario 4 presented in this Report which includes a 1:1 mitigation ratio.

- **Alternative 3** – Reserve Zones. Specific reserve areas identified would be the focus of acquisition activities.

  This Report did not model a scenario similar to Alternative 3 since it is not possible to identify these reserve areas in advance of habitat.

- **Alternative 4** – Reduced Development. Development in the City and Sutter County would be reduced in order to reduce the extent of development-related habitat impacts and incidental takes.

  Alternative 4 is most similar to Scenarios 2 and 3 in this Report, which include reduced development of 9,000 acres and 12,000 acres respectively.

- **Alternative 5** – No Action Alternative. No ITP would be issued to the City of Sacramento Sutter County, Reclamation District 1000, Natomas Mutual Water Company, and a comprehensive Natomas Basin HCP would not be implemented.

  Since this Alternative assumes no implementation of the NBHCP, this alternative was not modeled as part of this Economic Analysis.

NATOMAS MUTUAL AND RD 1000

In addition to the City of Sacramento and Sutter County, the Natomas Mutual Water Company and Reclamation District (RD) 1000 are potential permittees for the NBHCP. The on-going operation and maintenance activities of these agencies have the potential to impact the species covered under the NBHCP. While it is recognized that these agencies are part of the NBHCP, the economic analysis does not directly relate to their activities. These agencies will not be developing property and as such will not be required to pay NBHCP fees. Any economic or financial impacts on these agencies will be addressed separately by these agencies. It is likely that habitat mitigation provided by RD1000 and Natomas Mutual will be through changes in their O&M practices. Any costs associated with these practices currently are funded and will continue to be funded through their rate base or assessments.

BRIEF SUMMARY OF FINDINGS

- **Adequate Funding**: EPS has calculated a fee amount to implement the NBHCP for each Scenario such that the NBC will receive adequate funding throughout the 50-year permit period and beyond, i.e., annual fund balances show no deficits through the 50-year permit period. The fee estimates for each Scenario are shown in **Figure 1**. The financial model used to calculate the fees assumes land values and other costs as of 2001. There is no cap on the mitigation fee amount in the NBHCP to assure that the fees may be if adjusted if in the future costs increase, such as land acquisition costs.

- **Reduced Development**: If the number of acres of development obtaining incidental take coverage under the NBHCP were reduced from the current anticipated 17,500 acres of development within the Natomas Basin, the fee would need to be increased. Scenarios 2 and 3 model reduced development scenarios (either because development in each permit area is reduced or only 1 land use agency chooses to

participate), and as shown in **Figure 1**, the fee increases from $5,993 under the Base Case to $6,784 (12,000 acres of development) or $8,641 (8,000 acres of development). The primary reason for the increase in the fee is attributed to a reduction in habitat land used for rice farming. Less rice farming acres within the NBHCP translates into less operating revenue to run the NBHCP over the long term. This results in the need for additional funds to the NBC in order to conduct management of reserve lands over the long term.

The NBHCP would be feasible under a reduced development scenario only if the higher mitigation fees were adopted as indicated in either Scenario 2 or Scenario 3. If the permittees want to insure against the possibility of a reduced development scenario in the future, it also would be recommended to adopt such mitigation fees.

- **Maximum Extent Practicable**: The fee levels for all five Scenarios were considered in addressing the question of whether the NBHCP will provide mitigation to the Maximum Extent Practicable (MEP). The MEP funding addresses one of biology, legal, and economic considerations. This report only focuses on the economics or financial considerations in specific regard to the alternative fee levels. To address these considerations, two tests were employed - 1) a comparison with other HCP fee programs in surrounding jurisdictions, and 2) a cost burden analysis for residential and light industrial development projects. Both these tests indicate that the fee levels, particularly for Scenarios 3 through 5, would be at or near the MEP from an economic or financial viewpoint based on the following findings:

  - The fees as proposed under Scenarios 1 through 5 are considerably higher than similar fees charged by other surrounding jurisdictions.

  - Cost burdens for residential development projects are currently among the highest in the region and represent approximately 13-14 percent of the estimated sales price of the residential unit. Fifteen percent is recognized as a feasibility benchmark for cost burdens based on industry "rules of thumb" regarding how property values change with successive stages of entitlement and improvement. The cost burdens include all development impact fees, permit costs, school mitigation costs, and any bonded indebtedness of the project. While 15 percent is recognized as the feasibility benchmark, up to a 20 percent cost burden may be feasible depending on the specific financial considerations of a particular project. If a project were to exceed the 15 to 20 percent range in cost burden analysis, the financial feasibility would be jeopardized.

  - The fees calculated for Scenarios 1 through 5 slightly increase the cost burdens for residential development, in some cases from 13 to 14 percent. However, recognizing that the cost burdens already push the industry standard for feasibility, the City of Sacramento has eliminated certain programs, such as funding for some police, fire, bike trails, and community center facilities. In addition, there remains the risk that as supply and demand factors for habitat land continue to push land acquisition costs upward, the fee will continue to increase, thereby pushing the residential development projects beyond the point of financial feasibility.

Figure 1
Natomas Basin HCP
2001 Required Mitigation Fees
All Scenarios

Fee Component	2000 Fee	Scenario 1 *Base Case [1]*	Fewer Participants: Scenario 2 *70% Of Plan Implemented*	Fewer Participants: Scenario 3 *50% Of Plan Implemented*	Additional Mitigation: Scenario 4 *1 to 1 Acre Mitigation*	Additional Mitigation: Scenario 5 *Base Case Wit 75% Marsh*
		17,500 ac. of dev.; 1/2 ac. of mitigation per gr. acre of dev.; 25% marsh	*12,000 ac. of dev.; 1/2 ac. of mitigation per gr. acre of dev.; 25% marsh*	*8,000 ac. of dev.; 1/2 ac. of mitigation per gr. acre of dev.; 25% marsh*	*17,500 ac. of dev.; 1 ac. of mitigation per gr. acre of dev.; 25% marsh*	*17,500 ac. of de 1/2 ac. of mitigati per gr. acre of de 75% marsh*
Land Acquisition Fee (LA)						
Land Cost	*$2,125*	*$2,375*	*$2,375*	*$2,375*	*$4,750*	*$2,375*
Transaction Cost & Contingency	*$375*	*$625*	*$625*	*$625*	*$1,250*	*$625*
Total Land Acquisition Fee	$2,500	$3,000	$3,000	$3,000	$6,000	$3,000
Restoration/Enhancement (RE)	$423	$368	$368	$368	$736	$1,100
Administration/O & M	$750	$1,555	$2,100	$2,850	$2,000	$3,800
O & M Endowment Fund	$190	$800	$1,030	$2,100	$1,240	$2,320
Supplemental Endowment Fund	$0	$150	$150	$150	$300	$150
Fee Collection Administration	$78	$120	$136	$173	$210	$212
Total Mitigation Fee	**$3,941**	**$5,993**	**$6,784**	**$8,641**	**$10,486**	**$10,582**

fee scen

[1] Base fee, along with premium fee of $4,028, was adopted by City of Sacramento June 12, 2001.

Prepared by EPS.

10365 model update 2/12/2002

- The cost burden analysis for non-residential projects in North Natomas and south Sutter County show cost burdens that depending on the type of development, exceed the feasibility benchmark of 10 percent for non-residential development. However this percentage could range up to 15 percent, or in some cases higher depending on the specific financial considerations of a particular project.

  The cost burden analysis for commercial/retail development shows that the cost burden for development in the North Natomas area already exceeds the benchmark of 10 percent. The cost burden for commercial development in North Natomas is estimated to be 18-19 percent of the sales price per square foot. No commercial development was assumed for south Sutter County.

  A range of feasibility is presented for light industrial space depending on whether the building is intended for warehousing or more expensive flex space. The average sales price per sqft is estimated to range from $25.00 per sqft for warehouse space to $60.00 per sqft for light industrial flex space. As such, the cost burdens also range from 18 percent for warehouse space to 8 percent for higher end light industrial space in south Sutter County.

  The range for North Natomas is at 37 percent for warehouse space and 15 percent for higher end light industrial space. The cost burdens are likely to dictate what type of warehouse/light industrial projects are constructed in the each jurisdictions. Higher-end light industrial projects will be more feasible in either case, but ultimately the level of demand for these types of projects may result in a slower absorption than if a wider variety of projects were feasible.

- The City of Sacramento is currently revising the fee program for the North Natomas development area. As a result of this updated financing plan, the development impact fees are anticipated to increase significantly and will push the cost burdens closer to the upper end of the industry thresholds. The development projects in the Natomas Basin already have cost burdens that nearly meet or exceed the benchmarks for financial feasibility, and once the new fees are adopted, it is conceivable that any further increase in the NBHCP fees is likely to impact the feasibility of development projects in the Natomas Basin.

- Land acquisition prices for habitat land have increasingly trended upward since 1997, when the HCP was originally adopted. The NBHCP fee has been adjusted upward as land acquisition prices have increased. As the supply of land suitable for habitat mitigation in the Basin diminishes over time, the land acquisition price will increase (as less land will be available for reserve lands). The upward pressure on land acquisition prices would significantly increase under an HCP that required a mitigation ratio of 1:1 or higher or which required habitat land to be purchased in specified reserve areas.

While the fees associated with Scenarios 1 through 5 in this analysis do not push residential development projects out of the realm of financial feasibility, there is the very real potential that as land prices continue to increase overtime, the financial feasibility of development projects will diminish if sales prices for residential and non-residential projects do not keep pace. The impact of the mitigation fees on non-residential development, depending on the type of product, may already exceed the limits of financial feasibility.

II. OVERVIEW & FUNDING OF NBC & NBHCP

The Natomas Basin Conservancy (NBC or "the Conservancy), is a private, non-profit, public benefit corporation and it operates as the Plan Operator for the Natomas Basin Habitat Conservation Plan (the Plan). The Conservancy acquires mitigation land necessary to meet the mitigation requirements of the NBHCP. The goal of the NBHCP is to preserve, restore, and enhance habitat values found in the Natomas Basin while allowing urban development to proceed according to the local land use plans.

The Conservancy is not named in the lawsuits, but the outcome affects its ability to collect mitigation fees to support its operations. It is also true that the Judicial ruling incorporated a stipulation allowing the NBC its incidental take permit to continue to facilitate mitigation of the protected species.

The Conservancy has acquired land for habitat mitigation every year since beginning operation in January 1999. The Conservancy completed its year 2000 mitigation requirement with acquisition of the Frazer property on July 31, 2000. The Conservancy completed the acquisition of the Souza property (44.68 acres) and the Natomas Farms property (96.46 acres) in 2001.

Figure 2 summarizes mitigation land acquisition to date. **Map 1** shows the location of the acquired mitigation land and the general boundary of the Natomas Basin.

Figure 2
NBHCP Mitigation Land Acquisition to Date

Property	Date Acquired	Acres
Silva	1/07/99	159.20
Betts	4/05/99	138.99
Kismat	4/16/99	40.29
Bennett (C.L)	5/17/99	226.68
Bennett (H&B)	5/17/99	132.49
Lucich North*	5/18/99	267.99
Lucich South	5/18/99	331.21
Brennan	6/15/00	241.38
Frazer	7/31/00	92.60
Souza**	7/2/01	44.68
Natomas Farms	7/9/01	96.46
Total		**1,792.64**

* Lucich North may be reduced from records reflecting 20.68 acres to SAFCA.

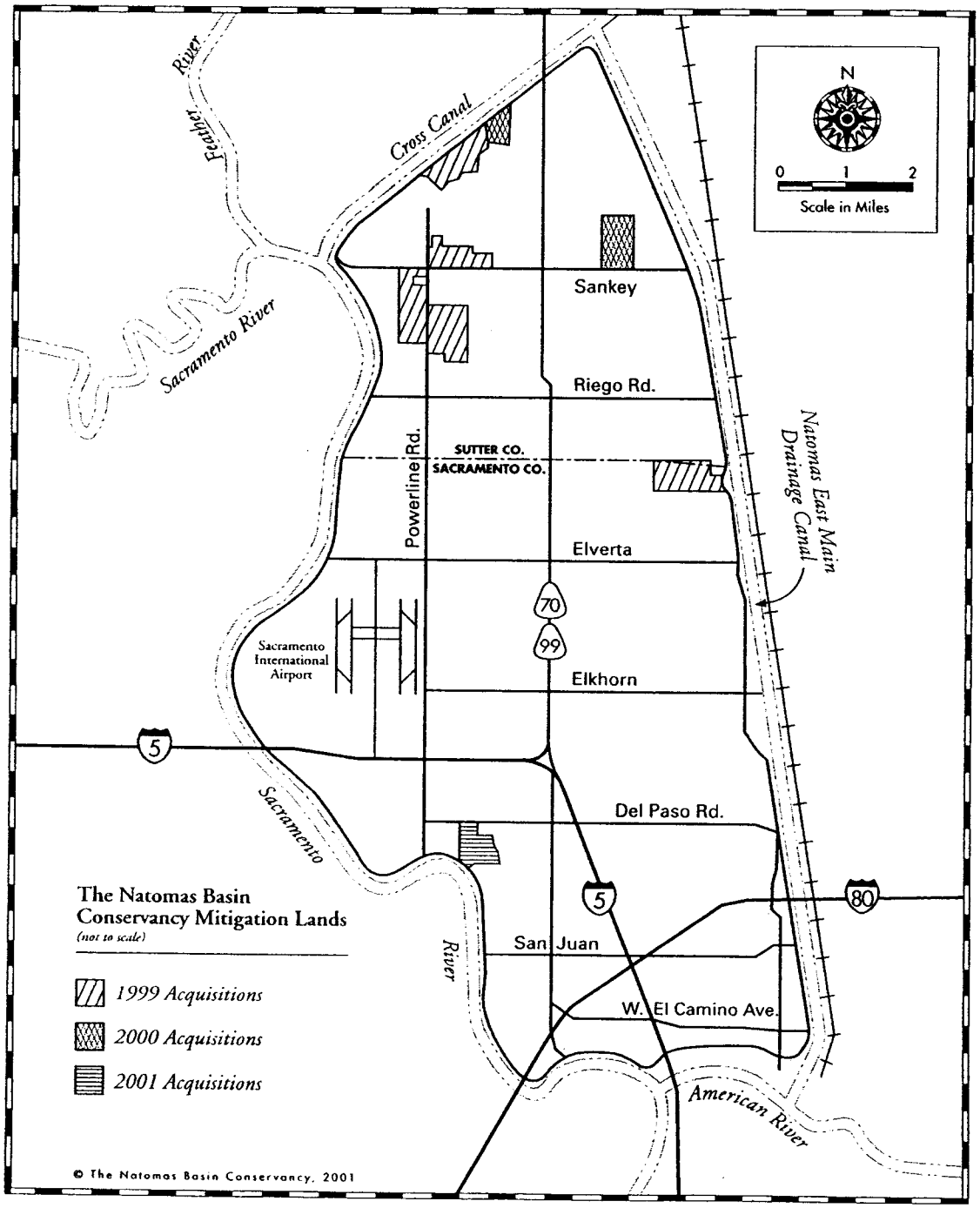
**Agreement of Purchase and Sale provides that seller can partition 4.68 acres during a 24-month period following sale.

MAP 1

THE NATOMAS BASIN CONSERVANCY

2001

Base Map



In addition to purchasing habitat acreage for preservation, the Conservancy has proceeded with habitat restoration and enhancement. At its August 2000 meeting, the Conservancy Board approved a site specific land management plan for the first 1,631 acres of mitigation land acquired. The *Site-Specific Management Plans for The Natomas Basin Conservancy's Mitigation Lands, Sacramento and Sutter Counties, California* was completed by Wildlands, Inc. in June of 2000 and provides a detailed habitat restoration and enhancement program for the following properties:

- Betts-Kismat-Silva Property;
- Lucich North Property;
- Lucich South Property; and,
- Bennett South Property.

The site-specific management plans also provide detailed instruction/direction on water, vegetation, pest, and agricultural management. Habitat monitoring, annual work plans, adaptive management, and other issues are also considered as part of the document prepared by Wildlands.

FUNDING OF THE NBC AND NBHCP

In order to provide for preservation acquisition of the habitat acreage and funding of the monitoring, restoration, and enhancement of the habitat sites, as well as provide funding for the operations of the NBC and on-going operation and maintenance of the habitat reserves, a funding plan was established in 1997 when the original HCP was adopted that utilizes various revenue sources, including:

- **Habitat Mitigation Fee** - a one-time up-front fee charged to new development on a per gross acre basis at a ratio of one-half acre of mitigation to every one acre of development;
- **Rice Revenues** - many of the properties in the habitat conservation plan will continue to be operated as rice farms. The rice farms are known to provide seasonal habitat for the giant garter snake, particularly when the rice fields are flooded. The NBC will generate revenue from leasing these properties to rice farmers.
- **Hunting Revenues** - a certain percentage of the habitat reserves were assumed to be utilized as seasonal water fowl hunting blinds, from which the NBC would earn revenues from the hunting operations.

EPS, beginning in 1995, developed a *pro-forma* financial model that analyzes the projected revenues and expenditures of the NBC dependent on a forecast of development of the Natomas Basin and the corresponding habitat mitigation required. Based on various assumptions, the financial model calculates the Habitat Mitigation Fee that would be required of new development. This financial model has been updated annually since 1998.

The financial model is currently composed of five funds:

- Land Acquisition (LA);
- Restoration and Enhancement (RE);
- Administration and Operations & Maintenance (O&M);
- O&M Endowment Fund; and,
- Supplemental Endowment Fund.

The financial model is intended to be a dynamic, fluid analysis of each of these funds and allows for interaction between the funds. The funds have been modeled over the 50-year permit period of the NBHCP. However, one of underlying goals of the financial analysis is to insure that the on-going operations and maintenance of the habitat preserves would be maintained in perpetuity (forever). Therefore, the O&M Endowment Fund, which is drawn on in later years to supplement funding of the Admin./O&M fund, is modeled such that it generates interest earnings in perpetuity. The interest earnings on the Endowment Fund, not the principal, will be used to generate funds for the management and on-going operations of the habitat reserves. The financial model has proven to be a useful tool to test how various assumptions of expenditures and/or revenues impact the fee required from new development.

To date the Natomas Basin Conservancy has been able to purchase land in accordance with the land costs and corresponding fee requirements as adopted by the NBC. As market forces have pushed land acquisition costs upward, the mitigation fee has been adjusted to account for projected increases in land acquisition costs, as well as other restoration & enhancement costs and O&M/Administration costs. **Figure 3** shows HCP mitigation fee amounts per gross acre from 1997 to 2001.

Figure 3
NBHCP Mitigation Fee Per Gross Acre (nominal $)

Year	Amount	
1997		$2,240
1998		$2,656
1999		$3,292
2000		$3,942
2001	Base Fee -	$5,993
	Settlement Premium -	$4,028
	Total Fee -	$10,021

The Natomas Basin Conservancy has also been able to meet the timing and other requirements related to land acquisition, conversion of rice land to managed marsh, and on-going O&M administration of the Conservancy.

III. ECONOMIC ANALYSIS OF THE NBHCP

As stated in **Chapter I**, the purposes of the economic analysis of the NBHCP are (1) determine whether adequate funding would be available for varying levels of development and mitigation requirements and (2) whether the proposed mitigation fee would provide for mitigation which minimizes and mitigates to the maximum extent practicable. Five scenarios were developed to test the funding of the NBHCP in regard to the issues of adequate funding and maximum extent practicable.

Scenario 1, also referred to as the Base Case, most closely resembles the previous financial analyses of the NBHCP and the analysis of the current base fee amount. Under this Scenario 17,500 acres would be developed in the Basing with a mitigation ratio of 0.5 mitigation acres to every gross acre of development. Four additional scenarios are considered to address the adequate funding issue and the maximum extent practicable issue. The five scenarios are summarized as follows:

Base Case

- *Scenario 1* – 17,500 acres of development, 0.5 to 1 mitigation ratio, 25 percent marsh (with revised HCP).

Adequate Funding

- *Scenario 2* – 12,000 acres of development, 0.5 to 1 mitigation ratio, 25 percent marsh.
- *Scenario 3* – 8,000 acres of development, 0.5 to 1 mitigation ratio, 25 percent marsh.

Maximum Extent Practicable

- *Scenario 4* – 17,500 acres of development, 1 to 1 mitigation ratio, 25 percent marsh.
- *Scenario 5* – 17,500 acres of development, 0.5 to 1 mitigation ratio, 75 percent marsh.

While Scenarios 2 and 3 are geared toward evaluating Adequate Funding for varying levels of development and Scenarios 4 and 5 are geared toward determining mitigation costs consistent with the Maximum Extent Practicable ("Practicability") finding, all five scenarios were analyzed in terms of these two issues as follows:

- ***Adequate Funding for HCP over 50-Year Permit Period.*** A fee level was established based on the parameters outlined for each Scenario and that provides adequate funding of the HCP for each fund account for the 50-year permit period. While the funding is modeled over the 50-year permit period, the fee levels estimated for the O&M/Admin. fund and O&M Endowment are intended to allow the funds to be sustained in perpetuity. The fees for each Scenario are summarized in **Figure 1**.

- ***Financial Feasibility or "Practicability"***. Two tests were used to examine financial feasibility – 1) fee comparisons with other established or proposed HCPs in the Central Valley, and 2) total infrastructure cost burden analysis for the North Natomas area and South Sutter County areas.

Each of the alternative scenarios was analyzed by customizing the cash flow model to reflect the assumptions of each scenario. For each Scenario, the fee level(s) was determined such that the cash flow model annual fund balances were positive for the 50-year permit period. The O&M/Administration and O&M Endowment funds are structured to go on in perpetuity (forever).

The next two chapters discuss the Adequate Funding issue and the Maximum Extent Practicable issues in regard to the financial modeling in greater detail.

IV. ADEQUATE FUNDING

Under Section 10 of the Endangered Species Act, the Service must ensure that the funding sources and levels proposed by the applicants are reliable and will meet the purpose of the HCP. The primary revenue source for funding of the NBHCP are development impact fees collected from new development paid on a per gross acre basis when a grading permit is pulled. Additional funding is projected based on the estimated revenues from leasing land owned by the NBHCP for rice farming and from the sale of waterfowl hunting rights.

The habitat mitigation fee calculated under each Scenario provides sufficient revenue to accomplish the "goals" under each Scenario. For example, under Scenario 4, which calls for a mitigation ratio of 1:1, the fee calculated provides adequate funding for each of the five funds included in the financial model. The financial model used to estimate the fee levels is discussed in **Chapter VI** of this Report.

Of specific concern regarding the question of adequate funding is whether or not the fee would provide sufficient funding if there is less development in the Basin than the projected total development of 17,500 acres allowable under the original NBHCP (which includes the City of Sacramento and Sutter County). If either the City of Sacramento or Sutter County were the sole participant to the NBHCP, development would approximate 8,000 acres. Scenario 2 and Scenario 3, were designed to specifically test the impacts on the fee of reduced development alternatives. These two scenarios are discussed in greater detail below.

A further consideration to determine adequate funding levels, is whether or not there will be sufficient funding to acquire the remaining acres of mitigation land if costs rise before all land acquisition is completed and all mitigation fees have already been paid.

SCENARIOS 2 AND 3 - REDUCED DEVELOPMENT

As stated above, if either the City of Sacramento or Sutter County were the sole permittee under the NBHCP, total development would approximate only 8,000 acres as opposed to the currently estimated 17,500 acres. **Scenario 3**, therefore, assumes a reduced development alternative of 8,000 acres. A provision of the NBHCP requires each permittee to complete a mid-point program review. The mid-point review program is designed to ensure that habitat modifications or other take would not occur before mitigation is implemented or at minimum they would occur contemporaneously. The City's mid-point review will be completed between 4,000 to 5,000 acres of development. Sutter County's mid-point review will be conducted between 3,500 to 5,000 acres of development. The combined total area necessitating the mid-point review is between 7,500 to 10,000 acres.

Scenario 2 assumes a reduced development alternative of 12,000 acres. A provision of the NBHCP requires an overall mid-point program review. This overall program

review is intended to provide a mechanism to evaluate the performance and effectiveness of the Plan. This program review would be initiated at the point where urban development reached 9,000 acres and would be completed before development exceeds 12,000 acres. Therefore, **Scenario 2** was structured to model a development alternative of 12,000 acres of total development.

The financial modeling demonstrated that the fee level needed to be increased relative to the Base Case to fund O&M/Admin. expenditures under these reduced development scenarios. The primary reasons for this increase are as follows:

- ***Reduced development results in reduced mitigation acres obtained.*** Consequently, the amount of mitigation acres that can be assumed to be revenue-generating through rice/crop farm leasing or hunting is also reduced. Revenues will vary with the extent of development undertaken. A reduction in the farm leasing and hunting revenues result in the need to increase the mitigation fee for the O&M/Administration fund as well as the O&M Endowment fund, which provides revenues to the O&M/Admin. fund in later years of the HCP.

- ***No off-setting reduction in administrative costs is assumed relative to the Base Case.*** In the Base Case, administrative costs are reduced by 15 percent at the completion of the land acquisition phase. This same assumption is made for the reduced development scenarios based on discussions with the NBC. Therefore, at the same time revenues are decreased in a reduced development scenario, there is no offsetting reduction assumed in the ongoing administrative or the species-monitoring costs of the NBC. In other words, while revenues are estimated to be variable, expenses are considered to be fixed.

These assumptions result in the need for greater fee revenue to be generated to support the ongoing operations & maintenance functions of the NBC and the NBHCP in the reduced development scenarios. As a result, the mitigation required for **Scenario 2** and **Scenario 3** are greater than in the Base Case.

LAND ACQUISITION COSTS

All Scenarios address the question of whether or not there will be sufficient funding to acquire the last acres of mitigation land if costs rise before all land acquisition is completed and all fees have already been paid. In order to address the concern regarding funding available to purchase the remaining acres of mitigation land, a fifth fund was created – the "Supplemental Endowment Fund" – that had not previously been included in the financial model. This Supplemental Endowment Fund will allow the NBC to purchase mitigation land in advance of requirements at any point in the 50-year permit period, given sufficient funds. It would also allow the NBC to build up a monetary reserve that can be utilized in the event that at the last stages of development, land prices spike upward and not all habitat mitigation land has been purchased.

If the Supplemental Endowment Fund reserve is not required, this funding can be transferred to the Administration/O&M fund and contribute to the on-going provision of these services.

V. ANALYSIS OF FINANCIAL PRACTICABILITY

A Habitat Conservation Plan must demonstrate that it meets a number of findings in order for the US Fish and Wildlife Service (USFWS) to issue an incidental take permit. One of these findings is that the HCP minimizes and mitigates the impact of the incidental take to the "maximum extent practicable." This funding typically requires consideration of two factors: (1) adequacy of the mitigation program, and (2) whether this program is the maximum that the applicants can implement from a practical stand point.

However, there are no precise standards set forth in the law or implementing guidelines for demonstrating adherence to this condition. Nevertheless, the standard should be considered from the biological, legal, and financial perspectives. This report documents consideration of the financial perspective.

Biological considerations will generally define the areas to be preserved, restored, and enhanced as part of the HCP. The biological analysis is being addressed through a separate study conducted by CH2M Hill and May Consulting, consultants to the Permittees and the USFWS.

In general, biological goals, e.g., the extent and type of mitigation to be performed, carry with them a financial burden or cost, such as the costs of land acquisition, habitat restoration, enhancement and on-going stewardship, biological monitoring, and enforcement. The ability to meet these biological goals will depend on the availability of funding. Different levels of proposed biological mitigation will require different levels of funding, some of which may be achievable and others not.

From the financial perspective, mitigating impacts to the maximum extent practicable requires a comprehensive exploration of potential funding sources, and the establishment of secure funding mechanisms that can be expected to provide adequate funding over time. **Chapter IV** of this Report describes how adequate funding for each of the Scenarios was determined by setting a mitigation fee sufficient to meet the goals of the program on an annual basis through the 50-year permit period.

This chapter takes the fee level for each Scenario and analyzes them from a feasibility or practicability standpoint. Two methods were employed to test the financial feasibility of the estimated fees for each Scenario as described below:

- *Fee Comparison*: Comparison of the proposed fee to other fees proposed as part of other similar HCPs. If the fee is significantly above those charged in other actual or proposed HCPs, the fee may be impracticable from an equity standpoint. In other words, charging a development project an HCP fee that is much greater than those fees charged to other comparable projects, results both in an unfair burden for habitat preservation and increased infeasibility for development projects.

- ***Cost Burden Analysis***: Cost burden analysis evaluates the impact of the habitat fee on the financial feasibility of a development project within the Basin. If the total cost burden on development, when including the habitat fee, is above supportable levels, some private development may not occur. This will result in a reduction in levels of development, and, consequently, less HCP funding than required as well as a series of other unintended consequences such as failure to implement a jurisdiction's General Plan or Community Plan. Setting the fee at such a level is therefore not supportable and the conservation program may not be practicable if other funding sources are unavailable.

A fee charged to new development largely funds the NBHCP. In the economic analysis, as described above, different fee levels have been estimated under alternative scenarios. This chapter analyzes the fee levels for Scenarios 1-5 under the two practicability tests—regional fee comparisons and the cost burden analysis.

FEE COMPARISONS

In order to explore the financial feasibility or practicability of the fee levels determined in this economic analysis, we have compared the Scenario 1-5 HCP fee levels to development impact fees for habitat preservation for other jurisdictions in the Central Valley region. Most HCP fees for other jurisdictions are proposed fees as the habitat conservation plans remain in the planning stages. It is also important to note that no two habitat conservation plans are alike. They differ in many respects, including types of habitat and species to be mitigated, estimated costs of mitigation, mitigation ratios, amount of outside funding, etc. Also, the fees may differ depending on whether they are funding land acquisition (fee title) costs or land easements, which would be less expensive. The NBHCP fees are based on land acquisition costs within the Natomas Basin. The fees compared are all on a per acre of development basis.

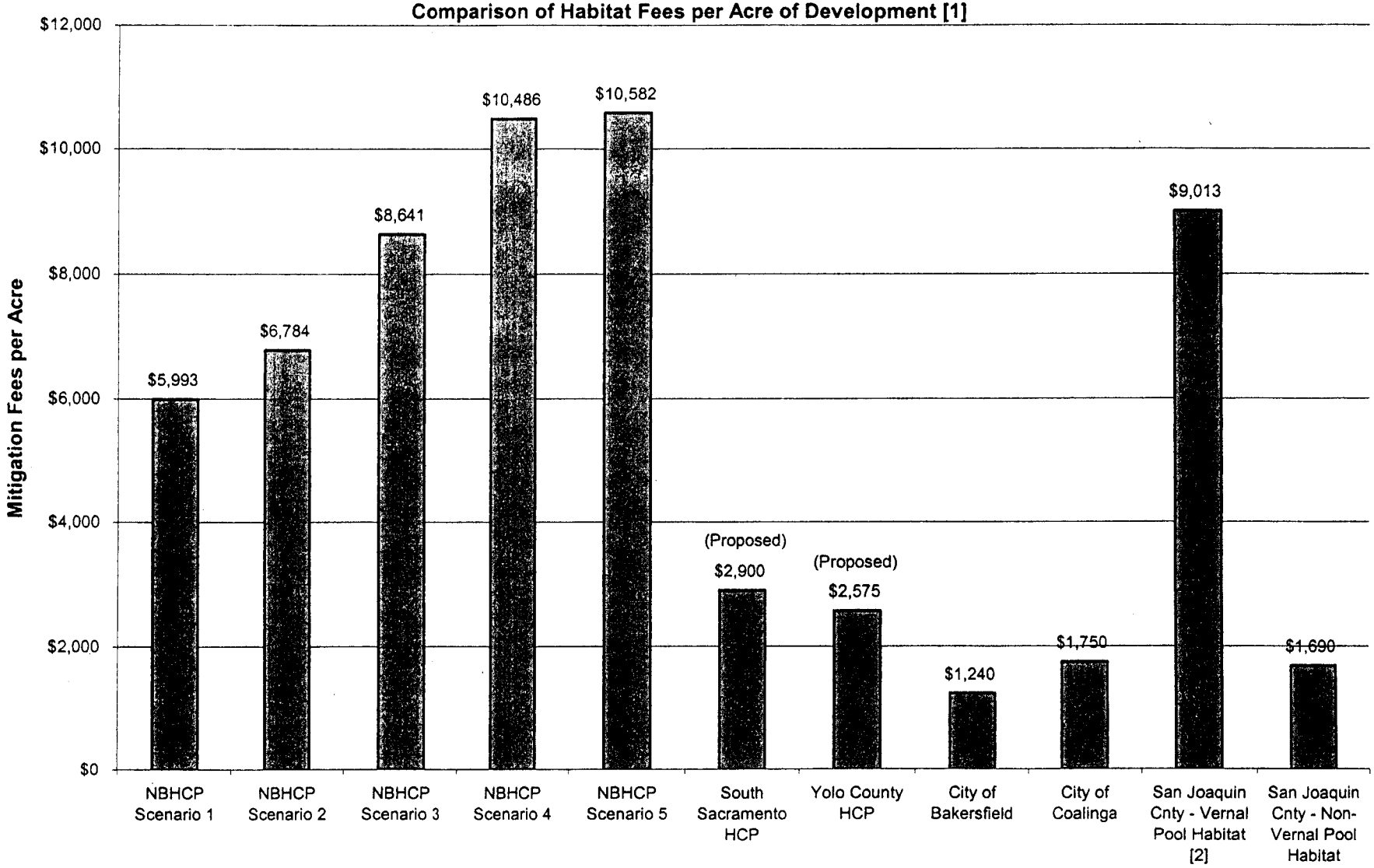
The range of NBHCP fees for Scenarios 1-5 was compared to five other Central Valley regions - South Sacramento, Yolo County, San Joaquin County, City of Bakersfield, and City of Coalinga, as shown in **Figure 4**.

The City of Bakersfield adopted its HCP and enacted the development impact fee of $1,240 per gross acre in 1994. The fee has not been adjusted for inflation. The plan mitigates for four animal species and five plant species and covers 405 square miles. The City of Coalinga HCP mitigates for 22 species on over 16,000 acres of land. The City of Coalinga charges $1,750 per acre of development.

All of the cities within San Joaquin County have adopted the San Joaquin Multi-Species Conservation Plan over the past year. Fees are collected for three types of habitat land including vernal pool habitat (average of $9,013 per acre), agricultural lands/non-vernal pool lands ($1,690 per acre), and multi-purpose open space land ($845 per acre). The County of San Joaquin is currently in the process of adopting the SJMSCP.

Two habitat conservation plans are proposed for South Sacramento and Yolo County. The fee as currently estimated for South Sacramento is $2,900 per acre of development.

Figure 4
Comparison of Habitat Fees per Acre of Development [1]



[1] The Habitat Plans vary by many factors including the number of species mitigated for, mitgation ratios, use of funds, amount of outside funding, etc.
[2] Vernal pool fees are proposed at $33,802 per wetted surface acre and $5,634 per upland acre for an average fee of $9,013 per acre for vernal pool grassland Conversions.

Prepared by EPS

10365 Fees Chart.xls 3/11/02

and covers only land acquisition and restoration costs. Funding for ongoing operations and maintenance is yet to be decided.

Yolo County HCP is proposing an average fee of $2,575 per acre of development. An estimated 11,672 acres are planned for development and the mitigation ratio currently contemplated is one acre of mitigation to one acre of development.

The NBHCP fees for Scenario 1-5 range from $5,993 to $10,582, which are significantly higher than the other four jurisdictions in the comparison. Scenario 1 has the lowest fee of $5,993, which is nearly double the next highest fee of $2,900 for South Sacramento. The fee comparison, therefore, does give an indication of impracticability.

TOTAL BURDEN COMPARISON

EPS has also analyzed the NBHCP fees for Scenarios 1 through 5 in the context of total backbone infrastructure to compare the overall burden of backbone infrastructure in the North Natomas and South Sutter County areas. The purpose was to determine if the total burden for new development in North Natomas is significantly higher than feasibility benchmarks for single family development.

Most fees and special taxes are set on a per single family unit basis. However, some fees, such as the NBHCP mitigation fee, are determined on a per acre basis. To compare the HCP fees in relation to the overall infrastructure cost burden, the HCP fees were converted to a per unit fee amount. The fees were converted assuming an average density, or number of units per acre based upon approved dwelling unit types which may be constructed in the Basin. The analysis also looks at two housing types, 1,800 sqft and 2,400 sqft. The per acre fees were converted as follows:

	1,800 Sqft SF Unit		2,400 Sqft SF Unit	
	Fee/Acre	Fee/Unit	Fee/Acre	Fee/Unit
Assumed Density		7 Units/Acre		5 Units/Acre
Scenario 1- Base Case	$5,993	$856	$5,993	$1,199
Scenario 2	$6,784	$969	$6,784	$1,357
Scenario 3	$8,641	$1,234	$8,641	$1,728
Scenario 4	$10,486	$1,498	$10,486	$2,097
Scenario 5	$10,582	$1,512	$10,582	$2,116

The analysis focuses on two of four quadrant areas in North Natomas, Quadrant 2 and Quadrant 4, as these are the areas where the greatest amount of single family development is planned to occur. However, the analysis is applicable to all residential areas in the permit area.

EXPLANATION OF BURDEN COMPONENTS

Many jurisdictions in California charge development impact fees on new development. In addition to city/countywide fees, localities have several techniques for financing backbone infrastructure. These financing methods include project specific fees; assessment districts; Mello-Roos Community Facilities Districts; school fees and special taxes; and conditions of approval implementation through the entitlement and subdividing process.

The city/county fees are comprised of processing fees (building permit and plan check fees) and development impact fees, which may include water, wastewater, traffic, drainage, library, fire/police, and park fees. The largest of the city/countywide fees are usually one-time water, wastewater, and traffic fees. Most jurisdictions present their fees on a per square foot, per unit, or per acre basis. The building permit and plan check fees, also a component of city/ countywide fees, are usually based on the building value which is determined from per square foot value factors provided by the individual jurisdiction.

In addition to the city/countywide development impact fees discussed above, school districts throughout Northern California often require developments to pay school mitigation fees, such as Sterling Fee, and/or participate in School Mello-Roos Special Tax programs. Any school General Obligation bonds are not included in this analysis.

Backbone infrastructure that benefits a specific project or is needed to mitigate the impacts of the project on the community as a whole is usually funded through project specific fees, special assessments, or Mello-Roos CFD special taxes.

The fees and taxes discussed in this report generally fund backbone infrastructure, not in-tract on-site infrastructure. It is assumed that the developer pays for all in-tract, on-site infrastructure. However, this distinction between on and off-site infrastructure is not absolute. Areas with high project specific fees and/or high special taxes for infrastructure are more likely to have their in-tract arterials and collectors funded. On the other hand, areas without project specific fees or special taxes are more likely to have greater on-site infrastructure needs.

Taken together, city/countywide fees, school mitigation costs, project specific fees, assessments and the present value of special taxes represent the total cost of backbone infrastructure.

RESIDENTIAL BACKBONE INFRASTRUCTURE COST COMPARISON

Figure 5 and **Figure 7** summarize the infrastructure cost burden on the two sample homes types of 1,800 sqft and 2,400 sqft. The existing HCP fee (on a per unit basis) is given as well as the incremental increase in the fee related to the five scenarios analyzed in this economic analysis. The average total existing infrastructure cost burden for an 1,800 sqft home in North Natomas is estimated at $31,756 per unit, and $36,474 per unit

for a 2,400 sqft home. The increase in the HCP fee increases the burden amount by an amount ranging from $293 to $949 per unit for a 1,800 sqft house to $410 to $1,328 for a 2,400 sqft house.

The Impact of Total Infrastructure Cost on Housing Market

Figure 6 and **Figure 8** show the total infrastructure cost burden as a percentage of the average home prices for a 1,800 sqft unit and a 2,400 sqft unit in North Natomas. Backbone infrastructure and school mitigation costs typically average around 15 percent of sales price of the house, although this cost may range from 10 to 20 percent. As the share of backbone costs starts exceeding 15 percent, the feasibility of the project starts to diminish. Either sales prices have to rise, limited by competition in the region, or the developers of the project take less of a profit. As profits are reduced to below required rates of return, the product will not be delivered in the market.

The cost burdens as they currently exist are around 13 to 14 percent of the home price for both comparisons. The increase in HCP mitigation fees per unit has little impact on the overall fee burden under all scenarios.

The City of Sacramento is currently revising the financing plan for the North Natomas area. As a result of this update, it is anticipated that the development impact fees specific to North Natomas will increase. As a result, the infrastructure cost burdens are expected to increase potentially pushing the project closer to the upper threshold of 20 percent for the overall cost burdens.

NON-RESIDENTIAL BACKBONE INFRASTRUCTURE COST COMPARISON

For non-industrial development, backbone infrastructure and school mitigation costs typically average around 10 percent of sales price per sqft, although this cost may range up to 15 percent. As the share of backbone costs starts exceeding 15 percent, the feasibility of the project starts to diminish. Either sales prices have to rise, limited by competition in the region, or the developers of the project take less of a profit. As profits are reduced to zero, the product will not be delivered in the market.

Figure 9 and **Figure 12** present a similar infrastructure cost burden analysis for retail/commercial development and warehouse/light industrial development in south Sutter County and North Natomas. Currently, commercial development is planned for North Natomas while warehouse/light industrial development is planned for south Sutter County.

Figure 9 and **Figure 10** shows the analysis for a retail/commercial development consisting of a 109,125 sqft building. The existing HCP fee (on a per square foot basis) is given as well as the incremental increase in the fee related to two scenarios analyzed in this economic analysis, Scenario 1 and Scenario 5. The average total existing infrastructure cost burden for a 109,000 sqft commercial building in the NBHCP area is estimated to be $21.79 per sqft in North Natomas. The proposed HCP fee increases the

burden amount by $0.19 to $0.61 per sqft depending on the scenario. For North Natomas, the cost burdens are estimated at 18 to 19 percent of the sales price per square foot, considerably higher than the 10 to 15 percent feasibility threshold.

Figure 11 and **Figure 12** summarizes the infrastructure cost burden on warehouse/light industrial development. The analysis assumes a 100,000 sqft building. The average total existing infrastructure cost burden for a 100,000 sqft warehouse/light industrial building in the NBHCP area is estimated at $4.15 per sqft in Sutter County and $8.90 per sqft in North Natomas. The proposed HCP fee increases the burden amount by $0.12 to $0.38 per square depending on the scenario. Depending on whether the building is intended for warehousing or more expensive flex space, the average sales price per sqft is estimated to range from $25.00 per sqft to $60.00 per sqft. Likewise the cost burdens also range from 18 percent for warehouse space to 8 percent for higher end light industrial space in south Sutter County.

The range for North Natomas is at 37 percent for warehouse space and 15 percent for higher end light industrial space. The cost burdens are likely to dictate what type of warehouse/light industrial projects are constructed in the two jurisdictions.

DISCUSSION OF NORTH NATOMAS FINANCING PLAN SHORTFALLS

The August 1999 Financing Plan Update for North Natomas compared the infrastructure and community facility cost burdens for the North Natomas area with other projects in the Greater Sacramento region. North Natomas had infrastructure costs comparable to nearby areas, although the costs were at the high end of the range for most land uses.

To maintain feasibility of the North Natomas Financing Plan, not all facilities were funded. Several facility improvements, such as those for bike trails, fire stations, library, and police station, as well as community centers, draw on funding from other regional sources, including the City's General fund, beyond the development impact fees charged to new development. For example the North Natomas Public Facilities Fee (NNPFF) funds only the off-street bike trails, but not the separated crossings for major roads and drainage canals (estimated at $6.8 million). Also of the two fire stations planned for the North Natomas area, the NNPFF will fund one fire station while the City is proposing fund the second station.

The residential infrastructure cost burdens of the North Natomas area remain in the range of feasibility due in large part to the fact that City planners and policy makers made a conscious decision to keep the public facilities financed in the Financing Plan reasonable. However, as stated above, the infrastructure cost burdens are at the high end of the range, and any increase in fees, including the HCP fee, pushes the burden even higher, and other facilities necessary to complete the community may go unfunded, relying on City, regional, state, and federal funding sources to provide facilities for a complete community.

Figure 5
Natomas Basin
Comparison of Burden of Impact Fees
on Residential Development - 1,800 Sqft Unit [1]

Fee Category	Sacramento County					Placer County		Yolo County	
	Natomas Basin			Sac. County	Folsom	Roseville	Rocklin	West Sac.	Woodland
	North Natomas Quadrant 2	North Natomas Quadrant 4	North Natomas Average	Laguna West	Broadstone Unit 2	North Central SP	Stanford Ranch	Southport	Sycamore Ranch
Existing Fees, Taxes & Assessments									
City/County Fees, Excluding Mitigation Fees	$10,782	$10,782	$10,782	$12,321	$17,597	$21,253	$19,903	$19,106	$12,772
Plan Area Fees	$5,806	$5,806	$5,806	$0	$0	$0	$0	$0	$4,702
School Mitigation	$6,030	$6,030	$6,030	$7,332	$5,292	$5,585	$9,658	$3,690	$9,055
Infrastructure Bonds/Assessments	$8,593	$8,557	$8,575	$9,331	$9,826	$13,790	$4,569	$0	$2,391
Subtotal	**$31,212**	**$31,175**	**$31,193**	**$28,984**	**$32,716**	**$40,628**	**$34,130**	**$22,796**	**$28,920**
Existing Habitat Mitigation Fees [2]	$563	$563	$563	$0	$0	$0	$0	$358	$358
Total Existing Fees, Taxes & Assessments	**$31,775**	**$31,738**	**$31,756**	**$28,984**	**$32,716**	**$40,628**	**$34,130**	**$23,154**	**$29,278**
Proposed Increase in NBHCP Fee Per Unit [2]									
Scenario 1	$293	$293	$293						
Scenario 2	$406	$406	$406						
Scenario 3	$671	$671	$671						
Scenario 4	$935	$935	$935						
Scenario 5	$949	$949	$949						
Total After Fee Increase									
Scenario 1	**$32,068**	**$32,031**	**$32,050**						
Scenario 2	**$32,181**	**$32,144**	**$32,163**						
Scenario 3	**$32,446**	**$32,410**	**$32,428**						
Scenario 4	**$32,710**	**$32,673**	**$32,691**						
Scenario 5	**$32,723**	**$32,687**	**$32,705**						

[1] All fees shown are for Fiscal Year 2001-02.
[2] Fee is charged on a per acre basis. This analysis assumes there are 7 units per acre.

"Summ 1,800 Sqft"

Prepared by EPS

10365 Fee Compar.xls 3/12/02

Figure 6
Natomas Basin
Comparison of Total Backbone Cost
as a Percentage of Average Home Prices

1,800 Square Foot Unit

Districts	Project Areas	Scenario	Average Home Price [1]	Existing/Current Mitigation Fees			Proposed Increase in Mitigation Fees		
				Habitat Mitigation Fees	Average Backbone Cost [2]	Percentage of Average Home Prices	NBHCP Mitigation Fees	Average Backbone Cost [2]	Percentage of Average Home Prices
NBHCP Service Areas									
North Natomas	Sacramento	#1-Low	$229,000	$563	$31,756	14%	$293	$32,050	14%
North Natomas	Sacramento	#5-High	$229,000	$563	$31,756	14%	$949	$32,705	14%
Major Development Areas									
Laguna West	Sacramento	n/a	$215,000		$28,984	13%			
Broadstone 2	Folsom	n/a	$261,000		$32,716	13%			
North Central Roseville	Roseville	n/a	$240,000		$40,628	17%			
Stanford Ranch	Rocklin	n/a	$243,000		$34,130	14%			
Southport	West Sacramento	n/a	$210,000	$358	$23,154	11%			
Sycamore Ranch	Woodland	n/a	$232,000	$358	$29,278	13%			

Source: City of Sacramento, North Natomas Drainage CFD No. 97-01

"1,800sf%"

[1] Based on data from The Gregory Group New-Home database.
[2] Total backbone costs include city/county-wide fees, including mitigation fees, school mitigation fees and project specific fees/bonds.

Figure 7
Natomas Basin
Comparison of Burden of Impact Fees
on Residential Development - 2,400 Sqft Unit [1]

Fee Category	Sacramento County					Placer County		Yolo County	
	City of Sacramento			Sac. County	Folsom	Roseville	Rocklin	West Sac.	Woodland
	North Natomas Quadrant 2	North Natomas Quadrant 4	North Natomas Average	Laguna West	Broadstone Unit 2	North Central SP	Stanford Ranch	Southport	Sycamore Ranch
Existing Fees, Taxes & Assessments									
City/County Fees, Excluding Mitigation Fees	$11,451	$11,451	$11,451	$12,583	$18,314	$22,155	$20,544	$20,761	$13,228
Plan Area Fees	$5,806	$5,806	$5,806	$0	$0	$0	$0	$0	$4,702
School Mitigation	$8,040	$8,040	$8,040	$9,354	$7,056	$5,585	$10,942	$4,920	$9,055
Infrastructure Bonds/Assessments	$9,161	$11,616	$10,389	$13,712	$9,826	$13,790	$4,776	$0	$2,391
Subtotal	**$34,458**	**$36,914**	**$35,686**	**$35,649**	**$35,197**	**$41,530**	**$36,262**	**$25,681**	**$29,376**
Existing Habitat Mitigation Fees [2]	$788	$788	$788					$502	$502
Total Existing Fees, Taxes & Assessments	**$35,247**	**$37,702**	**$36,474**	**$35,649**	**$35,197**	**$41,530**	**$36,262**	**$26,183**	**$29,877**
Proposed Increase in NBHCP Fee Per Unit [2]									
Scenario 1	$410	$410	$410						
Scenario 2	$569	$569	$569						
Scenario 3	$940	$940	$940						
Scenario 4	$1,309	$1,309	$1,309						
Scenario 5	$1,328	$1,328	$1,328						
Total After Fee Increase									
Scenario 1	**$35,657**	**$38,112**	**$36,885**						
Scenario 2	**$35,815**	**$38,270**	**$37,043**						
Scenario 3	**$36,187**	**$38,642**	**$37,414**						
Scenario 4	**$36,556**	**$39,011**	**$37,783**						
Scenario 5	**$36,575**	**$39,030**	**$37,802**						

"Summ 2,400 Sqft"

[1] All fees shown are for Fiscal Year 2001-02.
[2] Fee is charged on a per acre basis. This analysis assumes there are 5 units per acre.

Figure 8
Natomas Basin
Comparison of Total Backbone Cost
as a Percentage of Average Home Prices

2,400 Square Foot Unit

NBHCP Service Areas:	Average of Project Areas	Scenario	Average Home Price [1]	Existing/Current Mitigation Fees			Proposed Increase in Mitigation Fees		
				Habitat Mitigation Fees	Average Backbone Cost [2]	Percentage of Average Home Prices	NBHCP Mitigation Fees	Average Backbone Cost (1)	Percentage of Average Home Prices
NBHCP Service Areas									
North Natomas	Sacramento	#1-Low	$279,000	$788	$36,474	13%	$410	$36,885	13%
North Natomas	Sacramento	#5-High	$279,000	$788	$36,474	13%	$1,328	$37,802	14%
Comparable Development Areas									
Laguna West	Sacramento	n/a	$240,000		$35,649	15%			
Broadstone 2	Folsom	n/a	$360,000		$35,197	10%			
North Central Roseville	Roseville	n/a	$290,000		$41,530	14%			
Stanford Ranch	Rocklin	n/a	$324,000		$36,262	11%			
Southport	West Sacramento	n/a	$245,000	$502	$26,183	11%			
Sycamore Ranch	Woodland	n/a	$300,000	$502	$29,877	10%			

Source: City of Sacramento, North Natomas Drainage CFD No. 97-01

"2,400sf %"

[1] Based on data from The Gregory Group New-Home database.
[2] Total backbone costs include city/county-wide fees, including mitigation fees, school mitigation fees and project specific fees/bonds.

Figure 9
Natomas Basin
Comparison of Burden of Impact Fees Per Sqft
on Non-Residential Development - Retail

Fee Category	Sacramento County						Placer County		Yolo County	Sutter Co.
	City of Sacramento			Sac. County	Folsom	Sac. County	Roseville	Rocklin	West Sac.	
	North Natomas Quad. 1, Basin 6	North Natomas Quad. 2, Basin 1	North Natomas Average	Laguna West	Broadstone Unit 2	Northeast Galt	North Central SP	Stanford Ranch	Southport	South Sutter
Existing Fees, Taxes & Assessments										
City/County Fees, Excluding Mitigation Fees	$4.90	$4.90	$4.90	$7.09	$8.73	$16.06	$8.49	$10.42	$10.55	$5.53
Plan Area Fees	$9.15	$9.15	$9.15	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Infrastructure Bonds/Assessments	$7.77	$7.00	$7.38	$4.70	$4.89	$3.96	$5.65	$4.04	$9.35	$0.00
Subtotal	**$21.82**	**$21.05**	**$21.43**	**$11.79**	**$13.62**	**$20.01**	**$14.14**	**$14.47**	**$19.89**	**$5.53**
Existing Habitat Mitigation Fees [1]	$0.36	$0.36	$0.36	$0.00	$0.00	$0.00	$0.00	$0.00	$0.23	$0.36
Total Existing Fees, Taxes & Assessments	**$22.18**	**$21.41**	**$21.79**	**$11.79**	**$13.62**	**$20.01**	**$14.14**	**$14.47**	**$20.12**	**$5.89**
Proposed Increase in NBHCP Fee Per Sqft [1]										
Scenario 1	$0.19	$0.19	$0.19							$0.19
Scenario 2	$0.26	$0.26	$0.26							$0.26
Scenario 3	$0.43	$0.43	$0.43							$0.43
Scenario 4	$0.60	$0.60	$0.60							$0.60
Scenario 5	$0.61	$0.61	$0.61							$0.61
Total After Fee Increase										
Scenario 1	**$22.37**	**$21.60**	**$21.98**							**$6.08**
Scenario 2	**$22.44**	**$21.67**	**$22.06**							**$6.15**
Scenario 3	**$22.61**	**$21.84**	**$22.23**							**$6.32**
Scenario 4	**$22.78**	**$22.01**	**$22.39**							**$6.49**
Scenario 5	**$22.79**	**$22.02**	**$22.40**							**$6.50**

"Summ Retail"

[1] All fees shown are for Fiscal Year 2001-02.
[2] Fee is charged on a per acre basis. This analysis assumes there are 7 units per acre.

Figure 10
Natomas Basin
Comparison of Total Backbone Cost
as a Percentage of Average Sales Price per Sqft

Retail Development
Assumes 109,000 Sqft Building

Project Area	District	Scenario	Average Sales Price per Sqft [1]	Existing/Current Mitigation Fees			Proposed Increase of Mitigation Fees		
				Habitat Mitigation Fees	Average Backbone Cost [2]	Percentage of Average Sales Prices	NBHCP Mitigation Fees	Average Backbone Cost [1]	Percentage of Average Sales Prices
NBHCP Service Areas:									
North Natomas [3]	Sacramento	#1-Low	$120.00	$0.36	$21.79	18%	$0.19	$21.98	18%
North Natomas [3]	Sacramento	#5-High	$120.00	$0.36	$21.79	18%	$0.61	$22.40	19%
South Sutter County	Sutter County	#1-Low	$120.00	n/a	n/a	n/a	n/a	n/a	n/a
South Sutter County	Sutter County	#5-High	$120.00	n/a	n/a	n/a	n/a	n/a	n/a
Major Development Areas									
Laguna West	Sacramento	n/a	$120.00	$0.00	$11.79	10%			
Broadstone 2	Folsom	n/a	$120.00	$0.00	$13.62	11%			
Northeast Area	Galt	n/a	$120.00	$0.00	$20.01	17%			
North Central Roseville	Roseville	n/a	$120.00	$0.00	$14.14	12%			
Stanford Ranch	Rocklin	n/a	$120.00	$0.00	$14.47	12%			
Southport	West Sacramento	n/a	$120.00	$0.23	$20.12	17%			

"Retail %"

[1] Based on information provided by commercial developers and brokers.
[2] Total backbone costs include city/county-wide fees, plan area fees including mitigation fees, and project specific infrastructure fees/bonds.
[3] Backbone Infrastructure cost for North Natomas is based on the average cost of Quad 3 Basin 8c and Quadrant 1 Basin 9.

Figure 11
Natomas Basin
Comparison of Burden of Impact Fees Per Sqft
on Non-Residential Development - Warehouse/Light Industrial [1]

Fee Category	Sacramento County						Placer County		Yolo County		Sutter Co.
	City ofSacramento			Sac. County	Folsom	Galt	Roseville	Rocklin	West Sac.	Woodland	Sutter Co.
	North Natomas Quad 3, Basin 8c	North Natomas Quad 1, Basin 9	North Natomas Average	Laguna West	Broadstone Unit 2	Northeast Area	North Central SP	Stanford Ranch	Southport	East Main St. Assess. District	South Sutter
Existing Fees, Taxes & Assessments											
City/County Fees, Excluding Mitigation Fees	$3.70	$3.70	$3.70	$4.62	$5.09	$4.08	$6.49	$6.84	$5.20	$3.04	$3.92
Plan Area Fees	$1.82	$1.82	$1.82	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Infrastructure Bonds/Assessments	$3.82	$2.50	$3.16	$2.10	$3.06	$0.48	$2.63	$1.60	$4.25	$1.62	$0.00
Subtotal	**$9.33**	**$8.01**	**$8.67**	**$6.72**	**$8.15**	**$4.56**	**$9.12**	**$8.44**	**$9.45**	**$4.65**	**$3.92**
Existing Habitat Mitigation Fees [2]	$0.23	$0.23	$0.23	$0.00	$0.00	$0.00	$0.00	$0.00	$0.14	$0.14	$0.23
Total Existing Fees, Taxes & Assessments	**$9.56**	**$8.24**	**$8.90**	**$6.72**	**$8.15**	**$4.56**	**$9.12**	**$8.44**	**$9.60**	**$4.80**	**$4.15**
Proposed Increase in NBHCP Fee Per Sqft [2]											
Scenario 1	$0.12	$0.12	$0.12								$0.12
Scenario 2	$0.16	$0.16	$0.16								$0.16
Scenario 3	$0.27	$0.27	$0.27								$0.27
Scenario 4	$0.38	$0.38	$0.38								$0.38
Scenario 5	$0.38	$0.38	$0.38								$0.38
Total After Fee Increase											
Scenario 1	**$9.68**	**$8.35**	**$9.02**								**$4.27**
Scenario 2	**$9.72**	**$8.40**	**$9.06**								**$4.31**
Scenario 3	**$9.83**	**$8.51**	**$9.17**								**$4.42**
Scenario 4	**$9.94**	**$8.61**	**$9.27**								**$4.52**
Scenario 5	**$9.94**	**$8.62**	**$9.28**								**$4.53**

"Summ Lt Ind"

[1] All fees shown are for Fiscal Year 2001-02.
[2] Fee is charged on a per acre basis. This analysis assumes there are 7 units per acre.

Figure 12
Natomas Basin
Comparison of Total Backbone Cost
as a Percentage of Average Sales Price per Sqft

Warehouse Light Industrial Development
Assumes 100,000 Sqft Building

Project Area	District	Scenario	Average Sales Price per Sqft [1]	Existing/Current Mitigation Fees			Proposed Increase of Mitigation Fees		
				Habitat Mitigation Fees	Average Backbone Cost [2]	Percentage of Average Sales Prices	NBHCP Mitigation Fees	Average Backbone Cost [1]	Percentage of Average Sales Prices
			Low - High						
NBHCP Service Areas:									
North Natomas [3]	Sacramento	#1-Low	$25.00 - $60.00	$0.23	$8.90	36% - 15%	$0.12	$9.02	36% - 15%
North Natomas [3]	Sacramento	#5-High	$25.00 - $60.00	$0.23	$8.90	36% - 15%	$0.38	$9.28	37% - 15%
South Sutter County	Sutter County	#1-Low	$25.00 - $60.00	$0.23	$4.15	17% - 7%	$0.12	$4.27	17% - 7%
South Sutter County	Sutter County	#5-High	$25.00 - $60.00	$0.23	$4.15	17% - 7%	$0.38	$4.53	18% - 8%
Major Development Areas									
Laguna West	Sacramento	n/a	$25.00 - $60.00	$0.00	$6.72	27% - 11%			
Broadstone 2	Folsom	n/a	$25.00 - $60.00	$0.00	$8.15	33% - 14%			
North Central Roseville	Roseville	n/a	$25.00 - $60.00	$0.00	$9.12	36% - 15%			
Stanford Ranch	Rocklin	n/a	$25.00 - $60.00	$0.00	$8.44	34% - 14%			
Southport	West Sacramento	n/a	$25.00 - $60.00	$0.14	$9.60	38% - 16%			
East Main St.	Woodland	n/a	$25.00 - $60.00	$0.14	$4.80	19% - 8%			
Northeast Area	Galt	n/a	$25.00 - $60.00	$0.00	$4.56	18% - 8%			

"Lt Ind %"

[1] Based on information provided by commercial developers and brokers.
[2] Total backbone costs include city/county-wide fees, plan area fees including mitigation fees, and project specific infrastructure fees/bonds.
[3] Backbone Infrastructure cost for North Natomas is based on the average cost of Quad 3 Basin 8c and Quadrant 1 Basin 9.

CURRENT CONDITIONS VERSUS FUTURE CONDITIONS

As discussed in an earlier section of this Chapter, the proposed increase in the NBHCP fee from the 1999 fee level, is projected to have minimal impact on the cost burdens of new development projects. However, recognizing that the costs burdens are already high, any future increases in the fee, beyond the levels shown in this report, could negatively impact the feasibility of new development projects.

Over the last five years, increasing land values, as shown in **Figure 13,** have resulted in the need to increase the fee level. Land values increased over 11 percent from 1998 to 1999. From 2000 to 2001, land values increased over 28 percent.

As a result of the Settlement Agreement entered into by the City of Sacramento in 2001, land prices have spiked to $11,000 per acre. This has occurred due to the requirement that the City purchase habitat lands in specified areas within the Basin. This limit (restriction) on the supply of land suitable for habitat has increased the price of land, since demand has remained unchanged. It is anticipated that adoption of the revised NBHCP and elimination of the Settlement Agreement requirements specifying the location of habitat land acquisition, the cost per acre of habitat land will recede.

Nevertheless, there is anticipated to be on-going pricing pressure on habitat land as the potential supply of habitat land is reduced. **Figure 14** shows the distribution of the

Figure 13
Natomas Basin
In-Basin Land Values for Habitat Lands Acquired 1995-2001
(Excluding Transaction Costs)

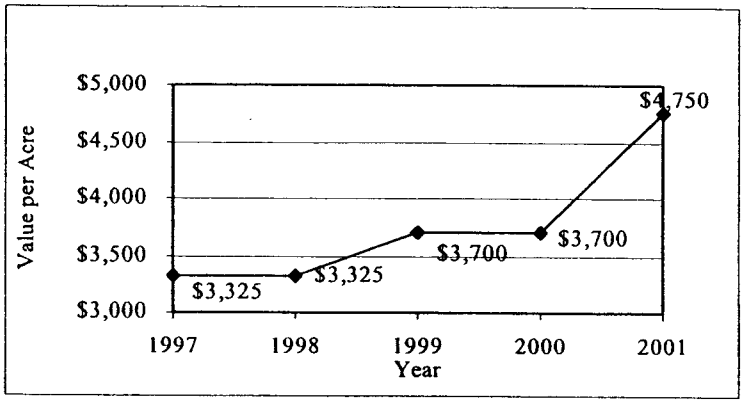
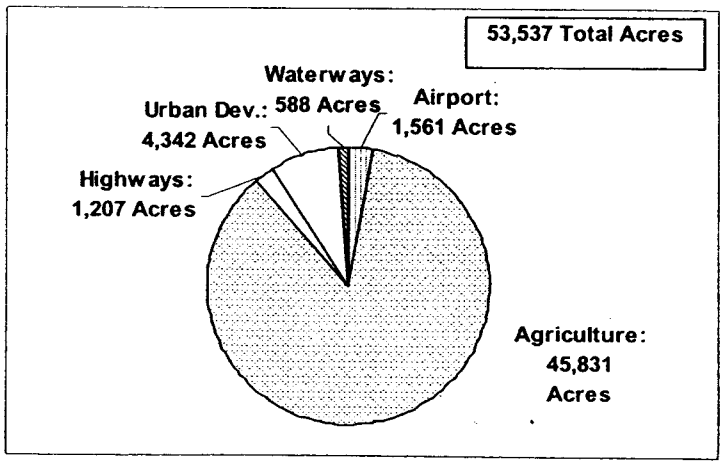


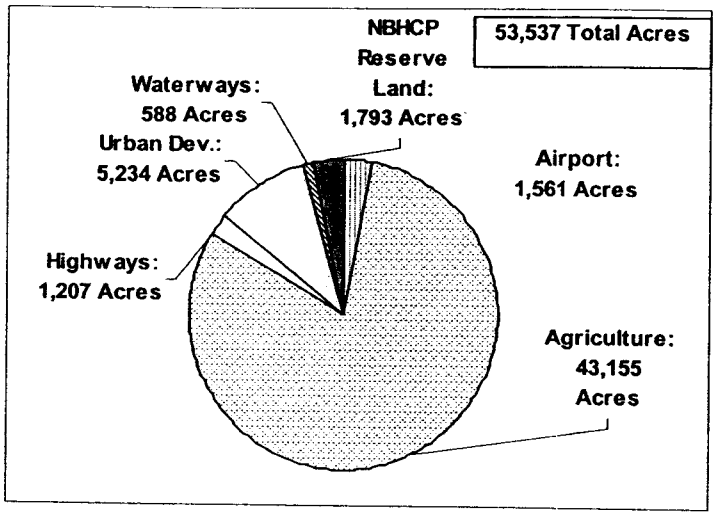
Figure 14
Natomas Basin
1997 Distribution of Acres by Land Use
Assuming 0.5:1 Mitigation Ratio



Source: HCP Tech Memo and EPS

approximately 53,500 acres in the basin among various land uses in 1997. In 1997, there were approximately 45,800 acres of agricultural land out of 53,500 acres total in the Natomas Basin.

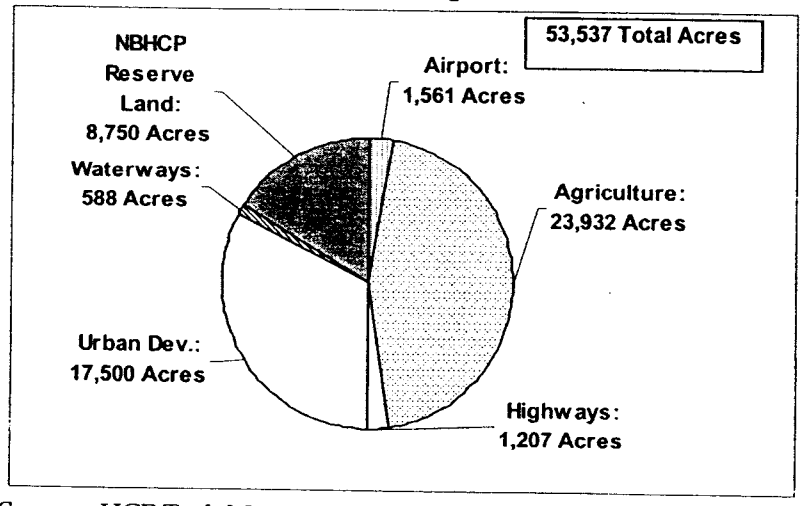
Figure 15
Natomas Basin
2001 Distribution of Acres by Land Use
Assumes 0.5:1 Mitigation Ratio



Source: HCP Tech Memo and EPS

In 2001, as shown in **Figure 15**, there were approximately 2,700 fewer agricultural acres. As urban development continues to occur, the pool of available agricultural land that can be purchased for habitat land decreases. As evidenced by the phenomenon occurring with implementation of the Settlement Agreement, this will undoubtedly drive the land acquisition costs up over time, and consequently the NBHCP Fee will need to increase over time to generate sufficient revenues for land acquisition.

Figure 16
Natomas Basin
Distribution of Acres by Land Use at Buildout
Assumes 0.5:1 Mitigation Ratio



Source: HCP Tech Memo and EPS

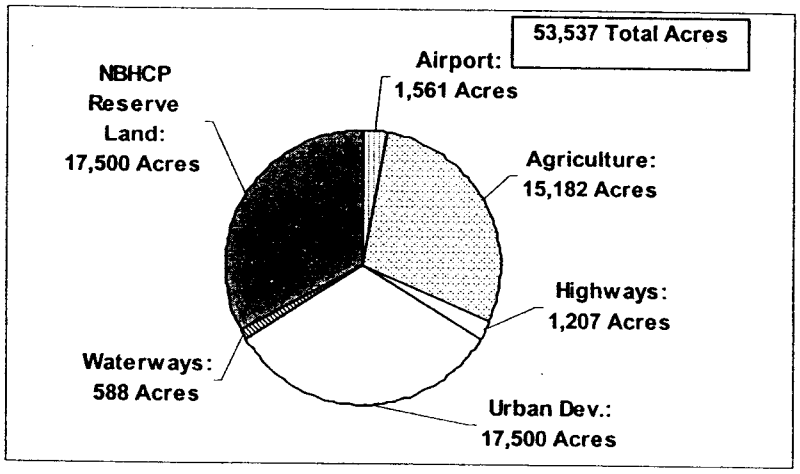
Figure 16 shows the likely distribution of acres in the Natomas Basin at buildout. Agricultural land, excluding habitat land, will have diminished to approximately 23,932 acres.

Each of the pie charts shown in **Figure 14** through **Figure 16** are based on a mitigation ratio of one-half acre of habitat mitigation to one acre of development. Scenario 4 presented in this Report contemplates a mitigation ratio of one acre of habitat mitigation to one acre of development.

Figure 17 presents a pie chart of the distribution of land uses at buildout assuming a 1:1 habitat mitigation ratio. In this scenario, the habitat mitigation acres at buildout total 17,500 acres. The remaining agricultural acres are reduced from 23,932 acres (as shown in **Figure 16**) to 15,182 acres, representing a 37 percent decline in total remaining agricultural acres.

Figure 18 shows the historical trend in land costs as well as three alternative projected trends in land costs through 2005 - increasing at 5%, 10%, and 20% annually. The historical annual average increase has been approximately 11%. By 2005, the land costs could range between $5,800 to $7,600 per acre excluding transaction costs and contingencies. Transaction and contingency costs are estimated to be approximately 20% of the land value. This would push the total acquisition costs between approximately $7,000 and $9,100 per acre.

Figure 17
Natomas Basin
Distribution of Acres by Land Use at Buildout
Assumes 1:1 Mitigation Ratio



Source: HCP Tech Memo and EPS

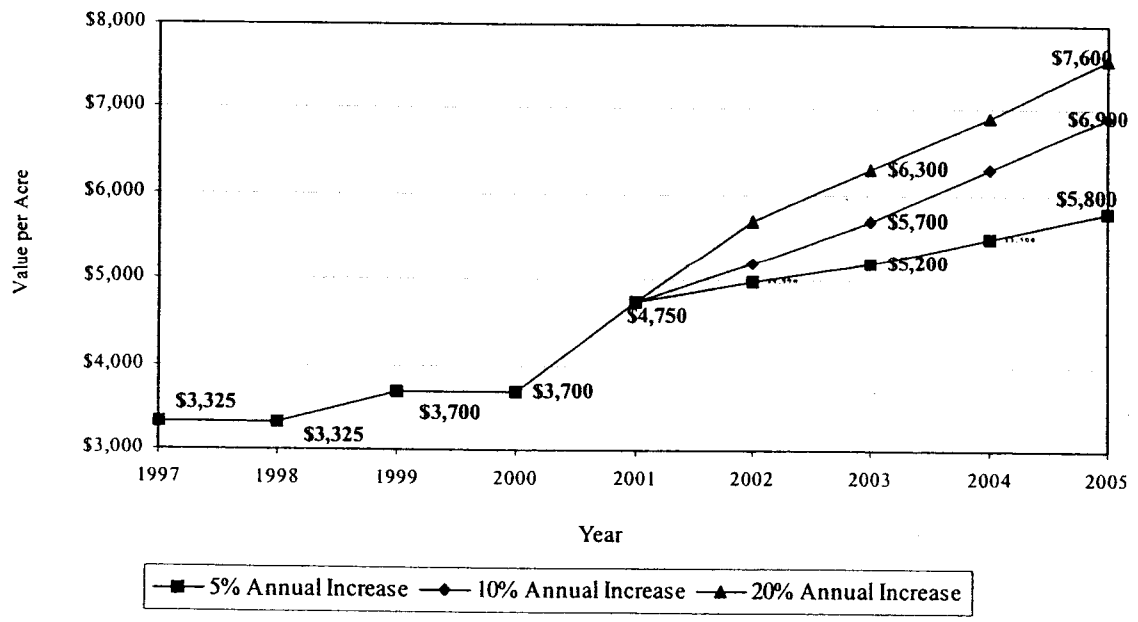
Land cost increases would be even greater under Scenario 4 (1:1 habitat mitigation ratio) due to the greater demand for habitat acres with a fixed supply of potential habitat land. While it is not possible to predict the actual land costs under such a scenario, it would most likely negatively impact the financial feasibility of the projects in the Natomas Basin. The fee estimated under Scenario 4 is $10,486, nearly double the fee estimated for the base case of $5,993 per acre - both of which assume the same land acquisition cost per acre. With the increased demand for habitat land under Scenario 4 and a static supply of acres from which to buy habitat land, the impact, over time, will be a significant increase in the land acquisition prices. This will require even greater fee increases potentially pushing the development projects out of the realm of feasibility.

While the economic analysis and financial modeling in this analysis did not model the 3:1 mitigation requirement included in the EIR Alternative 2, it can reasonably be assumed that the impact on land prices would be similar, if not greater, than under the 1:1 mitigation alternative. By inference, therefore, such an alternative would also negatively impact the feasibility of development projects in the Natomas Basin over time.

Similarly, the impact of a mitigation requirement to purchase habitat land in specified areas, as described in EIR Alternative 3 (also not modeled as part of this analysis) would result in increased land acquisition costs, as evidenced by the most recent NBC land acquisition costs of $11,000 an acre under the Settlement Agreement. While this is believed to be a temporary increase in land acquisition costs, past practice indicates requiring specific reserve areas as part of the HCP would increase the land costs on an on-going basis and negatively impact the financial feasibility of development projects.

In general, as land costs continue to increase and the NBHCP fee increases as a result, the financial feasibility of the development projects within the Natomas Basin area are likely to diminish over time as well.

Figure 18
Natomas Basin
Projected Land Costs (Excluding Transactions Costs) Over Time
Assuming a 0.5:1 Mitigation Ratio



VI. OVERVIEW OF FINANCIAL MODEL

This Chapter provides an overview of the financial model of the NBHCP. This discussion focuses on the general cash flow model assumptions and provides a detailed description of the model using the Base Case scenario.

IMPORTANT CONSIDERATIONS

Before describing the cash flow model and financial analysis in detail, there are several factors that should be noted and kept in mind when considering the financial analysis. They are as follows:

- ***Interaction of Funds***: Although the fee is based on the sum of several cost components, the portion of the fee funding the NBC annual costs may be used for any of the NBC annual activities given the priorities established by the NBHCP. Only the fee components for the O&M Endowment Fund and the 2 percent administrative fee are to be used entirely and exclusively for their respective purposes. In other words, the financing mechanism as established provides the ability to transfer monies between the Land Acquisition fund, the Restoration & Enhancement Fund, and the O&M/Administration fund.

- ***Viability Under Specific Set of Conditions***: The economic analysis and cash flow modeling incorporate the major provisions of the NBHCP into a working model to indicate whether the Plan is financially viable under a specific set of conditions. It is not intended to depict how the NBHCP will necessarily be implemented on an annual basis.

- ***Mitigation Fee Reviewed and Adjusted Annually***: The financial analysis assumes that costs, such as land acquisition costs, are constant through the 50-year permit period, for purposes of the cash flow modeling. In actuality costs will fluctuate over time in response to market conditions and other factors. The fee program is monitored and can be adjusted on an annual basis to adapt to changes in cost assumptions and revenue projections.

CASH FLOW MODEL ASSUMPTIONS

The cash flow model is based on a series of assumptions regarding expenditures and revenues for the HCP. The majority of these assumptions are presented in **Figure 19** through **Figure 21**.

Figure 19 shows the assumptions regarding land acquisition values per acre, the projected use of In-Basin lands, and the use of rice lands. The land acquisition values are based on the recent experience of the NBC in their acquisition of land to date. Land values within the Basin are likely to be higher than out of Basin because there is greater

land availability out of Basin and less development pressure. The HCP allowed for up to 20 percent of mitigation land to be purchased out of Basin. However, the financial analysis assumes that no land is purchased out of Basin, and therefore the land acquisition value assumed in the analysis may actually be higher, or reflect a more conservative assumption, than may prevail in implementation of the HCP. Transaction and contingency costs are added to the land acquisition value for a total land acquisition cost of $6,000 per acre.

The assumptions regarding the use of mitigation lands are based on the program as outlined in the HCP. **Figure 22** shows the distribution of mitigation land based on use for the Base Case scenario over the 50-year period of the ITPs and HCP.

Figure 19 also includes the assumptions regarding the average cost per acre of restoring and enhancing mitigation land. The only cost assumed with restoration and enhancement is in relation to the conversion of agricultural (predominantly rice) land to managed marsh. The cost per acre is estimated to be $2,919, based on the "Site-Specific Management Plans for the Natomas Basin Conservancy's Mitigation Lands for Sacramento and Sutter Counties" prepared by Wildlands, Inc. in June of 2000. The cost per acre of the conversion of marsh land, assumed to be 25 percent of total mitigation lands, is averaged over all of the mitigation lands acquired to determine a weighted average cost per acre of $621.

An average cost per acre of $116 is included to provide for the costs of conducting the site-specific plans for the mitigation lands. The total average cost per acre for restoration and enhancement is estimated to be $736 per habitat acre. (Note: this cost per habitat acre changes if the assumed percent of marsh land converted is changed.)

Figure 20 and **Figure 21** provide the expenditure and revenue assumptions for the ongoing O&M and administrative costs of the NBHCP. The O&M costs are based on estimates provided in the June 2000 Site-Specific Plan prepared by Wildlands, Inc. The property tax assumptions are based on the property tax bills for existing mitigation lands.

The administrative costs are based on the budget of the NBC. A breakdown of these costs is shown in **Figure 21**.

O&M revenues are assumed from rice or crop land farming leases and hunting of water fowl. The revenue assumed per acre for these activities is shown in **Figure 19.**

Figure 19
Natomas Basin HCP
Land Acquisition and Restoration/Enhancements Cost and Acquired Habitat Land Utilization Assumptions

Base Case
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Part A - Assumptions				Notes:
Inflation	**0.0%**			
Interest Rate	**3.0%**			
Land Acquisition Values per Acre	Land Value	Permitted by Plan	Assumed in Financial Analysis	
In-Basin Lands	$4,750	80%	100%	Estimated $4,500-$5,500 per acre range
Out-of-Basin Lands	$3,000	20%	0%	Estimated $2,500-$3,500 per acre range per Recent Experience of NBHCP
Average Land Value (1)	**$4,750**	Use In-Basin Land Value		
Plus Transaction Costs & Contingency	$1,250	per Acre		
Average Land Acquisition Cost	**$6,000**	**per acquired acre**		Beginning 1/1/01
Estimated Use of In-Basin Lands				
Marsh	25%			
Existing Rice	50%			
Other/Upland	25%			
Total Initial Use	**100%**			
Rice Converted to Marsh		After year 5, 324 acres in marsh 25% thereafter		
Rice Lands				
Uplands/Fallow	10%			
Leased for Other Crops	0%			
Leased Rice Base Land	90%			
Total Rice Lands	**100%**			
Initial Restoration/Enhancement	Use of Land	Initial Costs	Weighted Cost (5)	
Expended At Time Land Is Acquired				
Marsh (2)	0%	$0	$0	Note (3)
Existing Rice	75%	$0	$0	Note (3)
Dry Converted to Rice	0%	$0	$0	Note (3)
Other Upland	25%	$0	$0	Note (3)
Subtotal	**100%**		**$0**	
Expended At Time Land Is Converted				
Rice/Other Converted to Marsh	25%	$2,482	$621	Note (4)
Site Specific Plan Costs			$116 per acre	Based on initial Site Specific Plan for 1,297 acres
Average Cost per Habitat Acre			**$736**	Weighted average cost per acre

"assumptions1"

Source: Natomas Basin Conservancy

(1) Assumes all acquisition occurs at the average in-basin land value.

(2) Initial use of marsh land estimated at 0% because NBHCP estimates that little to no marshland is available for acquisition. However, rice land will be converted to marsh land.

(3) The initial costs of marsh, existing rice, dry land converted to rice and other upland have been set to zero as no initial restoration or enhancement costs are anticipated.

(4) The current estimate of $2,482 per acre is calculated from the May 2001 cost estimate of $2.13 million for 858 acres and is based on creation/maintenance of habitat for the giant garter snake and the Swainson's hawk.

(5) The cost of restoration and enhancement is weighted by the percent of acres assumed to be converted or used for that particular land use.

Prepared by EPS.

10365 model update 3/11/02

Figure 20
Natomas Basin HCP
Operations & Maintenance Assumptions

Base Case
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Part A - Assumptions Con't				Notes:
Operations & Maintenance Costs				
Marsh	$281	per acre		Updated Cost -- May 2001
Upland/Fallow	$18	per acre		Based on Wildlands, Inc. Estimates
Land Leased for Planted Rice Base	$3	per acre		Based on Wildlands, Inc. Estimates
Land Leased for Other Crops	$3	per acre		alfalfa, safflower, etc.
Other	$0	per acre		
Hunting	$0	per acre		Updated Cost -- May 2001
Misc./Monitoring/Adaptive Mgmt.	$27	per acre		Based on Wildlands, Inc. Estimates
Special Assessment & Property Tax Costs				
Sacramento County				
Reclamation District #1000	$13.1	per acre		Based on Existing Sacramento County Lands
NCMWA	$0.4	per acre		Based on Existing Sacramento County Lands
SAFCA O&M Assessment #1	$5.7	per acre		Based on Existing Sacramento County Lands
CSAI Safety Lights	$0.1	per acre		Based on Existing Sacramento County Lands
Property Tax [1]	$25.6	per acre		Assumes average assessed value of land at $2,400 per acre
Subtotal Sacramento County	**$45**	per acre		
Sutter County				
Reclamation District #1000	$13.1	per acre		
NCMWC	$0.4	per acre		
Property Tax	$24.0	per acre		Assumes average assessed value of land at $2,400 per acre
Subtotal Sutter County	**$37**	per acre		
Administrative Costs				
During Development	$447,695	per year		Figure 5 for detail
After All Land Acquired	$380,541	per year		phased in over 3- 5 years
Operations & Maintenance Revenues				
Crop Land Leases				
Through 2002				
Planted Rice Base Acreage	$160	per acre/year	normal ag. practices	$135 - $210 range
Other Crops (Flex. acreage)	$80	per acre/year	normal ag. practices	$75 - $100 range
2003 +				
Planted Rice Base Acreage	$160	per acre/year	normal ag. practices	$135 - $210 range
Other Crops (Flex. acreage)	$80	per acre/year	normal ag. practices	$75 - $100 range
Hunting				
Hunting Revenue per Acre	$12	per acre		Based on Wildlands Estimate for initial Site Plan

Source: Natomas Basin Conservancy

"assumptions2"

[1 Includes G.O. bond assessment.

Figure 21
Natomas Basin HCP
Estimated Annual Natomas Basin Conservancy (NBC) Administrative Costs

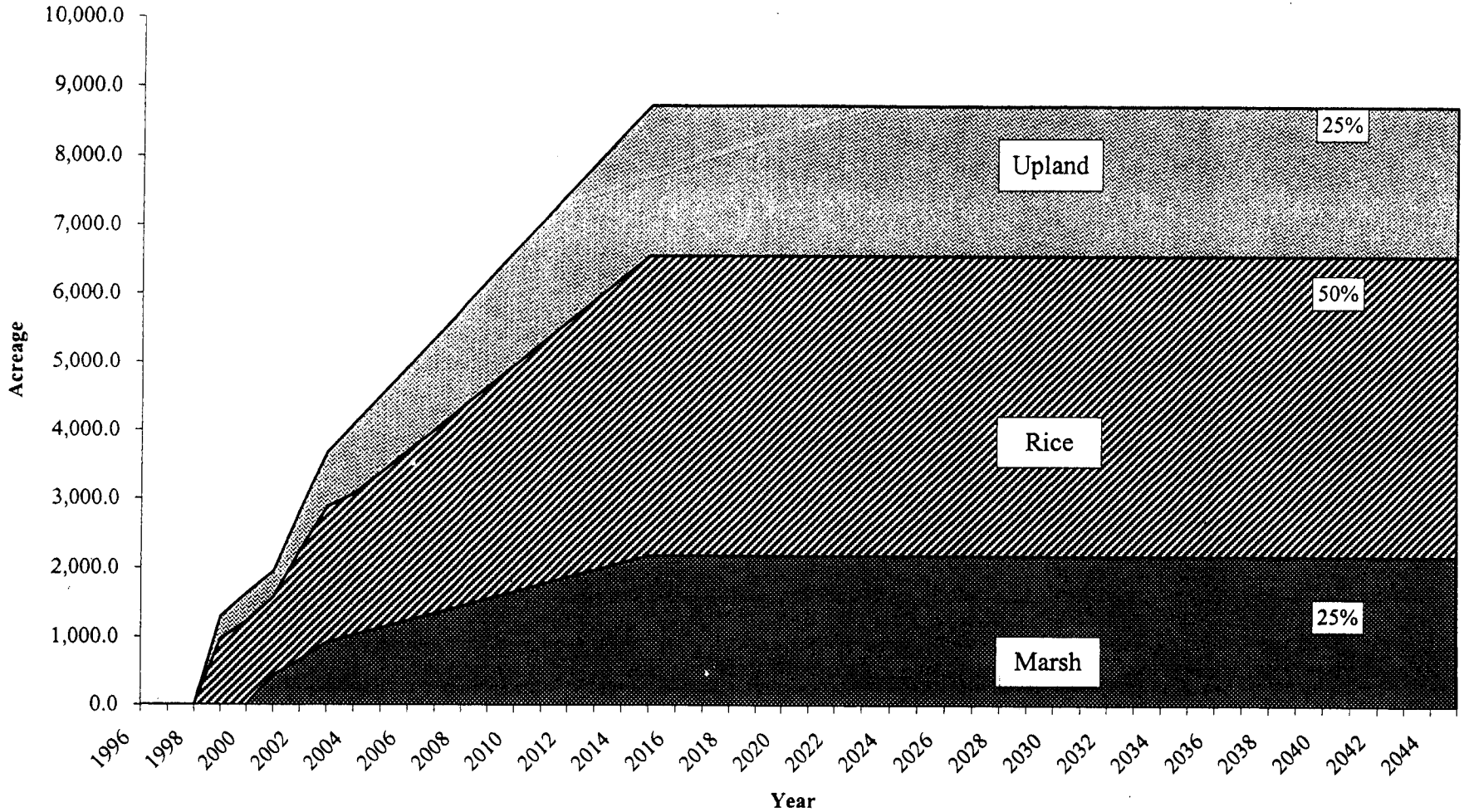
	Annual Cost	Notes
Administrative Expenses		
Staff	$150,000	
Benefits	$49,500	
Board Expense	$6,000	
Subtotal	**$205,500**	
Office Expense		
Rent	$15,000	
Telephone	$1,700	
Copying & Printing	$16,000	
Office Supplies	$5,000	
Postage	$600	
Equipment	$2,500	
Auto Expense	$6,500	
Subtotal	**$47,300**	
Miscellaneous Expense		
Insurance	$23,000	Liability and E&O
Accounting	$16,500	
Legal	$60,000	
Corporate Taxes	$1,000	
Subtotal	**$100,500**	
Contract Work/ Public Education/ Publications/Monitoring/Reports, etc.	**$36,000**	
Subtotal Costs	**$389,300**	
Contingency	$58,395	15% Contingency
Total Administration During Habitat Acquisition Phase	**$447,695**	
Total Administration After Habitat Acquisition	**$380,541**	[1]

"admin"

Source: NBC FY 2001 budget estimate

[1] Administrative costs are reduced by 15% after all habitat lands have been acquired per John Roberts.

Figure 22
Natomas Basin HCP
Summary of Habitat Acreage
Base Case



Prepared By EPS

10365 model update 3/11/02

UPDATES TO FINANCIAL ANALYSIS

The financial analysis for the Base Case relies in part on the last financial analysis of the HCP completed in July of 2000. The Base Case also incorporates updates based on the revised HCP and other revisions such that the cash flow modeling more accurately reflects the experience and projected operations of the NBC. These updates include:

- ***Rice Revenue Projections***: Rice revenues were modeled to more precisely match current estimates of projected revenue over the next two years.
- ***Revised Administrative Cost Estimates***: Administrative costs were revised based on the current budget estimates of the NBHCP.
- ***Fund Balance Adjustments***: The cash flow analysis was adjusted such that beginning balances in 2001 match actual fund balances of the NBHCP as of December 31, 2000.
- ***Transfer from O&M/Admin to Restoration & Enhancement***: The HCP fee program, since conception, was structured to allow transfers of funds between the Land Acquisition, Restoration & Enhancement, and Administration/O&M funds based on any surpluses or deficits that might exist in those funds. Currently, the O&M/Administration fund has operating surpluses due to operating and administrative efficiencies of the NBC while the revenues for Restoration & Enhancement need to be supplemented over the next few years due to higher than anticipated restoration and enhancement costs for marsh lands. Not only is the cost to restore and enhance managed marsh significantly higher than the original plan estimated, it is also anticipated that managed marsh restoration and enhancement obligations will be far more intense and concentrated than provided in the original plan due to a more condensed period of development activity. Therefore, a transfer from the O&M/ Administration fund to the Restoration & Enhancement fund was assumed in 2003 and 2004 in the cash flow model.
- ***No Reduction in Administrative Costs Post-Land Acquisition***: Previous versions of the financial analysis have assumed that administration costs would be reduced by 67 percent after all mitigation lands have been acquired. Based on discussions with the NBC and information provided by John Roberts, we have come to the conclusion that it is unrealistic to assume a significant decrease in administrative costs once all land acquisition has been completed. Therefore we have assumed a 15 percent reduction in administration costs. The reduction allows for a decrease in legal expenses, but leaves intact funding for most other administrative expenses. This revision to administration costs over the long term represents approximately a 20 percent increase in the Admin./O&M expenditures on an annual basis. However, the Admin./O&M fee is a relatively small component, approximately 16 percent, of the overall fee program including the Settlement Agreement Premium for land acquisition.
- ***Acceleration of Fees Paid (Grading Permits Pulled)***: Past cash flow model analyses have assumed a 50- year development absorption schedule for the 17,500 acres of planned development in the Natomas Basin. Historical development over the last three years has been substantially greater than anticipated by the original cash flow

analysis. Given recent market trends, it is likely that development activity will continue to be at higher levels than originally projected. Even if the market slows, and as a result development activity also slows, there is a very high probability that developers will pull grading permits even if they do not plan to develop the property in the immediate future in order to avoid future delays in the permitting process due to potential legal challenges to the NBHCP fee. Therefore, the current cash flow analysis assumes a 15-year development period, during which grading permits are projected to be pulled and the NBHCP fees paid. Actual development may substantially lag the grading permit stage.

FINANCIAL MODELING DISCUSSION FOR BASE CASE

The financial model includes a series of cash flows over a 50-year period. The financial analysis has historically included four major funds—Land Acquisition (LA), Restoration/Enhancement (RE), O&M/Administration, and the O&M Endowment fund. The current financial analysis has included a fifth fund that is the Supplemental Endowment Fund to be used for advanced acquisition of habitat mitigation lands. If the money generated for the Supplemental Endowment fund is not required to purchase land or not all funds are expended, the balance in the fund, at the discretion of the NBC Board of Directors, would be transferred to either the O&M Endowment fund or the O&M/ Administration fund at the end of the land acquisition phase of the HCP.

A summary of the cash flow for each of these funds is shown in **Figure 23** and **Figure 24**. The summary presents the status of the fund in five year intervals on a pro forma basis. A more detailed explanation of each of these cash flows is provided in **Figure 25** through **Figure 29**. The cash flow analysis is presented in nominal dollars as opposed to real dollars (no inflation is assumed in the analysis), which allows for a comparison of the end-term fund balances in today's dollars.

The Base Case assumes the level of development and mitigation ratios historically assumed by the NBHCP. It assumes a total of 17,500 acres of development occur over the next 30 years. The mitigation ratio is 0.5 acres of mitigation for every gross acre of development. Distribution of rice, marsh, and upland/other lands remains consistent with the historical cash flow model. Based on updates to the model as described above, the estimated fee is $5,993, which is currently the base fee under the settlement agreement.

The land acquisition cost has been increased based on discussions with the NBC (and is consistent across all scenarios). The August 2000 update assumed that combined land acquisition costs, transaction costs, and contingency costs totaled of $5,000. This amount has been increased to $6,000 to more accurately reflect current market conditions.

In addition, the Land Acquisition cash flow was adjusted such that the contingency is not deducted as an expense, but is maintained in the revenue portion of the cash flow. As a result, the fund balance is substantial at the end of the fifty-year time horizon

projected by the cash flow analysis. To the extent the contingency revenues are drawn upon, the fund balance surplus will decrease. If at the end of the land acquisition phase of the NBHCP there remains a fund balance surplus, it will be transferred to either the O&M/Administration fund or the O&M Endowment fund.

Besides the increase in land acquisition costs, the next largest increase in costs relates to O&M/Administration and the O&M Endowment fund. Because the administrative costs are assumed to go on in perpetuity at a higher level than assumed in past financial analyses, i.e., a 15 percent rather than a 67 percent reduction after all land has been acquired, the fee was increased accordingly.

The O&M Endowment fund fee component was also increased, because it is the O&M Endowment that provides operating revenues to the O&M/Administration fund after land acquisition. In year 50, the O&M endowment fund provides approximately 32 percent of operating revenues. The remaining revenues are assumed to come from rice and hunting revenues. **Figure 30** provides a comparison of funding sources for the O&M/Administration fund over the 50-year period.

Figure 23
Natomas Basin HCP
Cash Flow Summary
Land Acquisition, Supplemental Endowment, and Restoration and Enhancement Funds

Base Case
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Assumes:		
	0.0%	Inflation
	3.0%	Interest Rate

	Total 1995-2045	0 1995	1 1996	5 2000	10 2005	20 2015	30 2025	40 2035	50 2045
LAND ACQUISITION									
Beginning Balance		$0	$0	$587,176	$1,902,545	$6,382,454	$7,009,270	$7,009,270	$7,009,270
Less Land Costs	($43,320,901)	$0	$0	($1,614,279)	($2,182,526)	($2,182,526)	$0	$0	$0
Plus LA Fee Revenue	$48,453,077	$0	$55,641	$1,220,119	$2,534,546	$2,534,546	$0	$0	$0
Plus Interest Earnings	$1,574,349	$0	$0	$67,352	$66,556	$133,755	$0	$0	$0
Plus Transfer from O&M	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus Drawdown on Supp. Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus Adjustment (to balance to 2000 end bal)	$302,745								
Ending Balance	**$7,009,270**	**$0**	**$55,641**	**$260,368**	**$2,321,121**	**$6,868,229**	**$7,009,270**	**$7,009,270**	**$7,009,270**
SUPPLEMENTAL ENDOWMENT									
Beginning Balance	**$0**	**$0**	**$0**	**$0**	**$722,767**	**$2,424,124**	**$3,423,171**	**$4,600,455**	**$6,182,627**
Less Drawdown on Supp. Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus Supplemental Endowment Fee Revenue	$2,088,119	$0	$0	$0	$126,727	$126,727	$0	$0	$0
Plus Interest Earnings	$4,279,986	$0	$0	$0	$21,683	$72,724	$102,695	$138,014	$185,479
Ending Balance	**$6,368,106**	**$0**	**$0**	**$0**	**$871,177**	**$2,623,575**	**$3,525,866**	**$4,738,469**	**$6,368,106**
RESTORATION & ENHANCEMENTS									
Beginning Balance		$0	$0	$589,200	$1,100,820	$766,024	$127,745	$127,745	$127,745
Less Restoration/Enh. Costs	($6,441,343)	$0	$0	$0	($751,710)	($310,968)	$0	$0	$0
Plus R&E Fee Revenue	$5,839,422	$0	$0	$132,951	$310,968	$310,968	$0	$0	$0
Plus Transfer from O&M/Admin. Fund	$600,000	$0	$0	$0	$0	$0	$0	$0	$0
Plus Interest Earnings	$282,132	$0	$0	$12,373	$23,117	$16,087	$0	$0	$0
Plus adjustment (to balance to 2000 end bal)	($152,466)	$0	$0	($152,466)	$0	$0	$0	$0	$0
Ending Balance	**$127,745**	**$0**	**$0**	**$582,058**	**$683,196**	**$782,111**	**$127,745**	**$127,745**	**$127,745**

"cash_flow_sum1"

Prepared by EPS.

10365 model update 3/11/02

Figure 24
Natomas Basin HCP
Cash Flow Summary
Administration/Operations & Maintenance Fund, Endowment Fund, and Ending Balances Summary for All Funds

Base Case
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Assumes:	0.0%	Inflation
	3.0%	Interest Rate

	Total 1995-2045	0 1995	1 1996	5 2000	10 2005	20 2015	30 2025	40 2035	50 2045
ADMINISTRATION / OPERATIONS & MAINTENANCE									
Beginning Balance		$0	$0	$1,203,378	$5,823,281	$13,734,117	$10,632,160	$4,836,878	$0
Less O & M Costs	($64,768,078)	$0	$0	($502,829)	($1,084,975)	($1,584,646)	($1,517,492)	($1,517,492)	($1,517,492)
Plus Admin/O&M Fee Revenue	$23,568,011	$0	$4,561	$475,466	$1,313,740	$1,313,740	$0	$0	$0
Plus Rice Revenues	$25,436,070	$0	$0	$176,148	$325,856	$630,002	$630,002	$630,002	$630,002
Plus Hunting Revenues	$2,410,524	$0	$0	$0	$20,366	$63,000	$63,000	$63,000	$63,000
Plus Other Revenues (1)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus Interest Earnings	$10,125,364	$0	$0	$36,101	$174,698	$412,024	$318,965	$145,106	$0
Subtotal Revenues	**$61,539,968**	**$0**	**$4,561**	**$687,715**	**$1,834,660**	**$2,418,765**	**$1,011,967**	**$838,108**	**$693,002**
Less Transfer to RE Fund	($600,000)	$0	$0	$0	$0	$0	$0	$0	$0
Less Transfer to Land Acquisition Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus Adjustment (to balance to 2000 end bal)	$161,275	$0	$0	$161,275	$0	$0	$0	$0	$0
Drawdown on Endowment Fund	$3,666,835	$0	$0	$0	$0	$0	$0	$0	$824,490
Subtotal of Fund Transfers & Adjustment	**$3,228,110**	**$0**	**$0**	**$161,275**	**$0**	**$0**	**$0**	**$0**	**$824,490**
Ending Balance	**$0**	**$0**	**$4,561**	**$1,549,539**	**$6,572,966**	**$14,568,236**	**$10,126,635**	**$4,157,495**	**$0**
ENDOWMENT									
Beginning Balance	**$0**	**$0**	**$0**	**$323,846**	**$4,393,039**	**$13,728,746**	**$19,445,653**	**$26,301,336**	**$32,643,989**
Less Drawdown on Endowment Fund	($3,666,835)	$0	$0	$0	$0	$0	$0	$0	($824,490)
Plus Endowment Fee Revenue	$11,554,990	$0	$3,041	$113,645	$675,879	$675,879	$0	$0	$0
Plus Interest Earnings	$24,923,590	$0	$0	$26,490	$137,415	$420,188	$595,693	$807,282	$1,006,322
Plus Adjustment (to balance to 1999 end bal)	$14,076	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$32,825,821**	**$0**	**$3,041**	**$463,981**	**$5,206,333**	**$14,824,812**	**$20,041,346**	**$27,108,618**	**$32,825,821**
SUMMARY OF FUND ENDING BALANCES									
Land Acquistion	**$7,009,270**	**$0**	**$55,641**	**$260,368**	**$2,321,121**	**$6,868,229**	**$7,009,270**	**$7,009,270**	**$7,009,270**
Supplemental Endowment	**$6,368,106**	**$0**	**$0**	**$0**	**$871,177**	**$2,623,575**	**$3,525,866**	**$4,738,469**	**$6,368,106**
Restoration and Enhancements	**$127,745**	**$0**	**$0**	**$582,058**	**$683,196**	**$782,111**	**$127,745**	**$127,745**	**$127,745**
Operations and Maintenance	**$0**	**$0**	**$4,561**	**$1,549,539**	**$6,572,966**	**$14,568,236**	**$10,126,635**	**$4,157,495**	**$0**
Endowment	**$32,825,821**	**$0**	**$3,041**	**$463,981**	**$5,206,333**	**$14,824,812**	**$20,041,346**	**$27,108,618**	**$32,825,821**
COMBINED FUNDS ENDING BALANCE	**$46,330,942**	**$0**	**$63,242**	**$2,855,946**	**$15,654,793**	**$39,666,963**	**$40,830,862**	**$43,141,597**	**$46,330,942**

(1) "Other" revenues represents upfront funding from Federal, State or development fees to fund the initial acquisition and restoration/enhancement costs.

"cash_flow_sum2"

Prepared by EPS.

odel u

1/02

Figure 25
Natomas Basin HCP
Land Acquisition Cash Flow Summary

Base Case *17,500 acres of development*
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Assumes:		
	0.0%	Inflation
	3.0%	Interest Rate

	Total 1994-2045	0 1995	1 1996	5 2000	10 2005	20 2015	30 2025	40 2035	50 2045
LAND ACQUISITION									
Beginning Balance		$0	$0	$587,176	$1,902,545	$6,382,454	$7,009,270	$7,009,270	$7,009,270
Less Land Costs	($43,320,901)	$0	$0	($1,614,279)	($2,182,526)	($2,182,526)	$0	$0	$0
Plus LA Fee Revenue	$48,453,077	$0	$55,641	$1,220,119	$2,534,546	$2,534,546	$0	$0	$0
Plus Interest Earnings	$1,574,349	$0	$0	$67,352	$66,556	$133,755	$0	$0	$0
Plus Transfer from O&M	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus Drawdown on Supp. Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus Adjustment (to balance to 2000 end bal)	$302,745	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance (2)	**$7,009,270**	**$0**	**$55,641**	**$260,368**	**$2,321,121**	**$6,868,229**	**$7,009,270**	**$7,009,270**	**$7,009,270**

The Land Acquisition Cash Flow Summary provides a snapshot of the status of the fund at the end of multi-year periods. The detailed, year-by-year cash flow analysis is provided in the Appendix.

- **Beginning Balance**: Funds available at the start of the year.
- **Land Costs**: Represents money spent to buy land that year. Land costs are estimated based on the experience of the Natomas Basin Conservancy. Land acquisition costs are assumed to $4,750 per acre. Transaction costs and contingency costs are assumed to be $1,250 per acre. However the contingency costs are not charged in the cash flow analysis which results in a surplus. If land prices are higher than anticipated, the contingency would be drawndown, and the fee would be adjusted upward the following year to reflect current
- **Land Acquisition Fee Revenue**: Represents the fees collected to cover land acquisition, transaction costs, and contingencies. Based on the mitigation ratio of 0.5 to 1.0, the fee revenue collected per acre is half that of the land cost.
- **Interest Earnings**: Interest earned on the prior year's fund balance. An interest rate of 3% is assumed to be earned on 50% of the prior year's fund balance. No inflation is assumed, therefore the 3 percent interest is intended to reflect a real increase in interest earnings. Once land acquisition is completed, interest is no longer assumed to be earned.
- **Drawdown on Supplement Endowment Fund**: Represents a transfer of funds from the Supplemental Endowment Fund to the Land Acquisition Fund. No drawdown is assumed in this analysis. It is the intent of the Supplemental Endowment Fund to allow for advance purchase of mitigation lands or to pay for higher than anticipated land costs.
- **2000 Fund Balance Adjustment**: Represents a one-time fund balance adjustment in 2000 so that the ending year fund balance matches the actual fund balance for the Land Acqusition fund as of Dec. 31, 2000.
- **Ending Balance**: Represents funds available at the end of the year. The overall ending balance projected in this cash flow is positive, largely because the contingency revenues are reserved. To the extent that the contingency revenue is drawndown, the ending balance would be less. Any positive fund balance remaining after all mitigation lands had been purchased would be transferred to the O&M/Administration Fund or the O&M Endowment Fund.

Figure 26
Natomas Basin HCP
Supplemental Endowment Cash Flow Summary

Base Case *17,500 acres of development*
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Assumes:		
	0.0%	Inflation
	3.0%	Interest Rate

	Total 1994-2045	0 1995	1 1996	5 2000	10 2005	20 2015	30 2025	40 2035	50 2045
SUPPLEMENTAL ENDOWMENT									
Beginning Balance	$0	$0	$0	$0	$722,767	$2,424,124	$3,423,171	$4,600,455	$6,182,627
Less Drawdown on Supp. Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus Supplemental Endowment Fee Revenue	$2,088,119	$0	$0	$0	$126,727	$126,727	$0	$0	$0
Plus Interest Earnings	$4,279,986	$0	$0	$0	$21,683	$72,724	$102,695	$138,014	$185,479
Ending Balance (2)	**$6,368,106**	**$0**	**$0**	**$0**	**$871,177**	**$2,623,575**	**$3,525,866**	**$4,738,469**	**$6,368,106**

The Supplemental Endowment Cash low Summary provides a snapshot of the status of the fund at the end of multi-year periods. The detailed, year-by-year cash flow analysis is provided in the Appendix.

- **Beginning Balance**: Funds available at the start of the year.
- **Drawdown on Supplemental Endowment**: Represents money transferred from the Supplemental Endowment fund to the Land Acquisition Fund. No drawdown is assumed in the analysis and therefore reflects the contingency available to purchase mitigation land in advance or provide a cushion in the event that land prices are higher than anticipated.
- **Supplemental Endowment Fee Revenue**: Represents the fees collected to allow for advance purchase of mitigation land.
- **Interest Earnings**: Interest earned on the prior year's fund balance. An interest rate of 3% is assumed to be earned on 100% of the prior year's fund balance.
- **Ending Balance**: Represents funds available at the end of the year.

Figure 27
Natomas Basin HCP
Restoration & Enhancement Cash Flow Summary

Base Case *17,500 acres of development*
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Assumes:	0.0%	Inflation
	3.0%	Interest Rate

	Total 1994-2045	0 1995	1 1996	5 2000	10 2005	20 2015	30 2025	40 2035	50 2045
RESTORATION & ENHANCEMENTS									
Beginning Balance		$0	$0	$589,200	$1,100,820	$766,024	$127,745	$127,745	$127,745
Less Restoration/Enh. Costs	($6,441,343)	$0	$0	$0	($751,710)	($310,968)	$0	$0	$0
Plus R&E Fee Revenue	$5,839,422	$0	$0	$132,951	$310,968	$310,968	$0	$0	$0
Plus Transfer from O&M/Admin. Fund	$600,000	$0	$0	$0	$0	$0	$0	$0	$0
Plus Interest Earnings	$282,132	$0	$0	$12,373	$23,117	$16,087	$0	$0	$0
Plus adjustment (to balance to 2000 end bal)	($152,466)	$0	$0	($152,466)	$0	$0	$0	$0	$0
Ending Balance	**$127,745**	**$0**	**$0**	**$582,058**	**$683,196**	**$782,111**	**$127,745**	**$127,745**	**$127,745**

The Restoration & Enhancement Cash Flow Summary provides a snapshot of the status of the fund at the end of multi-year periods. The detailed, year-by-year cash flow analysis is provided in the Appendix.

- **Beginning Balance**: Funds available at the start of the year.
- **Restoration & Enhancement Costs**: Represents money spent to restore or enhance wetlands, i.e., creating marsh land. Restoration & Enhancement per acre cost estimates are based on the cost estimates provided in the Draft Site Specific Management Plan for the current 1,631 acres.
- **Restoration & Enhancement Fee Revenue**: Represents the fees collected to cover restoration and enhancement of mitigation lands. Based on the mitigation ratio of 0.5 to 1.0, the fee revenue collected per acre is half that of the land cost.
- **Interest Earnings**: Interest earned on the prior year's fund balance. An interest rate of 3% is assumed to be earned on 70% of the prior year's fund balance. Once land acquisition is completed, interest is no longer assumed to be earned.
- **2000 Fund Balance Adjustment**: Represents a one-time fund balance adjustment in 2000 so that the ending year fund balance matches the actual fund balance for the Land Acqusition fund as of Dec. 31, 2000.
- **Ending Balance**: Represents funds available at the end of the year.

Figure 28
Natomas Basin HCP
Operations & Maintenance/Administration Cash Flow Summary

Base Case *17,500 acres of development*
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Assumes:	0.0%	Inflation
	3.0%	Interest Rate

	Total 1994-2045	0 1995	1 1996	5 2000	10 2005	20 2015	30 2025	40 2035	50 2045
OPERATIONS & MAINTENANCE									
Beginning Balance		$0	$0	$1,203,378	$5,823,281	$13,734,117	$10,632,160	$4,836,878	$0
Less O & M Costs	($64,768,078)	$0	$0	($502,829)	($1,084,975)	($1,584,646)	($1,517,492)	($1,517,492)	($1,517,492)
Plus Admin/O&M Fee Revenue	$23,568,011	$0	$4,561	$475,466	$1,313,740	$1,313,740	$0	$0	$0
Plus Rice Revenues	$25,436,070	$0	$0	$176,148	$325,856	$630,002	$630,002	$630,002	$630,002
Plus Hunting Revenues	$2,410,524	$0	$0	$0	$20,366	$63,000	$63,000	$63,000	$63,000
Plus Other Revenues (1)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus Interest Earnings	$10,125,364	$0	$0	$36,101	$174,698	$412,024	$318,965	$145,106	$0
Subtotal Revenues	$61,539,968	$0	$4,561	$687,715	$1,834,660	$2,418,765	$1,011,967	$838,108	$693,002
		$0	$0	$0	$0	$0	$0	$0	$0
Less Transfer to RE Fund	($600,000)	$0	$0	$0	$0	$0	$0	$0	$0
Less Transfer to Land Acquisition Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Plus Adjustment (to balance to 2000 end bal)	$161,275	$0	$0	$161,275	$0	$0	$0	$0	$0
Drawdown on Endowment Fund	$3,666,835	$0	$0	$0	$0	$0	$0	$0	$824,490
Subtotal of Fund Transfers & Adjustment	$3,228,110	$0	$0	$161,275	$0	$0	$0	$0	$824,490
Ending Balance (2)	**$0**	**$0**	**$4,561**	**$1,549,539**	**$6,572,966**	**$14,568,236**	**$10,126,635**	**$4,157,495**	**$0**

The Operations & Maintenance/Administration Cash Flow Summary provides a snapshot of the status of the fund at the end of multi-year periods. The detailed, year-by-year cash flow analysis is provided in the Appendix.

- **Beginning Balance**: Funds available at the start of the year.
- **O&M/Admin Costs**: Represents the estimated expenditures for the following general categories for that year:
  - -- Maintenance for rice & other crop land, marsh, hunting, and other lands
  - -- Property taxes & special district assessments
  - -- Administration of the Natomas Basin Conservancy
  - -- Species monitoring
- **O&M/Admin Revenue**: Represents the revenues generated to pay for expenditures. Several revenue sources are assumed:
  - -- Mitigation fees collected
  - -- Rice farming lease revenues
  - -- Hunting revenues
  - -- Other revenues (none assumed)
- **Interest Earnings**: Interest earned on the prior year's fund balance. An interest rate of 3% is assumed to be earned on 100% of the prior year's fund balance.
- **Drawdown on O&M Endowment Fund**: Represents a transfer of funds from the O&M Endowment Fund to the O&M/Admin. Fund.
  Drawdowns occur after the acquisition phase of the plan. The endowment revenues supplement revenues earned from rice farming and hunting.
- **2000 Fund Balance Adjustment**: Represents a one-time fund balance adjustment in 2000 so that the ending year fund balance matches the actual fund balance for the Land Acqusition fund as of Dec. 31, 2000.
- **Ending Balance**: Represents funds available at the end of the year. In approximately the last ten years of the 50-year period, annual ending balances go to 0. This means that in each year costs equal revenues. The cash flow is intended to go on in perpeptuity and is able to do this by drawing on the O&M Endowment fund.

Figure 29
Natomas Basin HCP
O&M Endowment Cash Flow Summary

Base Case *17,500 acres of development*
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Assumes:	0.0%	Inflation
	3.0%	Interest Rate

0

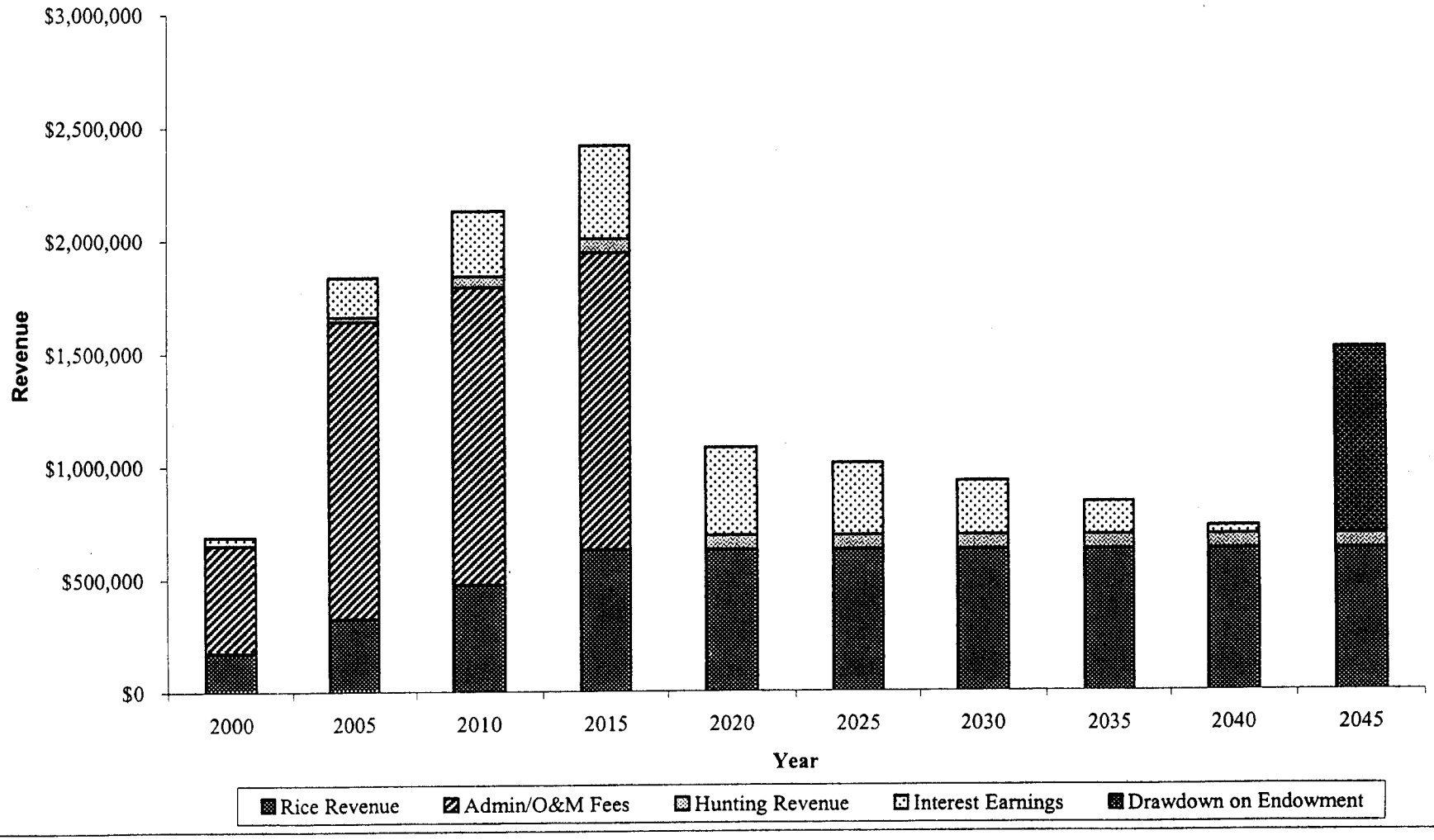
	Total 1994-2045	0 1995	1 1996	5 2000	10 2005	20 2015	30 2025	40 2035	50 2045
SUPPLEMENTAL ENDOWMENT									
Beginning Balance	$0	$0	$0	$323,846	$4,393,039	$13,728,746	$19,445,653	$26,301,336	$32,643,989
Less Drawdown on Endowment Fund	($3,666,835)	$0	$0	$0	$0	$0	$0	$0	($824,490)
Plus Endowment Fee Revenue	$11,554,990	$0	$3,041	$113,645	$675,879	$675,879	$0	$0	$0
Plus Interest Earnings	$24,923,590	$0	$0	$26,490	$137,415	$420,188	$595,693	$807,282	$1,006,322
Plus Adjustment (to balance to 1999 end bal)	$14,076	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance (2)	**$32,825,821**	**$0**	**$3,041**	**$463,981**	**$5,206,333**	**$14,824,812**	**$20,041,346**	**$27,108,618**	**$32,825,821**

The O&M Endowment Cash low Summary provides a snapshot of the status of the fund at the end of multi-year periods. The detailed, year-by-year cash flow analysis is provided in the Appendix.

- **Beginning Balance**: Funds available at the start of the year.
- **Drawdown on O&M Endowment**: Represents money transferred from the O&M Endowment fund to the O&M/Admin Fund.
- **O&M Endowment Fee Revenue**: Represents the fees collected to fund the O&M Endowment Fund.
- **Interest Earnings**: Interest earned on the prior year's fund balance. An interest rate of 3% is assumed to be earned on 100% of the prior year's fund balance.
- **Ending Balance**: Represents the estimated fund balance at the end of the year.

Prepared by EPS.

Figure 30
Natomas Basin HCP
O & M Revenue --Changing Mix of Revenue Sources Over Time
Base Case



Prepared By EPS

10365 model update 3/11/02

DRAFT
ADDENDUM: ECONOMIC ANALYSIS OF THE NBHCP

In March 2002, EPS completed the Final Report of the Economic Analysis of the Natomas Basin Habitat Conservation Plan (NBHCP). In the Report, EPS analyzed two main issues in response to the Judge's ruling on the NBHCP in August of 2000. The two main issues analyzed were:

- Adequate Funding of the NBHCP under a reduced development scenario, and the
- Financial Feasibility or "Practicability" of the NBHCP based on an analysis of five scenarios presented in the Report.

The analysis in the Report focused on five scenarios as follows:

- *Scenario 1 (Base Case)* - 17,500 acres of development, 0.5 to 1 mitigation ratio, 25 percent marsh (per revised NBHCP).
- *Scenario 2* - 12,000 acres of development, 0.5 to 1 mitigation ratio, 25 percent marsh.
- *Scenario 3* - 8,000 acres of development, 0.5 to 1 mitigation ratio, 25 percent marsh.
- *Scenario 4* - 17,500 acres of development, 1 to 1 mitigation ratio, 25 percent marsh.
- *Scenario 5* - 17,500 acres of development, 0.5 to 1 mitigation ratio, 75 percent marsh.

The five scenarios provide a methodology to analyze the range of alternatives inlcuded in the NBHCP Draft EIR/EIS. Each scenario was analyzed using a series of cash flows for land acquisition, restoration and enhancement, on-going operation and maintenance including administration of the Natomas Basin Conservancy (NBC), an endowment fund, and a supplemental endowment fund targeted at land acquisition. The cash flows are used to determine the Habitat Mitigation Fee (the "Fee") required to fully fund the NBHCP over the 50-year permit period and beyond. The fees as calculated are summarized in **Figure 1**.

Subsequent to completing the Final Report on the Economic Analysis of the NBHCP, several issues were raised by interested parties and EPS was requested to provide additional analysis or clarification on certain issues. This Addendum to the Report addresses the following issues:

1. Analysis of a "Specific Reserve" Alternative
2. Impact of increased mitigation monitoring and adaptive management requirements
3. Clarification on EPS discussion and findings in regard to the Cost Burden Analysis
4. Clarification on distinction between Administration/O&M Fund and O&M Endowment Fund
5. Clarification on how the calculated Fees are to be interpreted and, perhaps, implemented given uncertainties regarding development in the Natomas Basin

Each of these points is discussed in greater detail below.

SPECIFIC RESERVE ALTERNATIVE

Alternative 3 of the Revised HCP Draft EIR/EIS considers the possibility of identifying specific reserve areas or "reserve zones" that would then be the focus of the acquisition activity of the Natomas Basin Conservancy (NBC). The Economic Analysis prepared by EPS did not analyze this Alternative via the cash flow models as it would require speculation as to the timing and cost of reserve acquisitions.

However, the potential impacts of a specific reserve scenario was discussed qualitatively in the Report on page 37. The law of supply and demand dictates that if supply is restricted, as it would be under a specific reserve alternative, and demand remains unchanged, the result is an increase in price. Land acquisition costs have indeed risen as a result of current restrictions on acquisition of habitat mitigation land due to the Settlement Agreement.

Under the Settlement Agreement the NBC is directed to purchase habitat mitigation land around Fisherman's Lake. When the Settlement Agreement was entered into in May of 2001, the most current land acquisition transactions adjacent to Fisherman's Lake was a price per acre of $11,000 for habitat mitigation land. The fee adopted pursuant to the Settlement Agreement therefore, included land acquisition costs of $11,000. This represented an increase of $6,000 per acre for land acquisition above the $5,000 per acre price (2000 HCP Fee) which was in place prior to adoption of the Settlement Agreement Fee in 2001.

Since adoption of the Settlement Agreement, land acquisition costs, particularly for land in the vicinity of Fisherman's Lake, have continued to increase. Land owners are currently indicating that they will not sell land for less than $15,000 per acre. If the fees calculated for Scenarios 1 through 5 were adjusted to account for this higher land acquisition costs, the Fee would need to increase by approximately $4,500 (excluding any corresponding increase in transaction costs and contingency for land acquisition).

The fees would then range from $10,493 per acre for the Base Case to $15,082 per acre for Scenario 5.

The experience of the NBC over the last several years has been that the cost for land acquisition included in the fee becomes the floor for land acquisition prices rather than the ceiling. Therefore, it is likely that if the fee was raised to account for the possibility of land price increases in the future, due to restrictions on where habitat mitigation land could be purchased, land prices throughout the Natomas Basin would see a corresponding increase as well.

Unless new home values and non-residential lease rates continue to increase, the financial feasibility of new development projects are likely to be negatively impacted by significant increases in the NBHCP fee. As discussed in the EPS Report, development projects in the Natomas Basin already have cost burdens that nearly meet or exceed the benchmarks for financial feasibility. The future financial feasibility of development projects in the Natomas Basin will also be affected by the likely increase in development impact fees to be heard by the City of Sacramento City Council in May of 2002 and the most recent increase in the citywide park fee (an increase of approximately $600 per single family unit).

INCREASED MITIGATION MONITORING AND ADAPTIVE MANAGEMENT

The Economic Analysis of the NBHCP included specific costs assumptions for mitigation monitoring, species monitoring, and adaptive management. These cost assumptions were built into the Administration/O&M fund cash flow analysis. The assumptions, as shown below in **Figure 2**, remained constant for each of the five scenarios included in the Report.

Figure 2
Estimated Species & Habitat Monitoring Cost Assumptions
Included in EPS March 2002 Report

ITEM	COST ASSUMPTION
Monitoring and Adaptive Management	$27 per acre per year ($239,344 per year at buildout)
Reporting/Public Education	$36,000 per year
Species Monitoring	
Giant Garter Snake	$45,000 per year
Swainson's Hawk	$12,000 per year
All Species Inventory	$12,000 per year
TOTAL AT BUILDOUT	**$344,344 per year**

Source: NBC

The revised NBHCP, as currently proposed, would require more extensive mitigation and species monitoring and adaptive management practices. As shown in **Figure 3**, the costs associated with mitigation monitoring nearly double (as estimated at buildout).

Figure 3
Estimated Species & Habitat Monitoring Cost Assumptions
Based on February 2002 Revised HCP

Item	Cost	Recurrence Interval *(years)*	Annualized Cost
Conduct annual assessment of habitat conditions	$60,000	1	$60,000
Conduct GGS annual field surveys	$10,000	1	$10,000
Conduct GGS five-year assessment	$60,000	5	$12,000
Conduct Swainson's Hawk survey	$15,000	1	$15,000
Conduct all species baseline inventory	$15,000	43	$350
Conduct all species five-year inventory	$120,000	5	$24,000
Prepare reports	$25,000	1	$25,000
Accounting and evaluations	$25,000	1	$25,000
TOTAL	**$330,000**		**$171,350**
Habitat Acres Through 2002			2,089
Annual Cost Per Acre			**$82.02**
Total At Buildout (8,750 Acres)			**$716,675**

habitat o&m

Source: NBC

The increase in mitigation monitoring costs has a direct impact on the estimated NBHCP. The costs shown above represent annual costs to the NBC and it is estimated that the buildout cost will be reached by 2015. The one-time NBHCP Fee would need to be increased significantly in order to provide sufficient funding for the NBC over the entire 50-year permit period and beyond. As shown in **Figure 4**, the estimated NBHCP fee would need to be increased by approximately $1,700 to $3,200 depending on which Scenario is determined as the basis of the fee.

Figure 4
Comparison of Estimated NBHCP Fee
With and Without Increase in Species & Habitat Mitigation Costs

Scenario	Estimated Fee Prior to Revised Mitigation Monitoring Costs (March 2002)	Estimated Fee After Revised Mitigation Monitoring Costs (April 2002)	Difference
Scenario 1 - Base Case	$5,993	$7,722	$1,729
Scenario 2 - 70% of Plan Implemented	$6,784	$8,620	$1,836
Scenario 3 - 50% of Plan Implemented	$8,641	$10,753	$2,112
Scenario 4 - 1 to 1 Mitigation Ratio	$10,486	$13,649	$3,163
Scenario 5 - 75% Managed Marsh	$10,582	$12,449	$1,867

Source: EPS

COST BURDEN ANALYSIS

One of the tasks EPS was requested to undertake in the Economic Analysis of the NBHCP was to determine whether the mitigation imposed, will to the maximum extent practicable, reduce or mitigate the impacts of development on the protected species. As discussed in the March 2002 Report, the issue of whether the mitigation imposed under Scenarios 1 through 5 mitigates to the Maximum Extent Practicable requires consideration of biological, legal, and financial/economic factors.

EPS addressed only the financial/economic issues in the March 2002 Report. From an economic view point, the question of Maximum Extent Practicable (MEP) was interpreted as one of financial feasibility or practicability. Assuming that the HCP adequately provides for the biological and legal issues, does the fee as proposed "work" from the perspective of providing for financially feasible development. It is not our understanding, that the fee need not push development to the brink of in-feasibility to meet the test of the MEP.

Two tests were applied to Scenarios 1 through 5 to test the financial viability of new development under the mitigation required for each Scenario. The first test was a comparison of the NBHCP fees calculated under Scenarios 1 through 5 with the fees charged by other HCP programs in surrounding jurisdictions. Based on the this analysis it was determined that fees proposed for Scenarios 1 through 5 were considerably higher than similar fees charged by other surrounding jurisdictions for habitat mitigation.

The second test was a cost burden analysis for generic residential, retail, and light industrial development projects in the Natomas Basin and including a comparison to cost burdens for jurisdictions in surrounding areas. The cost burden analysis compares

the total backbone infrastructure costs estimated for the generic project to the estimated sales price of a residential unit or square foot of a retail or light industrial project.

In general, it was found that the infrastructure cost burdens for residential and retail projects in the Natomas Basin were high but not currently out of the range of financial feasibility. For light industrial development, it was found that the financial feasibility will likely depend on what type of product is constructed, e.g., low-end warehousing projects vs. high-end light industrial projects. Given the cost burdens, higher-end light industrial projects will be more feasible, but ultimately the level of demand for these types of projects may result in a slower absorption than if a wider variety of projects were feasible.

The cost burden analysis is a "static" analysis, or, in other words, it reflects the costs and projected product sales prices as of March 2002. To the extent these assumptions change, the results will inevitably change as well.

Whether or not the financial feasibility is impacted will depend on whether home sales price or lease/sales price of non-residential development will change to offset the higher burden. There is less certainty over sales or lease prices keeping pace with cost increases, as it is the market that drives the price at which developers can sell their product. Other development areas in the region, which are not subject to the NBHCP Fee, might be able to deliver their product more inexpensively, depending on supply and demand and other economic factors. If the infrastructure cost burdens continue to increase and there is no off-setting increase in product sales prices, the financial feasibility of development projects in the Natomas Basin will be jeopardized.

The NBHCP Fee has been and will continue to be adjusted annually to account for increases in land prices and other changes in assumptions regarding the NBHCP. To date, the fee increases have not impacted the financial feasibility of the projects in the Natomas Basin because product sales prices of homes and non-residential development have also increased overtime. As long as this trend continues, financial feasibility of development projects in the Natomas Basin will remain intact.

ADMIN/O&M FUND VS. O&M ENDOWMENT FUND

In concept, the Administration/O&M Fund (Admin/O&M Fund) and the O&M Endowment Fund are closely linked, however, they serve very different purposes.

The Admin/O&M Fund serves as the operating cash flow for the NBC. All expenses related to operating, maintaining, and administering the NBHCP are charged to the Admin/O&M Fund. This includes expenses such as species and mitigation monitoring costs, payment of ad valorem taxes, salaries of NBC employees, office rent, legal, reporting costs, etc.

Revenues for operations, maintenance, and administration of the NBC come from three primary sources: annual fee revenues, rice revenues, and hunting revenues. Rice and hunting revenues are projected to continue through the life of the NBHCP. However, fee revenues cease once all allowable grading permits have been pulled in the Natomas Basin (representing development of 17,500 acres).

Rice and hunting revenues are insufficient to cover all of the operating, maintenance, and administration costs of the NBC. Therefore, it was determined at the inception of the financing plan for the NBHCP, that another source of funding would be required in the out years of the Plan. As a result, the O&M Endowment Fund was created. The sole purpose of the O&M Endowment Fund is to provide revenue, in the form of interest earnings on the accumulated principal, to fund the shortfall in revenues for the Admin/O&M Fund in the later years of the Plan (approximately 2032 and beyond). No direct operating expenses are charged to the O&M Endowment Fund.

In running the cash flow model and calculating the NBHCP mitigation fee, EPS always insures that the interest earnings are greater than the drawdown (to the Admin/O&M Fund), so that the shortfall funding will remain available in perpetuity.

IMPLEMENTATION OF THE NBHCP FEE

As mentioned above, the March 2002 Report included five scenarios. Based on comments received by EPS regarding the analysis, it seems necessary to clarify how the Scenarios and corresponding fees should be interpreted in regard to implementing the NBHCP.

Scenario 1 represents the Base Case, which assumes no major change to the parameters of the NBHCP. Projected total development remains at 17,500 acres, the mitigation ratio remains at ½ acre of mitigation land for every gross acre of developed land, and the requirement for managed marsh remains at 25 percent of reserve land acquired by the NBC. Assuming no change to any of these parameters, the Base Fee could be adopted and the financing plan for the NBHCP would not be jeopardized[1].

In Scenario 2 and Scenario 3, the total estimated developed acres was reduced from 17,500 acres to 12,000 acres and 8,000 acres respectively. Under these reduced development scenarios, the estimated fee increases. The fee increases to reflect that under a reduced development scenario, less rice and hunting acres and corresponding revenues will be available. If the reduced development scenarios are a likely future outcome, the higher fee should be adopted at the outset to insure that the financing plan remains viable. The fee as calculated assumes that the fee would be adopted concurrent with the adoption of the revised HCP (in 2002). If the fee were to be adopted in later

[1] In April of 2002 EPS revised the Base Fee for the Natomas Basin Conservancy. The Base Fee increased from $5,993 in 2001 (and as shown in the March 2002 Report) to $7,934 per acre of development.

years given a reduced development scenario, the fee would need to be higher than is presently calculated.

Similarly, if the revised HCP calls for either a higher mitigation ratio or an increase in the allocation of managed marsh acres, the higher fee would need to be adopted concurrent with the revised HCP to insure financial viability of the Plan. It should be noted that the Economic Analysis assumed that each of these Scenarios posed a discrete alternative. The fees as calculated assume that no more than one of these parameters is changed with the revised HCP. If, for example, the revised HCP called for a reduced development scenario and adopted a higher mitigation ratio, the fee would need to be recalculated and would likely be much greater than the fees as currently estimated.

Appendix B

Draft "Revised Fee Estimate Based on the Draft (2002) NBHCP", dated October 11, 2002, prepared by Economic & Planning Systems, Inc.

REVISED FEE ESTIMATE BASED ON DRAFT NBHCP

EPS has updated the cash flow model used to estimate the Natomas Basin Habitat Conservation Plan (NBHCP) mitigation fee (the "fee") based on the Draft NBHCP released July 2002.

The fee was last revised in April 2002, as detailed in Appendix I of the Draft NBHCP dated July 2002. Currently the NBHCP fee is composed of two components - the Base Fee and the Settlement Land Acquisition Premium (the "Settlement Premium") as follows:

	Base Fee	Settlement Premium	Total Fee
Land Acquisition, including Transaction Costs & Contingencies	$3,750	$3,947	$7,697
Restoration & Enhancement	$782		$782
O&M/Administration	$1,555		$1,555
O&M Endowment Fund	$1,500		$1,500
Supplemental Endowment	$188		$188
Fee Collection Administration	$159	$81	$240
Total	**$7,934**	**$4,028**	**$11,962**

The Settlement Premium adopted in 2001 was due to stay in effect only until the expiration of the Settlement Agreement, which was October 1, 2002. As a result, this memorandum details the updated assumptions used to derive only the Base Fee amount.

This memo details the changes to the assumptions used in the cash flow model to calculate the fee. The updated assumptions reflect the best cost estimates at this time of implementing the revised NBHCP. As newer and better cost estimates become available (through operating experience of the TNBC, etc.), the cash flow model and fee calculation will continue to be updated.

The July 2002 Draft NBHCP includes two appendices, Appendix A and Appendix I, containing economic analysis and cost data related to the proposed plan, respectively. Appendix A contains the Economic Analysis of the NBHCP, including an assessment of adequate funding for the NBHCP and a maximum extent practicable analysis. Appendix I provides the NBHCP Fee Update - 2002 (April 25, 2002) which presents cost data regarding the mitigation fee currently in effect in the City of Sacramento under the 1997 NBHCP.

The "Revised Fee Estimate Based on Draft NBHCP" contained in the following fee analysis addresses the costs of implementing the July 2002 Draft NBHCP, including cost estimates associated with TNBC's obligations under the revised plan, and the mitigation fees necessary to fund the plan. This analysis is not intended to be an update of Economic Analysis in Appendix A nor is it an update to the April 25, 2002 NBHCP Fee Update. Although the following analysis represents an independent estimate of the total costs associated with the implementation of the July 2002 Draft NBHCP, the fee estimates contained in this analysis fall within the range of fees analyzed in the Economic Analysis contained in Appendix A to the NBHCP.

FEE UPDATE

Table 1 presents a summary of the NBHCP fees as well as the fee as currently calculated based on the revised NBHCP. The current fee estimate is $10,027 per acre and is presented in **Table 2**. In some instances, developers may choose to dedicate land to satisfy the land acquisition portion of the fee. Any land dedication would be subject to the provisions of the NBHCP. In such a case the fee would be $6,252 as currently calculated.

The fee is calculated based on actual costs and cost assumptions for each fee category listed below:

- Land Acquisition (LA)
- Restoration and Enhancement (RE)
- Administration/Operation & Maintenance (Admin/O&M)
- O&M Endowment
- Supplemental Endowment (for Land Acquisition)

There is a cash flow for each fee category. The fee is determined by ensuring that there are sufficient revenues to meet the required expenditures for each fee category through the NBHCP permit period. In the case of the O&M/Administration and O&M Endowment fund, the cash flow and corresponding fee amounts provide for the required activities, such as land management and monitoring, in perpetuity (forever).

The following details the assumptions used in estimating the fee.

ASSUMPTIONS

GENERAL ASSUMPTIONS

Table 3 presents the general assumptions used in estimating the NBHCP Fee based on the revised NBHCP. These assumptions are consistent with previous analyses of the

Base Fee (e.g., the April 2002 NBHCP Fee Update included in Appendix I of the Draft NBHCP, July 2002).

LAND ACQUISITION

Land costs are currently estimated at $6,000 per acre as shown in **Table 4**. Transaction and contingency costs are estimated at $1,550. The transaction costs were increased by $50 per acquired acre to provide for costs associated with the pre-acquisition survey the Natomas Basin Conservancy (TNBC) must perform prior to any HCP acquisition, as specified in the revised Draft NBHCP.

RESTORATION AND ENHANCEMENT

Table 5 presents the assumptions used for Restoration and Enhancement. The cost per acre for the Site-Specific Management Plan was increased to account for the need for a biological site assessment and a pre-construction survey as required by the revised NBHCP. As a result, the cost per acre for site specific management costs was doubled, from $127 per acre to $253 per acre.

The current cost estimate associated with restoration and enhancement (i.e., converting to managed marsh) was increased to $5,200 from $5,095. The $5,200 cost per acre reflects the costs of converting acquired acres to managed marsh based on the most recent experience of the TNBC on the Betts/Kismat/Silva (BKS) property. In the previous fee analysis (April 2002), it was assumed that the future costs for restoration and enhancement would be reduced from those incurred in the BKS property. However, the TNBC no longer believes this will be the case, particularly given the four to five year lag time between when fees are collected and restoration and enhancement is completed. Restoration and enhancement costs will be closely monitored and the fee adjusted accordingly in the future to ensure that the monies collected will be adequate to fund the required restoration and enhancement projects.

As a result of these assumption changes, the fee for restoration and enhancement increased from $782 per acre to $893 per acre.

OPERATIONS & MAINTENANCE/ADMINISTRATION

Table 6, **Table 7**, and **Table 8** summarize the O&M and Administration assumptions for the NBHCP. The most significant change related to O&M/Administration is in the species and habitat mitigation monitoring requirements.

Table 8 details the increased mitigation monitoring requirements in relation to the revised NBHCP. The monitoring costs are based on estimates of what it would cost today assuming the 2,800 acres of habitat preserves. Other than the costs associated

with the mid-point program reviews, all the mitigation monitoring costs are inflated by 3 percent annually to reflect likely cost increases as habitat preserve acreage increases to 8,700 acres over time. Once all habitat acres are acquired, the costs are no longer escalated.

In addition to the increased monitoring requirements, the TNBC also would be responsible for increased reporting costs as well as costs associated with maintaining a database of all of the monitoring data. As a result, TNBC will need to hire an additional full-time staff person or contract with outside staff to manage these increased responsibilities. The costs associated with this additional staff person have been assumed in two locations in the cash flow analysis. The administrative costs have been increased in **Table 7** and by approximately $62,000 per year to account for an allocation towards salary, benefits, and related office costs for a full-time staff costs. The remaining estimated staff costs of $38,000 are assumed in the $210,000 annual monitoring costs shown in **Table 8**.

The TNBC is also currently in the process of hiring a third staff person to fill the position of an Administrative Manager. The estimated cost related to this additional staff person is also included in **Table 8**.

The increase in O&M/Administration costs results in an increase of the O&M/ Administration fee component from $1,555 to $2,850 per acre.

O&M ENDOWMENT

The sole function of the O&M Endowment fund is to ensure that the TNBC will be able to fund ongoing O&M of the habitat preserves and administer the program for the life of the permit and for the reserve management in perpetuity (forever). Once all fee revenues are paid, the O&M/Administration fund will need another source of funding since crop revenues and hunting revenues will be insufficient to fully fund the HCP in any given year.

The O&M Endowment fund builds principle as fees are collected and as interest earnings are accrued. Towards the end of the 50-year permit period, the O&M/Administration fund begins to drawdown on the endowment fund. The cash flow is structured such that only interest earnings are drawdown, never the principle balance.

The endowment fund is also structured such that the interest earnings are at least 1.2 times the annual drawdown amount. This allows the fund to continue to grow in perpetuity (forever). As a result, however, the principle balance in the current fee model grows to over $66 million, as opposed to $45 million in the April 2002 fee analysis. The higher principle balance (derived from higher fees) is necessary in order to ensure that the fund can generate the 1.2 times in interest earnings.

Because the costs related to O&M/Administration have increased and the related fee, it is also necessary to increase the fee component for the O&M Endowment fund, from $1,500 per acre to $1,900 per acre.

SUPPLEMENTAL ENDOWMENT FUND

The Supplemental Endowment fund was created in 2001 to provide additional revenue to allow the TNBC to either purchase mitigation land in advance of requirements (such as establishing a 200 reserve land surplus) or to provide a cushion for land acquisition in the case that land prices spike in any given year before the fee can be adjusted accordingly.

Based on the revised NBHCP, TNBC is required to purchase the 200 acres and keep it in surplus through the end of the acquisition period. As a result the TNBC has purchased 200 acres and has financed this acquisition through a loan from the City of Sacramento. In order to build the acquisition cost as well as the financing cost into the fee program, the Supplemental Endowment fund cash flow was modified such that it shows the 200-acre acquisition in year 2002. The fund carries a negative fund balance, although it declines over time, until all fees have been paid. See **Table A-10** in the Appendix.

In addition, the Supplemental Endowment builds in a cost for Changed Circumstances, as required by the NBHCP. At this time exactly what constitutes or will constitute Changed Circumstances in the future is unknown. Therefore, a simple assumption of $500 per acquired acre is assumed for Changed Circumstances.

The overall fee component for the Supplemental Endowment Fund increased from $188 per acre to $408 per acre based on these assumption changes.

CASH FLOW SUMMARY

Table 10 presents a summary of the cash flow funds through the end of the 50-year permit period. The detailed cash flows for each fund are presented in **Appendix A**.

DRAFT

Table 1
Natomas Basin HCP -- July 2002
HCP Mitigation Fee Summary 1996-2002

Assumes
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

	Adopted						Proposed w/ **Revised HCP**
	1996/1997	1998	1999	2000	2001	2002	Fall 2002
Land Acquisition Cost (LA) [1]	$1,830	$1,830	$2,036	$2,500	$3,000	$3,750	$3,775
Land Acquisition Settlement [3]					$3,947	$3,947	
Restoration/Enhancement (RE) [2]	$140	$198	$200	$423	$368	$782	$893
Administration/O & M	$150	$475	$800	$750	$1,555	$1,555	$2,850
O & M Endowment Fund	$75	$100	$190	$190	$800	$1,500	$1,900
Supplemental Endowment Fund	$0	$0	$0	$0	$150	$188	$408
Fee Collection Administration	$45	$53	$66	$78	$201	$240	$201
Subtotal Mitigation Fee	**$2,240**	**$2,656**	**$3,292**	**$3,941**	**$10,021**	**$11,962**	**$10,027**
Percent Increase		*19%*	*24%*	*20%*	*154%*	*19%*	

"hist_fee_sum"

[1] Land acquisition cost includes land cost, transaction costs, and contingency costs. Acquisition costs estimated at $4,000 to $9,000 per acre.
[2] Increases in RE fee components reflects the significant cost of restoring or or enhancing marsh land to benefit Swainson's hawk and the giant garter snake.
[3] Fee through 2002 only.

DRAFT

Table 2
Natomas Basin HCP – July 2002
Estimation of Mitigation Fee

Assumes
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Estimation of Mitigation Fee				Notes:
Mitigation Requirement	**1/2 Acre of Mitigation Land for Each Gross Acre of Developed Land**			
Habitat Mitigation Fee	Cost per Acre of Habitat *a*	Mitigation Fee per Acre of Development *b=a x .5*	Percent of Base Fee	
BASE FEE				
Land Acquisition Cost (LA)				
Land Cost	$6,000 [1]	$3,000		
Transaction Costs & Contingency	$1,550 [1]	$775		
Total Land Acquisition Cost (LA)	**$7,550**	**$3,775**	38%	
Restoration/Enhancement (RE)				
RE Cost	$1,553	$777		
RE Contingency	$233	$116		
Total Restoration/Enhancement (RE)	**$1,786**	**$893**	9%	
Administration/O & M	$5,700 [2]	$2,850	28%	
O & M Endowment Fund	$3,800 [2]	$1,900	19%	
Supplemental Endowment Fund	$815	$408	4%	5% of land acquisition fee
Subtotal Mitigation Fee	**$19,651**	**$9,826**		
Fee Collection Administration		$201	2%	2% of fee for collection
Total Base Fee		**$10,027**	**100%**	
FEE EXCLUDING LAND ACQUISITION		**$6,252**		[3]

"fee_sum_1"

[1] Based on information provided by the Natomas Basin Conservancy
[2] Administration/O&M and Endowment Fund costs set based on cash flow analysis, ensuring that fund balances are positive in year 50 and that annual interest earnings in endowment fund exceed drawdown by Admin/O&M fund.
[3] In some cases developers may choose to dedicate land to satisfy the land acquisition component of the NBHCP. Any land dedication will be subject to the terms of the NBHCP

Table 3
Natomas Basin HCP -- July 2002
General Assumptions

Inflation	0.0%
Interest Rate	3.0%
Escalation Factor for Marsh Conversion	
In addition to Inflation Factor	0.0%
Mitigation Ratio	0.5
Habitat Acres Acquired to Date	2,782
Remaining Acres to be Acquired	5,918
Estimated Use of In-Basin Lands	
Marsh	25%
Existing Rice	50%
Other/Upland	25%
Total Initial Use	**100%**
Rice Converted to Marsh	After Year-5, 324 acres in marsh 25% thereafter
Rice Lands (excluding land converted to marsh) [2]	
Uplands/Fallow	10%
Leased for Other Crops	0%
Leased Rice Base Land	90%
Total Rice Lands	**100%**

"Gen_Assumps"

DRAFT

Table 4
Natomas Basin HCP -- July 2002
Land Acquisition Cost and
Acquired Habitat Land Utilization Assumptions

Assumes
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Item				Notes:	NBHCP Page Ref. #
Land Acquisition Values per Acre	Land Value	Permitted by Plan	Assumed in Financial Analysis		
In-Basin Lands	$6,000	80%	100%	Based on survey of available land prices early 2002.	
Out-of-Basin Lands	$3,250	20%	0%	Estimated $3,100-$3,500 per acre range per Recent Experience of NBHCP	
Average Land Value [1]	**$6,000**	Use In-Basin Land Value			
Plus Transaction Costs & Contingency	$1,550	per Acre		Includes Pre-acquisition field reconnaissance.	V-17
Average Land Acquisition Cost	**$7,550**	**per acquired acre**		Beginning 1/1/02	
2002 Habitat Acres (Settlement Agreement)					
Average Land Value	$9,450	per acquired acre			
Plus Transaction Costs & Contingency	$1,550	per acquired acre			
Average Land Acquisition Cost	**$11,000**	**per acquired acre**			

"Land_Acq_Assumps"
10365 model update Fall 02.xls

Source: Natomas Basin Conservancy

[1] Assumes all acquisition occurs at the average in-basin land value.
[2] Rice Lands percents included for cost and revenue calculation purposes only.

DRAFT

Table 5
Natomas Basin HCP -- July 2002
Restoration & Enhancement Assumptions

Assumes
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Item	Estimated Cost	Estimated Cost per Acre		Note:	NBHCP Page #
Site Specific Management Plan Costs					
NBHCP Biological Site Assessment	$15,000 per Acquisition	$76	per Acquired Acre assumes 30 more acquisitions	Baseline Biological site assessments for: -Tri-Colored Blackbird -Valley Elderberry Longhon Beetle -Delta Tule Pea -Sanford Arrowhead Assessment for Species Introduction: -Delta Tule Pea -CTS -ST -Pond Turtle -Sanford Arrowhead -Vernal Pool Plant Species, -Other Covered Plant Species	IV-25; V-22; V-25; V-26; VI-15
NBHCP Pre-construction Survey	$12,000 per Acquisition	$61	per Acquired Acre assumes 30 more acquisitions	Formal pre-construction site survey for restoration and enhancement, including: -Assessment of Swainsons Hawk nest disturbance -Assessment of Other Avian Species nest disturbance -Assessment of Valley Eldeberry Longhorn Beetle	V-17; V-20; V-25
Preparation of Site Specific Management Plan	$23,000 per Acquisition	$117	per Acquired Acre	Assumes 30 more acquisitions.	
Subtotal SSMP Cost Per Acre		**$253**	**per acre**	Note [1]	
To be Completed:	Within 1 Year of Reserve Acquisition				

Restoration & Enhancement

	Use of Land	Initial Costs	Weighted Cost [5]	
Expended At Time Land Is Acquired				
Marsh	0%	$0	$0	Note [2], [3]
Existing Rice	75%	$0	$0	Note [3]
Dry Converted to Rice	0%	$0	$0	Note [3]
Other Upland	25%	$0	$0	Note [3]
Subtotal	**100%**		**$0**	
Expended At Time Land Is Converted				
Rice/Other Converted to Marsh	25%	$5,200	$1,300	Note [4]
Subtotal Restoration & Enhancement			**$1,300**	
R&E Cost Per Acre			**$1,553**	Weighted average cost per Acquired Acre
R&E Contingency (@ 15%)			**$233**	Per Acquired Acre

"RE_Assumps"
10365 model update Fall 02.xls

Source: The Natomas Basin Conservancy

[1] The addition of a formal biological site assessment and pre-construction survey are required by the Draft HCP -- July 2002.
[2] Initial use of marsh land estimated at 0% because NBHCP estimates that little to no marshland is available for acquisition. However, rice land will be converted to marsh land.
[3] The initial costs of marsh, existing rice, dry land converted to rice and other upland have been set to zero as no initial restoration or enhancement costs are anticipated.
[4] In 2001, the cost of converting of acquired acres to marsh cost approximately $5,200 per acre.
[5] The cost of restoration and enhancement is weighted by the percent of acres assumed to be converted or used for that particular land use.

DRAFT

Table 6
Natomas Basin HCP -- July 2002
Operations & Maintenance Assumptions

Assumes
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Item				Notes:
Operations & Maintenance Costs				
Marsh	$281.00	per acre		Updated Cost -- May 2001
Upland/Fallow	$18.25	per acre		Based on Wildlands, Inc. Estimates
Land Leased for Planted Rice Base	$2.67	per acre		Based on Wildlands, Inc. Estimates
Land Leased for Other Crops	$2.67	per acre		alfalfa, safflower, etc.
Other	$0.00	per acre		
Hunting	$0.00	per acre		Updated Cost -- May 2001
Miscellaneous Maintenance Costs	$23.65	per acre		Based on Wildlands, Inc. Estimates
Special Assessment & Property Tax Costs				
Sacramento County				
Reclamation District #1000	$13.08	per acre		Based on published tariffs and rates
NCMWA	$0.42	per acre		Based on published tariffs and rates
SAFCA O&M Assessment #1	$5.69	per acre		Based on published tariffs and rates
CSAI Safety Lights	$0.08	per acre		Based on published tariffs and rates
Property Tax [1]	$54.42	per acre		Based on average assessed value of all properties acquired through Feb. 2002 -- $5,100 per acre
Subtotal Sacramento County	**$73.68**	per acre		
Sutter County				
Reclamation District #1000	$13.08	per acre		Based on published tariffs and rates
NCMWC	$0.42	per acre		Based on published tariffs and rates
Property Tax	$51.00	per acre		Based on average assessed value of all properties acquired through Feb. 2002 -- $5,100 per acre
Subtotal Sutter County	**$64.50**	per acre		
Mitigation Monitoring & Adaptive Management				
One-Time/Fixed Costs	$7,500			
On-Going Monitoring	$203,040	per year		See Table 8 for detail
Administrative Costs				
During Development	$756,585	per year		See Table 7 for detail
After All Land Acquired	$756,585	per year		
Operations & Maintenance Revenues				
Crop Land Leases				
Through 2002				
Planted Rice Base Acreage	$160	per acre/year	normal ag. practices	
Other Crops (Flex. acreage)	$80	per acre/year	normal ag. practices	
2003 +				
Planted Rice Base Acreage	$160	per acre/year	normal ag. practices	
Other Crops (Flex. acreage)	$80	per acre/year	normal ag. practices	
Hunting				
Hunting Revenue per Acre	$12	per acre		Based on Wildlands Estimate for initial Site Plan

"OM_Assumps"

Source: The Natomas Basin Conservancy

[1] Includes G.O. bond assessment.

DRAFT

Table 7
Natomas Basin HCP
Estimated Annual Natomas Basin Conservancy (NBC) Administrative Costs

	Annual Cost	Notes
Administrative Expenses		
Staff	$280,000	
Benefits	$92,400	
Board Expense	$6,000	
Subtotal	**$378,400**	
Office Expense		
Rent	$20,000	
Telephone	$2,100	
Copying & Printing	$23,000	
Office Supplies	$8,000	
Postage	$900	
Equipment	$5,000	
Auto Expense	$9,500	
Subtotal	**$68,500**	
Miscellaneous Expense		
Insurance	$25,000	Liability and E&O
Accounting	$20,000	
Legal	$80,000	
Corporate Taxes	$1,000	
Subtotal	**$126,000**	
Contract Work & Public Education	**$45,000**	
Publications, Printing, & Distribution	**$40,000**	
Subtotal Costs	**$657,900**	
Contingency	$98,685	15% Contingency
Total Administration During Habitat Acquisition Phase	**$756,585**	
Total Administration After Habitat Acquisition	**$756,585**	[1]

"admin_assumps"
10365 model update Fall 02.xls

Source: NBC FY 2001 budget estimate; Draft HCP July 2002

DRAFT

Table 8
Natomas Basin HCP -- July 2002
Species & Habitat Monitoring Cost Assumptions

Item	Description	Total Cost	Interval (Years)	Cost per unit	Annualized Cost	Comments	NBHCP Pg. #
					50 Years		
Fixed or One-Time Costs							
Mid-Point Program Reviews	Mid-Point Program Review for Permitees & Overall Program Review	$375,000	3	$125,000	$7,500	Written report required; extensive requirements; refer to NBHCP. Assumes the Overall Program Review will happen concurrently with one of the Permitee Reviews	VI-28
Connectivity -- Acquisition Costs	Ensure connectivity through easements, etc. Acquisition costs. Estimate -- 10 miles of abandoned water conveyance structures	NA		NA	NA	Assumed to be applied towards habitat preserve land acquisition requirements. Therefore, it assumed costs would be absorbed under land acquisition.	IV-8
Land Acquisition Restrictions	Setback; no mitigation land designated for urban use.	NA		NA	NA	Greatly restricts land available for mitigation land acquisition resulting in much higher costs.	IV-11
Subtotal					**$7,500**		
Annual Monitoring & Reporting Requirements							
Biological Effectiveness Monitoring Plan							
Giant Garter Snake	Annual Field Survey -- Basinwide	$1,600,000	40	$40,000	$32,000		VI-19
Swainson's Hawk	Annual Field Survey -- Basinwide	$1,000,000	40	$25,000	$20,000		V-18; VI-20
Other Covered Species	Annual monitoring of Preserve Sites & Control Sites for: -Delta Tule Pea -Sanford Arrowhead -VP Plants	$400,000	40	$10,000	$8,000	Site Specific Monitoring Programs Must monitor known populations annually and file report.	V-26; VI-15

DRAFT

Table 8
Natomas Basin HCP -- July 2002
Species & Habitat Monitoring Cost Assumptions

Item	Description	Total Cost	Interval (Years)	Cost per unit	Annualized Cost	Comments	NBHCP Pg. #
Connectivity-- Assessment		$120,000	40	$3,000	$2,400	Level of effort assumed - letter to the water agency requesting information, and subsequent documentation based on info provided by water agencies. No independent assessment by TNBC assumed.	
Reporting Costs						Assumed in administrative budget.	VI-15
Other Annual Costs							
Connectivity -- O&M	Ensure connectivity through easements, etc. Management and maintenance.	$250,000	10	$5,000	$5,000	Estimate 10 miles of abandonment. This is only a rough estimate due to the uncertainty of accounting for this eventuality. Suggest hiring water agency to maintain and manage acquired structures with the cost shown serving as an estimate of contract cost. Estimate costs for water and maintenance at $500/mile.	IV-8
Avian Species Monitoring	General Habitat Monitoring-- including wintering bird species evaluation	$750,000	50	$15,000	$15,000	"...additional surveys should be carried out...to detect actual species...on and off mitigation lands. Seven to 14-days per year; annual estimates of avian colonies...size and nesting success...must determine habitat characteristics.	VI-20
Subtotal					**$82,400**		
5-Year Monitoring & Reporting Requirements							
Biological Effectiveness Monitoring Plan							
Annual Biological Effectiveness Assessment		$780,000	10	$78,000	$15,600	See Above	

DRAFT

Table 8
Natomas Basin HCP -- July 2002
Species & Habitat Monitoring Cost Assumptions

Item	Description	Total Cost	Interval (Years)	Cost per unit	Annualized Cost	Comments	NBHCP Pg. #
Additional Monitoring Requirements	Five-Year Inventory of Reserve Lands Botanical inventory Rarely occurring species inventory Seasonal wetland monitoring/surveying	$550,000	10	$55,000	$11,000	Density and distribution of all covered species on reserves.	VI-14; VI-20; VI-21;
Adaptive Management	Review of Biological Effectiveness Monitoring Program procedures and practices.	$200,000	10	$20,000	$4,000	"Whenever review indicates revision is necessary to effectively monitor the success...of goals and objectives." Outside, independent, third-party likely required to conduct for compliance.	VI-22
Subtotal					**$30,600**		
Other Costs							
Adaptive Management	Periodic Review of NBHCP Monitoring Data	$180,000	10	$18,000	$3,600	Review data, new science, future recovery plans, TAC recs, i.d. threshold limits. Suggest outside, third-party independent contractor needs to do to achieve compliance.	VI-23
Adaptive Management	Report to Review Adaptive Management.	$306,000	17	$18,000	$6,120	Assess adaptive management in published reports using scientific information, research and baseline inventories, etc. And file report with agencies.	VI-23
Data Management	Database Management; Validity and Reliability Testing Evaluation	$1,000,000	50	$20,000	$20,000	Provide report on complete database to Resources Agencies annually. Reliability Evaluation required annually; w/TAC or third party approved by the Wildlife Agencies.	VI-24
Subtotal					**$29,720**		

DRAFT

Table 8
Natomas Basin HCP -- July 2002
Species & Habitat Monitoring Cost Assumptions

Item	Description	Total Cost	Interval (Years)	Cost per unit	Annualized Cost	Comments	NBHCP Pg. #
Total Annual Cost					**$210,540**		
Habitat Acres through 2002					2,788		
Annual Cost Per Acre					**$75.52**		

"Monitoring_Assumps"

Source: The Natomas Basin Conservancy

DRAFT

Table 9
Natomas Basin HCP -- July 2002
Supplemental Endowment Cost Assumptions

Item	Base Cost per Acre	Cost per Acre Including Int Cost	Total Est. Acquisition Cost	Allocated Cost		Note:
200 Acre Reserve -- Contingency Fund	$8,000	$10,400 [1]	$2,080,000	$315	per Acquired Acre	Allocated over remaining reserve requirement (6,600 acres)
Changed Circumstances						
Managed Marsh Contingency					per Acquired Acre	Note [2]
Other Changed Circumstance Contingency				$500	per Acquired Acre	
Total				**$815**	**per Acquired Acre**	

"supp_endow_assumps"

Source: The Natomas Basin Conservancy and EPS

[1] Includes a financing factor of 30% ($8,000 * 1.3 = $10,400).

DRAFT

Table 10
Natomas Basin HCP
Cash Flow Summary- 2002$

Assumes:	0.0% Inflation
	3.0% Interest Rate

	Total 1996-2045	1 1996	2 1997	3 1998	4 1999	5 2000	6 2001	7 2002	8 2003
		[1]	[1]	[1]	[2]				
LAND ACQUISITION									
Beginning Balance		$0	$55,641	$247,608	$2,773,665	$545,571	$563,113	$2,225,278	($2,007,870)
Total Revenues	$64,621,447	$55,641	$191,966	$2,526,057	$2,696,904	$1,287,471	$3,198,070	$3,941,346	$4,462,910
Total Expenditures	($56,510,403)	$0	$0	$0	($4,924,998)	($1,647,666)	($1,535,905)	($9,510,155)	($1,569,213)
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$1,335,661	($1,335,661)
Balance Adjustments	$377,738	$0	$0	$0	$0	$377,738	$0	$0	$0
Ending Balance	**$8,488,781**	**$55,641**	**$247,608**	**$2,773,665**	**$545,571**	**$563,113**	**$2,225,278**	**($2,007,870)**	**($449,834)**
RESTORATION & ENHANCEMENTS									
Beginning Balance		$0	$4,257	$19,032	$292,743	$589,200	$582,058	$268,280	$375,241
Total Revenues	$13,688,163	$4,257	$14,775	$273,711	$296,457	$145,324	$746,644	$452,121	$1,056,627
Total Expenditures	($13,163,748)	$0	$0	$0	$0	$0	($1,060,422)	($345,161)	($462,832)
Balance Adjustments	($152,466)	$0	$0	$0	$0	($152,466)	$0	$0	$0
Ending Balance	**$371,949**	**$4,257**	**$19,032**	**$292,743**	**$589,200**	**$582,058**	**$268,280**	**$375,241**	**$969,035**
ADMINISTRATION/O&M									
Beginning Balance		$0	$4,561	$70,261	$621,109	$1,172,809	$1,549,539	$1,754,659	$167,061
Total Revenues	$82,462,946	$4,561	$65,700	$657,778	$878,604	$686,778	$816,275	$1,035,862	$3,583,074
Drawdown on Endowment Fund	$11,459,781	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	($94,153,763)	$0	$0	($106,930)	($326,904)	($541,084)	($611,155)	($1,287,799)	($1,333,577)
Balance Adjustments (Inc. Transfers)	$231,035	$0	$0	$0	$0	$231,035	$0	($1,335,661)	$1,335,661
Ending Balance	**$0**	**$4,561**	**$70,261**	**$621,109**	**$1,172,809**	**$1,549,539**	**$1,754,659**	**$167,061**	**$3,752,219**
O&M ENDOWMENT									
Beginning Balance		$0	$3,041	$13,622	$152,066	$323,846	$463,981	$1,003,066	$1,988,158
Total Revenues	$75,769,670	$3,041	$10,581	$138,445	$157,704	$140,135	$539,085	$985,092	$2,296,283
Drawdown on Endowment Fund	($11,459,781)	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$14,076	$0	$0	$0	$14,076	$0	$0	$0	$0
Ending Balance	**$64,323,965**	**$3,041**	**$13,622**	**$152,066**	**$323,846**	**$463,981**	**$1,003,066**	**$1,988,158**	**$4,284,441**
SUPPLEMENTAL ENDOWMENT									
Beginning Balance		$0	$0	$0	$0	$0	$0	$58,799	($1,925,438)
Total Revenues	$5,470,315	$0	$0	$0	$0	$0	$58,799	$95,764	$479,172
Total Expenditures	($5,337,202)	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$133,114**	**$0**	**$0**	**$0**	**$0**	**$0**	**$58,799**	**$154,562**	**($1,446,266)**
Changed Circumstances Fund Balance		**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$293,610**

Prepared by EPS.

10365 model update Fall 02 10/11/2002

Table 10
Natomas Basin HCP
Cash Flow Summary- 2002$

DRAFT

	9 2004	10 2005	11 2006	12 2007	13 2008	14 2009	15 2010	16 2011	17 2012
LAND ACQUISITION									
Beginning Balance	($449,834)	$268,582	$1,001,525	$1,745,626	$2,500,887	$2,897,668	$3,259,870	$3,627,506	$4,000,655
Total Revenues	$4,675,471	$4,699,365	$4,710,522	$4,721,684	$2,031,014	$1,996,436	$2,001,869	$2,007,383	$2,012,981
Total Expenditures	($3,957,054)	($3,966,422)	($3,966,422)	($3,966,422)	($1,634,233)	($1,634,233)	($1,634,233)	($1,634,233)	($1,634,233)
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$268,582**	**$1,001,525**	**$1,745,626**	**$2,500,887**	**$2,897,668**	**$3,259,870**	**$3,627,506**	**$4,000,655**	**$4,379,403**
RESTORATION & ENHANCEMENTS									
Beginning Balance	$969,035	$388,778	$798,517	$740,514	$892,652	$499,371	$97,832	$153,105	$209,539
Total Revenues	$1,104,815	$1,095,197	$1,103,802	$1,102,584	$466,622	$458,363	$449,931	$451,091	$452,276
Total Expenditures	($1,685,073)	($685,458)	($1,161,805)	($950,446)	($859,902)	($859,902)	($394,657)	($394,657)	($394,657)
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$388,778**	**$798,517**	**$740,514**	**$892,652**	**$499,371**	**$97,832**	**$153,105**	**$209,539**	**$267,158**
ADMINISTRATION/O&M									
Beginning Balance	$3,752,219	$6,173,247	$8,673,418	$11,193,613	$13,823,241	$14,443,752	$15,035,918	$15,631,890	$16,223,949
Total Revenues	$3,831,158	$3,984,212	$4,101,138	$4,295,443	$2,344,092	$2,372,688	$2,410,014	$2,447,454	$2,484,776
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	($1,410,131)	($1,484,040)	($1,580,943)	($1,665,814)	($1,723,582)	($1,780,522)	($1,814,042)	($1,855,395)	($1,896,981)
Balance Adjustments (Inc. Transfers)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$6,173,247**	**$8,673,418**	**$11,193,613**	**$13,823,241**	**$14,443,752**	**$15,035,918**	**$15,631,890**	**$16,223,949**	**$16,811,744**
O&M ENDOWMENT									
Beginning Balance	$4,284,441	$6,725,821	$9,246,121	$11,842,254	$14,516,506	$15,911,282	$17,348,155	$18,828,397	$20,353,320
Total Revenues	$2,441,380	$2,520,300	$2,596,134	$2,674,252	$1,394,776	$1,436,873	$1,480,242	$1,524,923	$1,570,955
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$6,725,821**	**$9,246,121**	**$11,842,254**	**$14,516,506**	**$15,911,282**	**$17,348,155**	**$18,828,397**	**$20,353,320**	**$21,924,275**
SUPPLEMENTAL ENDOWMENT									
Beginning Balance	($1,739,876)	($1,547,994)	($1,355,658)	($1,163,322)	($970,986)	($891,741)	($812,495)	($733,249)	($654,003)
Total Revenues	$495,492	$496,665	$496,665	$496,665	$204,634	$204,634	$204,634	$204,634	$204,634
Total Expenditures	($2,080,000)	($293,610)	($303,610)	($304,329)	($304,329)	($304,329)	($125,389)	($125,389)	($125,389)
Ending Balance	**($3,324,384)**	**($1,344,939)**	**($1,162,603)**	**($970,986)**	**($1,070,681)**	**($991,435)**	**($733,249)**	**($654,003)**	**($574,758)**
Changed Circumstances Fund Balance	**$606,029**	**$928,539**	**$1,260,724**	**$1,602,875**	**$1,776,350**	**$1,955,029**	**$2,139,069**	**$2,328,630**	**$2,523,877**

Prepared by EPS.

10365 model update Fall 02 10/11/2002

Table 10
Natomas Basin HCP
Cash Flow Summary- 2002$

DRAFT

	18 2013	19 2014	20 2015	21 2016	22 2017	23 2018	24 2019	25 2020
LAND ACQUISITION								
Beginning Balance	$4,379,403	$4,659,012	$4,931,328	$5,207,729	$5,488,275	$5,642,593	$5,796,911	$5,951,229
Total Revenues	$1,252,809	$1,245,515	$1,249,600	$1,253,746	$1,127,517	$1,127,517	$1,127,517	$1,127,517
Total Expenditures	($973,199)	($973,199)	($973,199)	($973,199)	($973,199)	($973,199)	($973,199)	($973,199)
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$4,659,012**	**$4,931,328**	**$5,207,729**	**$5,488,275**	**$5,642,593**	**$5,796,911**	**$5,951,229**	**$6,105,547**
RESTORATION & ENHANCEMENTS								
Beginning Balance	$267,158	$170,488	$71,788	$102,885	$134,634	$164,223	$193,812	$223,400
Total Revenues	$272,324	$270,294	$268,221	$268,874	$266,714	$266,714	$266,714	$266,714
Total Expenditures	($368,994)	($368,994)	($237,125)	($237,125)	($237,125)	($237,125)	($237,125)	($237,125)
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$170,488**	**$71,788**	**$102,885**	**$134,634**	**$164,223**	**$193,812**	**$223,400**	**$252,989**
ADMINISTRATION/O&M								
Beginning Balance	$16,811,744	$16,812,353	$16,786,109	$16,767,220	$16,730,436	$16,674,952	$16,599,930	$16,504,500
Total Revenues	$1,932,213	$1,940,228	$1,982,496	$1,993,578	$2,004,123	$2,014,107	$2,023,504	$2,032,290
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	($1,931,604)	($1,966,472)	($2,001,385)	($2,030,362)	($2,059,607)	($2,089,128)	($2,118,934)	($2,149,033)
Balance Adjustments (Inc. Transfers)	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$16,812,353**	**$16,786,109**	**$16,767,220**	**$16,730,436**	**$16,674,952**	**$16,599,930**	**$16,504,500**	**$16,387,757**
O&M ENDOWMENT								
Beginning Balance	$21,924,275	$23,157,193	$24,427,406	$25,736,045	$27,084,277	$28,473,302	$29,904,358	$31,378,720
Total Revenues	$1,232,918	$1,270,213	$1,308,640	$1,348,232	$1,389,025	$1,431,056	$1,474,362	$1,518,983
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$23,157,193**	**$24,427,406**	**$25,736,045**	**$27,084,277**	**$28,473,302**	**$29,904,358**	**$31,378,720**	**$32,897,703**
SUPPLEMENTAL ENDOWMENT								
Beginning Balance	($574,758)	($527,566)	($480,375)	($433,183)	($385,992)	($338,801)	($291,609)	($244,418)
Total Revenues	$121,861	$121,861	$121,861	$121,861	$121,861	$121,861	$121,861	$121,861
Total Expenditures	($125,389)	($125,389)	($74,670)	($74,670)	($74,670)	($74,670)	($74,670)	($74,670)
Ending Balance	**($578,285)**	**($531,094)**	**($433,183)**	**($385,992)**	**($338,801)**	**($291,609)**	**($244,418)**	**($197,226)**
Changed Circumstances Fund Balance	**$2,674,264**	**$2,829,161**	**$2,988,706**	**$3,153,037**	**$3,322,299**	**$3,496,638**	**$3,676,207**	**$3,861,163**

Table 10
Natomas Basin HCP
Cash Flow Summary- 2002$

DRAFT

	26 2021	27 2022	28 2023	29 2024	30 2025	31 2026	32 2027	33 2028	34 2029
LAND ACQUISITION									
Beginning Balance	$6,105,547	$6,259,865	$6,414,183	$6,568,501	$6,722,819	$6,877,137	$7,361,264	$8,488,781	$8,488,781
Total Revenues	$1,127,517	$1,127,517	$1,127,517	$1,127,517	$1,127,517	$1,127,517	$1,127,517	$0	$0
Total Expenditures	($973,199)	($973,199)	($973,199)	($973,199)	($973,199)	($643,391)	$0	$0	$0
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$6,259,865**	**$6,414,183**	**$6,568,501**	**$6,722,819**	**$6,877,137**	**$7,361,264**	**$8,488,781**	**$8,488,781**	**$8,488,781**
RESTORATION & ENHANCEMENTS									
Beginning Balance	$252,989	$282,578	$312,167	$341,755	$371,344	$400,933	$443,326	$510,698	$377,149
Total Revenues	$266,714	$266,714	$266,714	$266,714	$266,714	$266,714	$266,714	$0	$0
Total Expenditures	($237,125)	($237,125)	($237,125)	($237,125)	($237,125)	($224,321)	($199,342)	($133,549)	($5,200)
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$282,578**	**$312,167**	**$341,755**	**$371,344**	**$400,933**	**$443,326**	**$510,698**	**$377,149**	**$371,949**
ADMINISTRATION/O&M									
Beginning Balance	$16,387,757	$16,248,758	$16,086,526	$15,900,042	$15,688,249	$15,450,048	$15,182,424	$14,880,477	$13,708,446
Total Revenues	$2,040,436	$2,047,915	$2,054,696	$2,060,750	$2,066,045	$2,065,082	$2,052,573	$1,188,722	$1,153,561
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	($2,179,435)	($2,210,147)	($2,241,180)	($2,272,543)	($2,304,246)	($2,332,706)	($2,354,519)	($2,360,753)	($2,360,753)
Balance Adjustments (Inc. Transfers)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$16,248,758**	**$16,086,526**	**$15,900,042**	**$15,688,249**	**$15,450,048**	**$15,182,424**	**$14,880,477**	**$13,708,446**	**$12,501,254**
O&M ENDOWMENT									
Beginning Balance	$32,897,703	$34,462,660	$36,074,988	$37,736,123	$39,447,549	$41,210,791	$43,027,423	$44,899,067	$46,259,901
Total Revenues	$1,564,957	$1,612,327	$1,661,135	$1,711,425	$1,763,242	$1,816,632	$1,871,644	$1,360,834	$1,402,214
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$34,462,660**	**$36,074,988**	**$37,736,123**	**$39,447,549**	**$41,210,791**	**$43,027,423**	**$44,899,067**	**$46,259,901**	**$47,662,115**
SUPPLEMENTAL ENDOWMENT									
Beginning Balance	($197,226)	($150,035)	($102,843)	($55,652)	($8,460)	$38,731	$85,922	$133,114	$133,114
Total Revenues	$121,861	$121,861	$121,861	$121,861	$121,861	$121,861	$121,861	$0	$0
Total Expenditures	($74,670)	($74,670)	($74,670)	($74,670)	($74,670)	($74,670)	($74,670)	($74,670)	($74,670)
Ending Balance	**($150,035)**	**($102,843)**	**($55,652)**	**($8,460)**	**$38,731**	**$85,922**	**$133,114**	**$58,444**	**$58,444**
Changed Circumstances Fund Balance	**$4,051,668**	**$4,247,888**	**$4,449,994**	**$4,658,164**	**$4,872,579**	**$5,093,427**	**$5,320,899**	**$5,480,526**	**$5,644,942**

Prepared by EPS.

10365 model update Fall 02 10/11/2002

Table 10
Natomas Basin HCP
Cash Flow Summary- 2002$

DRAFT

	35 2030	36 2031	37 2032	38 2033	39 2034	40 2035	41 2036	42 2037	43 2038
LAND ACQUISITION									
Beginning Balance	$8,488,781	$8,488,781	$8,488,781	$8,488,781	$8,488,781	$8,488,781	$8,488,781	$8,488,781	$8,488,781
Total Revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**
RESTORATION & ENHANCEMENTS									
Beginning Balance	$371,949	$371,949	$371,949	$371,949	$371,949	$371,949	$371,949	$371,949	$371,949
Total Revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$371,949**	**$371,949**	**$371,949**	**$371,949**	**$371,949**	**$371,949**	**$371,949**	**$371,949**	**$371,949**
ADMINISTRATION/O&M									
Beginning Balance	$12,501,254	$11,257,846	$9,977,135	$8,658,004	$7,299,298	$5,899,831	$4,458,381	$2,973,686	$1,444,451
Total Revenues	$1,117,345	$1,080,043	$1,041,622	$1,002,048	$961,287	$919,303	$876,059	$831,518	$785,641
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$130,661
Total Expenditures	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)
Balance Adjustments (Inc. Transfers)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$11,257,846**	**$9,977,135**	**$8,658,004**	**$7,299,298**	**$5,899,831**	**$4,458,381**	**$2,973,686**	**$1,444,451**	**$0**
O&M ENDOWMENT									
Beginning Balance	$47,662,115	$49,106,972	$50,595,774	$52,129,865	$53,710,626	$55,339,485	$57,017,912	$58,747,421	$60,529,574
Total Revenues	$1,444,857	$1,488,802	$1,534,090	$1,580,762	$1,628,859	$1,678,426	$1,729,509	$1,782,153	$1,836,407
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	($130,661)
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$49,106,972**	**$50,595,774**	**$52,129,865**	**$53,710,626**	**$55,339,485**	**$57,017,912**	**$58,747,421**	**$60,529,574**	**$62,235,320**
SUPPLEMENTAL ENDOWMENT									
Beginning Balance	$133,114	$133,114	$133,114	$133,114	$133,114	$133,114	$133,114	$133,114	$133,114
Total Revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$133,114**	**$133,114**	**$133,114**	**$133,114**	**$133,114**	**$133,114**	**$133,114**	**$133,114**	**$133,114**
Changed Circumstances Fund Balance	**$5,814,290**	**$5,988,719**	**$6,168,381**	**$6,353,432**	**$6,544,035**	**$6,740,356**	**$6,942,567**	**$7,150,844**	**$7,365,369**

Prepared by EPS.

Table 10
Natomas Basin HCP
Cash Flow Summary- 2002$

DRAFT

	44 2039	45 2040	46 2041	47 2042	48 2043	49 2044	50 2045	51 2046	52 2047
LAND ACQUISITION									
Beginning Balance	$8,488,781	$8,488,781	$8,488,781	$8,488,781	$8,488,781	$8,488,781	$8,488,781	$8,488,781	$8,488,781
Total Revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**	**$8,488,781**
RESTORATION & ENHANCEMENTS									
Beginning Balance	$371,949	$371,949	$371,949	$371,949	$371,949	$371,949	$371,949	$371,949	$371,949
Total Revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$371,949**	**$371,949**	**$371,949**	**$371,949**	**$371,949**	**$371,949**	**$371,949**	**$371,949**	**$371,949**
ADMINISTRATION/O&M									
Beginning Balance	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Revenues	$742,308	$742,308	$742,308	$742,308	$742,308	$742,308	$742,308	$742,308	$742,308
Drawdown on Endowment Fund	$1,618,446	$1,618,446	$1,618,446	$1,618,446	$1,618,446	$1,618,446	$1,618,446	$1,618,446	$1,618,446
Total Expenditures	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)	($2,360,753)
Balance Adjustments (Inc. Transfers)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
O&M ENDOWMENT									
Beginning Balance	$62,235,320	$62,505,274	$62,784,180	$63,072,342	$63,370,072	$63,677,693	$63,995,542	$64,323,965	$64,663,321
Total Revenues	$1,888,400	$1,897,352	$1,906,607	$1,916,175	$1,926,067	$1,936,295	$1,946,869	$1,957,802	$1,939,900
Drawdown on Endowment Fund	($1,618,446)	($1,618,446)	($1,618,446)	($1,618,446)	($1,618,446)	($1,618,446)	($1,618,446)	($1,618,446)	($1,618,446)
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$62,505,274**	**$62,784,180**	**$63,072,342**	**$63,370,072**	**$63,677,693**	**$63,995,542**	**$64,323,965**	**$64,663,321**	**$64,984,775**
SUPPLEMENTAL ENDOWMENT									
Beginning Balance	$133,114	$133,114	$133,114	$133,114	$133,114	$133,114	$133,114	$133,114	$133,114
Total Revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$133,114**	**$133,114**	**$133,114**	**$133,114**	**$133,114**	**$133,114**	**$133,114**	**$133,114**	**$133,114**
Changed Circumstances Fund Balance	**$7,586,330**	**$7,813,920**	**$8,048,338**	**$8,289,788**	**$8,538,481**	**$8,794,636**	**$9,058,475**	**$9,330,229**	**$9,610,136**

Prepared by EPS.

10365 model update Fall 02 10/11/2002

DRAFT

Table 10
Natomas Basin HCP
Cash Flow Summary- 2002$

	53 2048	54 2049	55 2050
LAND ACQUISITION			
Beginning Balance	$8,488,781	$8,488,781	$8,488,781
Total Revenues	$0	$0	$0
Total Expenditures	$0	$0	$0
Transfers from Admin/O&M Fund	$0	$0	$0
Balance Adjustments	$0	$0	$0
Ending Balance	**$8,488,781**	**$8,488,781**	**$8,488,781**
RESTORATION & ENHANCEMENTS			
Beginning Balance	$371,949	$371,949	$371,949
Total Revenues	$0	$0	$0
Total Expenditures	$0	$0	$0
Balance Adjustments	$0	$0	$0
Ending Balance	**$371,949**	**$371,949**	**$371,949**
ADMINISTRATION/O&M			
Beginning Balance	$0	$0	$0
Total Revenues	$742,308	$742,308	$742,308
Drawdown on Endowment Fund	$1,618,446	$1,618,446	$1,618,446
Total Expenditures	($2,360,753)	($2,360,753)	($2,360,753)
Balance Adjustments (Inc. Transfers)	$0	$0	$0
Ending Balance	**$0**	**$0**	**$0**
O&M ENDOWMENT			
Beginning Balance	$64,984,775	$65,315,873	$65,656,903
Total Revenues	$1,949,543	$1,959,476	$1,969,707
Drawdown on Endowment Fund	($1,618,446)	($1,618,446)	($1,618,446)
Balance Adjustments	$0	$0	$0
Ending Balance	**$65,315,873**	**$65,656,903**	**$66,008,165**
SUPPLEMENTAL ENDOWMENT			
Beginning Balance	$133,114	$133,114	$133,114
Total Revenues	$0	$0	$0
Total Expenditures	$0	$0	$0
Ending Balance	**$133,114**	**$133,114**	**$133,114**
Changed Circumstances Fund Balance	**$9,898,440**	**$10,195,393**	**$10,501,255**

"cash_flow"

Prepared by EPS.

10365 model update Fall 02 10/11/2002

Appendix C

U.S. Fish and Wildlife Service (USFWS) Conservation Guidelines for the Valley Elderberry Longhorn Beetle, updated July 9, 1999.

United States Department of the Interior

Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

Conservation Guidelines for the Valley Elderberry Longhorn Beetle

Revised July 9, 1999

The following guidelines have been issued by the U.S. Fish and Wildlife Service (Service) to assist Federal agencies and non-federal project applicants needing incidental take authorization through a section 7 consultation or a section 10(a)(1)(B) permit in developing measures to avoid and minimize adverse effects on the valley elderberry longhorn beetle. The Service will revise these guidelines as needed in the future. The most recently issued version of these guidelines should be used in developing all projects and habitat restoration plans. The survey and monitoring procedures described below are designed to avoid any adverse effects to the valley elderberry longhorn beetle. Thus a recovery permit is not needed to survey for the beetle or its habitat or to monitor conservation areas. If you are interested in a recovery permit for research purposes please call the Service's Regional Office at (503) 231-2063.

Background Information

The valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), was listed as a threatened species on August 8, 1980 (Federal Register 45: 52803-52807). This animal is fully protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The valley elderberry longhorn beetle (beetle) is completely dependent on its host plant, elderberry (Sambucus species), which is a common component of the remaining riparian forests and adjacent upland habitats of California's Central Valley. Use of the elderberry by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. The life cycle takes one or two years to complete. The animal spends most of its life in the larval stage, living within the stems of an elderberry plant. Adult emergence is from late March through June, about the same time the elderberry produces flowers. The adult stage is short-lived. Further information on the life history, ecology, behavior, and distribution of the beetle can be found in a report by Barr (1991) and the recovery plan for the beetle (USFWS 1984).

Surveys

Proposed project sites within the range of the valley elderberry longhorn beetle should be surveyed for the presence of the beetle and its elderberry host plant by a qualified biologist. The beetle's range extends throughout California's Central Valley and associated foothills from about the 3,000-foot elevation contour on the east and the watershed of the Central Valley on the west (Figure 1). All or portions of 31 counties are included: Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Madera, Mariposa, Merced, Napa, Nevada, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba.

If elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level occur on or adjacent to the proposed project site, or are otherwise located where they may be directly or indirectly affected by the proposed action, minimization measures which include planting replacement habitat (conservation planting) are required (Table 1).

All elderberry shrubs with one or more stems measuring 1.0 inch or greater in diameter at ground level that occur on or adjacent to a proposed project site must be thoroughly searched for beetle exit holes (external evidence of beetle presence). In addition, all elderberry stems one inch or greater in diameter at ground level must be tallied by diameter size class (Table 1). As outlined in Table 1, the numbers of elderberry seedlings/cuttings and associated riparian native trees/shrubs to be planted as replacement habitat are determined by stem size class of affected elderberry shrubs, presence or absence of exit holes, and whether a proposed project lies in a riparian or non-riparian area.

Elderberry plants with no stems measuring 1.0 inch or greater in diameter at ground level are unlikely to be habitat for the beetle because of their small size and/or immaturity. Therefore, no minimization measures are required for removal of elderberry plants with no stems measuring 1.0 inch or greater in diameter at ground level with no exit holes. Surveys are valid for a period of two years.

Avoid and Protect Habitat Whenever Possible

Project sites that do not contain beetle habitat are preferred. If suitable habitat for the beetle occurs on the project site, or within close proximity where beetles will be affected by the project, these areas must be designated as avoidance areas and must be protected from disturbance during the construction and operation of the project. When possible, projects should be designed such that avoidance areas are connected with adjacent habitat to prevent fragmentation and isolation of beetle populations. Any beetle habitat that cannot be avoided as described below should be considered impacted and appropriate minimization measures should be proposed as described below.

Avoidance: Establishment and Maintenance of a Buffer Zone

Complete avoidance (i.e., no adverse effects) may be assumed when a 100-foot (or wider) buffer is established and maintained around elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level. Firebreaks may not be included in the buffer zone. In buffer areas construction-related disturbance should be minimized, and any damaged area should be promptly restored following construction. The Service must be consulted before any disturbances within the buffer area are considered. In addition, the Service must be provided with a map identifying the avoidance area and written details describing avoidance measures.

Protective Measures

1. Fence and flag all areas to be avoided during construction activities. In areas where encroachment on the 100-foot buffer has been approved by the Service, provide a minimum setback of at least 20 feet from the dripline of each elderberry plant.

2. Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.

3. Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.

4. Instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

Restoration and Maintenance

Restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants.

Buffer areas must continue to be protected after construction from adverse effects of the project. Measures such as fencing, signs, weeding, and trash removal are usually appropriate.

No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant should be used in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level.

The applicant must provide a written description of how the buffer areas are to be restored, protected, and maintained after construction is completed.

Mowing of grasses/ground cover may occur from July through April to reduce fire hazard. No mowing should occur within five (5) feet of elderberry plant stems. Mowing must be done in a manner that avoids damaging plants (e.g., stripping away bark through careless use of mowing/trimming equipment).

Transplant Elderberry Plants That Cannot Be Avoided

Elderberry plants must be transplanted if they can not be avoided by the proposed project. All elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level must be transplanted to a conservation area (see below). At the Service's discretion, a plant that is unlikely to survive transplantation because of poor condition or location, or a plant that would be extremely difficult to move because of access problems, may be exempted from transplantation. In cases where transplantation is not possible the minimization ratios in Table 1 may be increased to offset the additional habitat loss.

Trimming of elderberry plants (e.g., pruning along roadways, bike paths, or trails) with one or more stems 1.0 inch or greater in diameter at ground level, may result in take of beetles. Therefore, trimming is subject to appropriate minimization measures as outlined in Table 1.

1. Monitor. A qualified biologist (monitor) must be on-site for the duration of the transplanting of the elderberry plants to insure that no unauthorized take of the valley elderberry longhorn beetle occurs. If unauthorized take occurs, the monitor must have the authority to stop work until corrective measures have been completed. The monitor must immediately report any unauthorized take of the beetle or its habitat to the Service and to the California Department of Fish and Game.

2. Timing. Transplant elderberry plants when the plants are dormant, approximately November through the first two weeks in February, after they have lost their leaves. Transplanting during the non-growing season will reduce shock to the plant and increase transplantation success.

3. Transplanting Procedure.

a. Cut the plant back 3 to 6 feet from the ground or to 50 percent of its height (whichever is taller) by removing branches and stems above this height. The trunk and all stems measuring 1.0 inch or greater in diameter at ground level should be replanted. Any leaves remaining on the plant should be removed.

b. Excavate a hole of adequate size to receive the transplant.

c. Excavate the plant using a Vemeer spade, backhoe, front end loader, or other suitable equipment, taking as much of the root ball as possible, and replant immediately at the conservation area. Move the plant only by the root ball. If the plant is to be moved and transplanted off site, secure the root ball with wire and wrap it with burlap. Dampen the burlap with water, as necessary, to keep the root ball wet. Do not let the roots dry out. Care should be taken to ensure that the soil is not dislodged from around the roots of the transplant. If the site receiving the transplant does not have adequate soil moisture, pre-wet the soil a day or two before transplantation.

d. The planting area must be at least 1,800 square feet for each elderberry transplant. The root ball should be planted so that its top is level with the existing ground. Compact the soil sufficiently so that settlement does not occur. As many as five (5) additional elderberry plantings (cuttings or seedlings) and up to five (5) associated native species plantings (see below) may also be planted within the 1,800 square foot area with the transplant. The transplant and each new planting should have its own watering basin measuring at least three (3) feet in diameter. Watering basins should have a continuous berm measuring approximately eight (8) inches wide at the base and six (6) inches high.

e. Saturate the soil with water. Do not use fertilizers or other supplements or paint the tips of stems with pruning substances, as the effects of these compounds on the beetle are unknown.

f. Monitor to ascertain if additional watering is necessary. If the soil is sandy and well-drained, plants may need to be watered weekly or twice monthly. If the soil is clayey and poorly-drained, it may not be necessary to water after the initial saturation. However, most transplants require watering through the first summer. A drip watering system and timer is ideal. However, in situations where this is not possible, a water truck or other apparatus may be used.

Plant Additional Seedlings or Cuttings

Each elderberry stem measuring 1.0 inch or greater in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) must be replaced, in the conservation area, with elderberry seedlings or cuttings at a ratio ranging from 1:1 to 8:1 (new plantings to affected stems). Minimization ratios are listed and explained in Table 1. Stock of either seedlings or cuttings should be obtained from local sources. Cuttings may be obtained from the plants to be transplanted if the project site is in the vicinity of the conservation area. If the Service determines that the elderberry plants on the proposed project site are unsuitable candidates for transplanting, the Service may allow the applicant to plant seedlings or cuttings at higher than the stated ratios in Table 1 for each elderberry plant that cannot be transplanted.

Plant Associated Native Species

Studies have found that the beetle is more abundant in dense native plant communities with a mature overstory and a mixed understory. Therefore, a mix of native plants associated with the elderberry plants at the project site or similar sites will be planted at ratios ranging from 1:1 to 2:1 [native tree/plant species to each elderberry seedling or cutting (see Table 1)]. These native plantings must be monitored with the same survival criteria used for the elderberry seedlings (see below). Stock of saplings, cuttings, and seedlings should be obtained from local sources. If the parent stock is obtained from a distance greater than one mile from the conservation area, approval by the Service of the native plant donor sites must be obtained prior to initiation of the revegetation work. Planting or seeding the conservation area with native herbaceous species is encouraged. Establishing native grasses and forbs may discourage unwanted non-native species from becoming established or persisting at the conservation area. Only stock from local sources should be used.

Examples

Example 1

The project will adversely affect beetle habitat on a vacant lot on the land side of a river levee. This levee now separates beetle habitat on the vacant lot from extant Great Valley Mixed Riparian Forest (Holland 1986) adjacent to the river. However, it is clear that the beetle habitat located on the vacant lot was part of a more extensive mixed riparian forest ecosystem extending farther from the river's edge prior to agricultural development and levee construction. Therefore, the beetle habitat on site is considered riparian. A total of two elderberry plants with at least one stem measuring 1.0 inch or greater in diameter at ground level will be affected by the proposed action. The two plants

have a total of 15 stems measuring over 1.0 inch. No exit holes were found on either plant. Ten of the stems are between 1.0 and 3.0 inches in diameter and five of the stems are greater than 5.0 inches in diameter. The conservation area is suited for riparian forest habitat. Associated natives adjacent to the conservation area are box elder (Acer negundo californica), walnut (Juglans californica var. hindsii), sycamore (Platanus racemosa), cottonwood (Populus fremontii), willow (Salix gooddingii and S. laevigata), white alder (Alnus rhombifolia), ash (Fraxinus latifolia), button willow (Cephalanthus occidentalis), and wild grape (Vitis californica).

Minimization (based on ratios in Table 1):

• Transplant the two elderberry plants that will be affected to the conservation area.

• Plant 40 elderberry rooted cuttings (10 affected stems compensated at 2:1 ratio and 5 affected stems compensated at 4:1 ratio, cuttings planted:stems affected)

• Plant 40 associated native species (ratio of associated natives to elderberry plantings is 1:1 in areas with no exit holes):

5 saplings each of box elder, sycamore, and cottonwood

5 willow seedlings

5 white alder seedlings

5 saplings each of walnut and ash

3 California button willow

2 wild grape vines

Total: 40 associated native species

• Total area required is a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. Since, a total of 80 plants must be planted (40 elderberries and 40 associated natives), a total of 0.33 acre (14,400 square feet) will be required for conservation plantings. The conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period.

Example 2

The project will adversely affect beetle habitat in Blue Oak Woodland (Holland 1986). One elderberry plant with at least one stem measuring 1.0 inch or greater in diameter at ground level will be affected by the proposed action. The plant has a total of 10 stems measuring over 1.0 inch. Exit holes were found on the plant. Five of the stems are between 1.0 and 3.0 inches in diameter and five

of the stems are between 3.0 and 5.0 inches in diameter. The conservation area is suited for elderberry savanna (non-riparian habitat). Associated natives adjacent to the conservation area are willow (Salix species), blue oak (Quercus douglasii), interior live oak (Q. wislizenii), sycamore, poison oak (Toxicodendron diversilobum), and wild grape.

Minimization (based on ratios in Table 1):

• Transplant the one elderberry plant that will be affected to the conservation area.

• Plant 30 elderberry seedlings (5 affected stems compensated at 2:1 ratio and 5 affected stems compensated at 4:1 ratio, cuttings planted:stems affected)

• Plant 60 associated native species (ratio of associated natives to elderberry plantings is 2:1 in areas with exit holes):

20 saplings of blue oak, 20 saplings of sycamore, and 20 saplings of willow, and seed and plant with a mixture of native grasses and forbs

• Total area required is a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. Since, a total of 90 plants must be planted (30 elderberries and 60 associated natives), a total of 0.37 acre (16,200 square feet) will be required for conservation plantings. The conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period.

Conservation Area—Provide Habitat for the Beetle in Perpetuity

The conservation area is distinct from the avoidance area (though the two may adjoin), and serves to receive and protect the transplanted elderberry plants and the elderberry and other native plantings. The Service may accept proposals for off-site conservation areas where appropriate.

1. Size. The conservation area must provide at least 1,800 square feet for each transplanted elderberry plant. As many as 10 conservation plantings (i.e., elderberry cuttings or seedlings and/or associated native plants) may be planted within the 1800 square foot area with each transplanted elderberry. An additional 1,800 square feet shall be provided for every additional 10 conservation plants. Each planting should have its own watering basin measuring approximately three feet in diameter. Watering basins should be constructed with a continuous berm measuring approximately eight inches wide at the base and six inches high.

The planting density specified above is primarily for riparian forest habitats or other habitats with naturally dense cover. If the conservation area is an open habitat (i.e., elderberry savanna, oak woodland) more area may be needed for the required plantings. Contact the Service for assistance if the above planting recommendations are not appropriate for the proposed conservation area.

No area to be maintained as a firebreak may be counted as conservation area. Like the avoidance area, the conservation area should connect with adjacent habitat wherever possible, to prevent isolation of beetle populations.

Depending on adjacent land use, a buffer area may also be needed between the conservation area and the adjacent lands. For example, herbicides and pesticides are often used on orchards or vineyards. These chemicals may drift or runoff onto the conservation area if an adequate buffer area is not provided.

2. Long-Term Protection. The conservation area must be protected in perpetuity as habitat for the valley elderberry longhorn beetle. A conservation easement or deed restrictions to protect the conservation area must be arranged. Conservation areas may be transferred to a resource agency or appropriate private organization for long-term management. The Service must be provided with a map and written details identifying the conservation area; and the applicant must receive approval from the Service that the conservation area is acceptable prior to initiating the conservation program. A true, recorded copy of the deed transfer, conservation easement, or deed restrictions protecting the conservation area in perpetuity must be provided to the Service before project implementation.

Adequate funds must be provided to ensure that the conservation area is managed in perpetuity. The applicant must dedicate an endowment fund for this purpose, and designate the party or entity that will be responsible for long-term management of the conservation area. The Service must be provided with written documentation that funding and management of the conservation area (items 3-8 above) will be provided in perpetuity.

3. Weed Control. Weeds and other plants that are not native to the conservation area must be removed at least once a year, or at the discretion of the Service and the California Department of Fish and Game. Mechanical means should be used; herbicides are prohibited unless approved by the Service.

4. Pesticide and Toxicant Control. Measures must be taken to insure that no pesticides, herbicides, fertilizers, or other chemical agents enter the conservation area. No spraying of these agents must be done within one 100 feet of the area, or if they have the potential to drift, flow, or be washed into the area in the opinion of biologists or law enforcement personnel from the Service or the California Department of Fish and Game.

5. Litter Control. No dumping of trash or other material may occur within the conservation area. Any trash or other foreign material found deposited within the conservation area must be removed within 10 working days of discovery.

6. Fencing. Permanent fencing must be placed completely around the conservation area to prevent unauthorized entry by off-road vehicles, equestrians, and other parties that might damage or destroy the habitat of the beetle, unless approved by the Service. The applicant must receive written approval from the Service that the fencing is acceptable prior to initiation of the conservation program. The fence must be maintained in perpetuity, and must be

repaired/replaced within 10 working days if it is found to be damaged. Some conservation areas may be made available to the public for appropriate recreational and educational opportunities with written approval from the Service. In these cases appropriate fencing and signs informing the public of the beetle's threatened status and its natural history and ecology should be used and maintained in perpetuity.

7. Signs. A minimum of two prominent signs must be placed and maintained in perpetuity at the conservation area, unless otherwise approved by the Service. The signs should note that the site is habitat of the federally threatened valley elderberry longhorn beetle and, if appropriate, include information on the beetle's natural history and ecology. The signs must be approved by the Service. The signs must be repaired or replaced within 10 working days if they are found to be damaged or destroyed.

Monitoring

The population of valley elderberry longhorn beetles, the general condition of the conservation area, and the condition of the elderberry and associated native plantings in the conservation area must be monitored over a period of either ten (10) consecutive years or for seven (7) years over a 15-year period. The applicant may elect either 10 years of monitoring, with surveys and reports every year; or 15 years of monitoring, with surveys and reports on years 1, 2, 3, 5, 7, 10, and 15. The conservation plan provided by the applicant must state which monitoring schedule will be followed. No change in monitoring schedule will be accepted after the project is initiated. If conservation planting is done in stages (i.e., not all planting is implemented in the same time period), each stage of conservation planting will have a different start date for the required monitoring time.

Surveys. In any survey year, a minimum of two site visits between February 14 and June 30 of each year must be made by a qualified biologist. Surveys must include:

1. A population census of the adult beetles, including the number of beetles observed, their condition, behavior, and their precise locations. Visual counts must be used; mark-recapture or other methods involving handling or harassment must not be used.

2. A census of beetle exit holes in elderberry stems, noting their precise locations and estimated ages.

3. An evaluation of the elderberry plants and associated native plants on the site, and on the conservation area, if disjunct, including the number of plants, their size and condition.

4. An evaluation of the adequacy of the fencing, signs, and weed control efforts in the avoidance and conservation areas.

5. A general assessment of the habitat, including any real or potential threats to the beetle and its host plants, such as erosion, fire, excessive grazing, off-road vehicle use, vandalism, excessive weed growth, etc.

The materials and methods to be used in the monitoring studies must be reviewed and approved by the Service. All appropriate Federal permits must be obtained prior to initiating the field studies.

Reports. A written report, presenting and analyzing the data from the project monitoring, must be prepared by a qualified biologist in each of the years in which a monitoring survey is required. Copies of the report must be submitted by December 31 of the same year to the Service (Chief of Endangered Species, Sacramento Fish and Wildlife Office), and the Department of Fish and Game (Supervisor, Environmental Services, Department of Fish and Game, 1416 Ninth Street, Sacramento, California 95814; and Staff Zoologist, California Natural Diversity Data Base, Department of Fish and Game, 1220 S Street, Sacramento, California 95814). The report must explicitly address the status and progress of the transplanted and planted elderberry and associated native plants and trees, as well as any failings of the conservation plan and the steps taken to correct them. Any observations of beetles or fresh exit holes must be noted. Copies of original field notes, raw data, and photographs of the conservation area must be included with the report. A vicinity map of the site and maps showing where the individual adult beetles and exit holes were observed must be included. For the elderberry and associated native plants, the survival rate, condition, and size of the plants must be analyzed. Real and likely future threats must be addressed along with suggested remedies and preventative measures (e.g. limiting public access, more frequent removal of invasive non-native vegetation, etc.).

A copy of each monitoring report, along with the original field notes, photographs, correspondence, and all other pertinent material, should be deposited at the California Academy of Sciences (Librarian, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118) by December 31 of the year that monitoring is done and the report is prepared. The Service's Sacramento Fish and Wildlife Office should be provided with a copy of the receipt from the Academy library acknowledging receipt of the material, or the library catalog number assigned to it.

Access. Biologists and law enforcement personnel from the California Department of Fish and Game and the Service must be given complete access to the project site to monitor transplanting activities. Personnel from both these agencies must be given complete access to the project and the conservation area to monitor the beetle and its habitat in perpetuity.

Success Criteria

A minimum survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants must be maintained throughout the monitoring period. Within one year of discovery that survival has dropped below 60 percent, the applicant must replace failed plantings to bring survival above this level. The Service will make any determination as to the applicant's replacement responsibilities arising from circumstances beyond its control, such as plants damaged or killed as a result of severe flooding or vandalism.

Service Contact

These guidelines were prepared by the Endangered Species Division of the Service's Sacramento Fish and Wildlife Office. If you have questions regarding these guidelines or to request a copy of the most recent guidelines, telephone (916) 414-6600, or write to:

U.S. Fish and Wildlife Service
Ecological Services
2800 Cottage Way, W-2605
Sacramento, CA 95825

Literature Cited

Barr, C. B. 1991. The distribution, habitat, and status of the valley elderberry longhorn beetle *Desmocerus californicus dimorphus*. U.S. Fish and Wildlife Service; Sacramento, California.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished Report. State of California, The Resources Agency, Department of Fish and Game, Natural Heritage Division, Sacramento, California.

USFWS. 1980. Listing the valley elderberry longhorn beetle as a threatened species with critical habitat. Federal Register 45:52803-52807.

USFWS. 1984. Recovery plan for the valley elderberry longhorn beetle. U.S. Fish and Wildlife Service, Endangered Species Program; Portland, Oregon.

Table 1: Minimization ratios based on location (riparian vs. non-riparian), stem diameter of affected elderberry plants at ground level, and presence or absence of exit holes.

Location	Stems (maximum diameter at ground level)	Exit Holes on Shrub Y/N (quantify) 1	Elderberry Seedling Ratio[2]	Associated Native Plant Ratio[3]
non-riparian	stems >=1" & =<3"	No:	1:1	1:1
		Yes:	2:1	2:1
non-riparian	stems >3" & <5"	No:	2:1	1:1
		Yes:	4:1	2:1
non-riparian	stems >=5"	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems >=1" & <=3"	No:	2:1	1:1
		Yes:	4:1	2:1
riparian	stems > 3" & < 5"	No:	3:1	1:1

		Yes:	6:1	2:1
riparian	stems >=5"	No:	4:1	1:1
		Yes:	8:1	2:1

[1] All stems measuring one inch or greater in diameter at ground level on a single shrub are considered occupied when exit holes are present anywhere on the shrub.

[2] Ratios in the Elderberry Seedling Ratio column correspond to the number of cuttings or seedlings to be planted per elderberry stem (one inch or greater in diameter at ground level) affected by a project.

[3] Ratios in the Associated Native Plant Ratio column correspond to the number of associated native species to be planted per elderberry (seedling or cutting) planted.

Click for range map

Endangered Species Div., Sacramento Fish & Wildlife Office, U.S. Fish & Wildlife Service

Appendix D

California Department of Fish and Game Staff Report on Burrowing Owl Mitigation, dated October 17, 1995.

STAFF REPORT ON BURROWING OWL MITIGATION

Introduction

The Legislature and the Fish and Game Commission have developed the policies, standards and regulatory mandates to protect native species of fish and wildlife. In order to determine how the Department of Fish and Game (Department) could judge the adequacy of mitigation measures designed to offset impacts to burrowing owls (*Speotyto cunicularia*; A.O.U. 1991) staff (WMD, ESD, and Regions) has prepared this report. To ensure compliance with legislative and commission policy, mitigation requirements which are consistent with this report should be incorporated into: (1) Department comments to Lead Agencies and project sponsors pursuant to the California Environmental Quality Act (CEQA); and (2) other authorizations the Department gives to project proponents for projects impacting burrowing owls.

This report is designed to provide the Department (including regional offices and divisions), CEQA Lead Agencies and project proponents the context in which the Environmental Services Division (ESD) will review proposed project specific mitigation measures. This report also includes preapproved mitigation measures which have been judged to be consistent with policies, standards and legal mandates of the Legislature, the Fish and Game Commission and the Department's public trust responsibilities. Implementation of mitigation measures consistent with this report are intended to help achieve the conservation of burrowing owls and should compliment multi-species habitat conservation planning efforts currently underway. The *Burrowing Owl Survey Protocol and Mitigation Guidelines* developed by The California Burrowing Owl Consortium (CBOC 1993) were taken into consideration in the preparation of this staff report as were comments from other interested parties.

A range-wide conservation strategy for this species is needed. Any range-wide conservation strategy should establish criteria for avoiding the need to list the species pursuant to either the California or federal Endangered Species Acts through preservation of existing habitat, population expansion into former habitat, recruitment of young into the population, and other specific efforts.

California's burrowing owl population is clearly declining and, if declines continue, the species may qualify for listing. Because of the intense pressure for urban development within suitable burrowing owl nesting and foraging habitat (open, flat and gently rolling grasslands and grass/shrub lands) in California, conflicts between owls and development projects often occur. Owl survival can be adversely affected by disturbance and foraging habitat loss even when impacts to individual birds and nests/burrows are avoided. Adequate information about the presence of owls is often unavailable prior to project approval. Following project approval there is no legal mechanism through which to seek mitigation other than avoidance of occupied burrows or nests. The absence of standardized survey methods often impedes consistent impact assessment.

Burrowing Owl Habitat Description

Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and arid scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat. Both natural and artificial burrows provide protection, shelter, and nests for burrowing owls (Henny and Blus 1981). Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

Occupied Burrowing Owl Habitat

Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can be verified at a site by detecting a burrowing owl, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one burrowing owl has been observed occupying a burrow there within the last three years (Rich 1984).

CEQA Project Review

The measures included in this report are intended to provide a decision-making process that should be implemented whenever there is potential for an action or project to adversely affect burrowing owls. For projects subject to the California Environmental Quality Act (CEQA), the process begins by conducting surveys to determine if burrowing owls are foraging or nesting on or adjacent to the project site. If surveys confirm that the site is occupied habitat, mitigation measures to minimize impacts to burrowing owls, their burrows and foraging habitat should be incorporated into the CEQA document as enforceable conditions. The measures in this document are intended to conserve the species by protecting and maintaining viable populations of the species throughout their range in California. This may often result in protecting and managing habitat for the species at sites away from rapidly urbanizing/developing areas. Projects and situations vary and mitigation measures should be adapted to fit specific circumstances.

Projects not subject to CEQA review may have to be handled separately since the legal authority the Department has with respect to burrowing owls in this type of situation is often limited. The burrowing owl is protected from "take" (Section 3503.5 of the Fish and Game Code) but unoccupied habitat is likely to be lost for activites not subject to CEQA.

Legal Status

The burrowing owl is a migratory species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3505, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. To avoid violation of the take provisions of these laws generally requires that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle (February 1 to August 31). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered "take" and is potentially punishable by fines and/or imprisonment.

The burrowing owl is a Species of Special Concern to California because of declines of suitable habitat and both localized and statewide population declines. Guidelines for the Implementation of the California Environmental Quality Act (CEQA) provide that a species be considered as endangered or "rare" regardless of appearance on a formal list for the purposes of the CEQA (Guidelines, Section 15380, subsections b and d). The CEQA requires a mandatory findings of significance if impacts to threatened or endangered species are likely to occur (Sections 21001{c}, 2103; Guidelines 15380, 15064, 15065). To be legally adequate, mitigation measures must be capable of "avoiding the impact altogether by not taking a certain action or parts of an action"; "minimizing impacts by limiting the degree or magnitude of the action and its implementation"; "rectifying the impact by repairing, rehabilitating or restoring the impacted environment"; "or reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action" (Guidelines, Section 15370). Avoidance or mitigation to reduce impacts to less than significant levels must be included in a project or the CEQA lead agency must make and justify findings of overriding considerations.

Impact Assessment

Habitat Assessment

The project site and a 150 meter (approximately 500 ft.) buffer (where possible and appropriate based on habitat) should be surveyed to assess the presence of burrowing owls and their habitat (Thomsen 1971, Martin 1973). If occupied habitat is detected on or adjacent to the site, measures to avoid, minimize, or mitigate the project's impacts to the species should be incorporated into the project, including burrow preconstruction surveys to ensure avoidance of direct take. It is also recommended that preconstruction surveys be conducted if the species was not detected but is likely to occur on the project site.

Burrowing Owl and Burrow Surveys

Burrowing owl and burrow surveys should be conducted during both the wintering and nesting seasons, unless the species is detected on the first survey. If possible, the winter survey should be conducted between December 1 and January 31 (when wintering owls are most likely to be present) and the nesting season survey should be conducted between April 15 and July 15 (the peak of the breeding season). Surveys conducted from two hours before sunset to one hour after, or from one hour before to two hours after sunrise, are also preferable.

Surveys should be conducted by walking suitable habitat on the entire project site and (where possible) in areas within 150 meters (approx. 500 ft.) of the project impact zone. The 150-meter buffer zone is surveyed to identify burrows and owls outside of the project area which may be impacted by factors such as noise and vibration (heavy equipment, etc.) during project construction. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.) and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To effectively survey large projects (100 acres or larger), two or more surveyors should be used to walk adjacent transects. To avoid impacts to owls from surveyors, owls and/or occupied burrows should be avoided by a minimum of 50 meters (approx. 160 ft.) wherever practical. Disturbance to occupied burrows should be avoided during all seasons.

Definition of Impacts

The following should be considered impacts to the species:

- Disturbance within 50 meters (approx. 160 ft.) Which may result in harassment of owls at occupied burrows;
- Destruction of natural and artificial burrows (culverts, concrete slabs and debris piles that provide shelter to burrowing owls); and
- Destruction and/or degradation of foraging habitat adjacent (within 100 m) of an occupied burrow(s).

Written Report

A report for the project should be prepared for the Department and copies should be submitted to the Regional contact and to the Wildlife Management Division Bird and Mammal Conservation Program. The report should include the following information:

- Date and time of visit(s) including name of the qualified biologist conducting surveys, weather and visibility conditions, and survey methodology;

- Description of the site including location, size, topography, vegetation communities, and animals observed during visit(s);

- Assessment of habitat suitability for burrowing owls;

- Map and photographs of the site;

- Results of transect surveys including a map showing the location of all burrow(s) (natural or artificial) and owl(s), including the numbers at each burrow if present and tracks, feathers, pellets, or other items (prey remains, animal scat);

- Behavior of owls during the surveys;

- Summary of both winter and nesting season surveys including any productivity information and a map showing territorial boundaries and home ranges; and

- Any historical information (Natural Diversity Database, Department regional files, Breeding Bird Survey data, American Birds records, Audubon Society, local bird club, other biologists, etc.) regarding the presence of burrowing owls on the site.

Mitigation

The objective of these measures is to avoid and minimize impacts to burrowing owls at a project site and preserve habitat that will support viable owls populations. If burrowing owls are detected using the project area, mitigation measures to minimize and offset the potential impacts should be included as enforceable measures during the CEQA process.

Mitigation actions should be carried out from September 1 to January 31 which is prior to the nesting season (Thomsen 1971, Zarn 1974). Since the timing of nesting activity may vary with latitude and climatic conditions, this time frame should be adjusted accordingly. Preconstruction surveys of suitable habitat at the project site(s) and buffer zone(s) should be conducted within the 30 days prior to construction to ensure no additional burrowing owls have established territories since the initial surveys. If ground disturbing activities are delayed or suspended for more than 30 days after the preconstruction survey, the site should be resurveyed.

Although the mitigation measures may be included as enforceable project conditions in the CEQA process, it may also be desirable to formalize them in a Memorandum of Understanding (MOU) between the Department and the project sponsor. An MOU is needed when lands (fee title or conservation easement) are being transferred to the Department.

Specific Mitigation Measures

1. Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by the Department verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

2. To offset the loss of foraging and burrow habitat on the project site, a minimum of 6.5 acres of foraging habitat (calculated on a 100 m {approx. 300 ft.} foraging radius around the burrow) per pair or unpaired resident bird, should be acquired and permanently protected. The protected lands should be adjacent to occupied burrowing owl habitat and at a location acceptable to the Department. *Protection of additional habitat acreage per pair or unpaired resident bird may be applicable in some instances.* The CBOC has also developed mitigation guidelines (CBOC 1993) that can be incorporated by CEQA lead agencies and which are consistent with this staff report.

3. When destruction of occupied burrows is unavoidable, existing unsuitable burrows should be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on the protected lands site. One example of an artificial burrow design is provided in Attachment A.

4. If owls must be moved away from the disturbance area, passive relocation techniques (as described below) should be used rather than trapping. At least one or more weeks will be necessary to accomplish this and allow the owls to acclimate to alternate burrows.

5. The project sponsor should provide funding for long-term management and monitoring of the protected lands. The monitoring plan should include success criteria, remedial measures, and an annual report to the Department.

Impact Avoidance

If avoidance is the preferred method of dealing with potential project impacts, then no disturbance should occur within 50 meters (approx. 160 ft.) of occupied burrows during the nonbreeding season of September 1 through January 31 or within 75 meters (approx. 250 ft.) during the breeding season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be *permanently* preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird. The configuration of the protected habitat should be approved by the Department.

Passive Relocation - With One-Way Doors

Owls should be excluded from burrows in the immediate impact zone and within a 50 meter (approx. 160 ft.) buffer zone by installing one-way doors in burrow entrances. One-way doors (e.g., modified dryer vents) should be left in place 48 hours to insure owls have left the burrow before excavation. Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily for one week* to confirm owl use of burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrow.

Passive Relocation - Without One-Way Doors

Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily until the owls have relocated to the new burrows*. The formerly occupied burrows may then be excavated. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into burrows during excavation to maintain an escape route for any animals inside the burrow.

Projects Not Subject to CEQA

The Department is often contacted regarding the presence of burrowing owls on construction sites, parking lots and other areas for which there is no CEQA action or for which the CEQA process has been completed. In these situations, the Department should seek to reach agreement with the project sponsor to implement the specific mitigation measures described above. If they are unwilling to do so, passive relocation without the aid of one-way doors is their only option based upon Fish and Game Code 3503.5.

Literature Cited

American Ornithologists Union (AOU). 1991. Thirty-eighth supplement to the AOU checklist of North American birds. *Auk* 108:750-754.

Feeney, L. 1992. Site fidelity in burrowing owls. Unpublished paper presented to Raptor Research Annual Meeting, November 1992. Seattle, Washington.

Haug, E. A. and L. W. Oliphant. 1990. Movements, activity patterns, and habitat use of burrowing owls in Saskatchewan. *J. Wildlife Management* 54:27-35.

Henny, C. J. and L. J. Blus. 1981. Artificial burrows provide new insight into burrowing owl nesting biology. *Raptor Research* 15:82-85.

Martin, D. J. 1973. Selected aspects of burrowing owl ecology and behavior. *Condor* 75:446-456.

Rich, T. 1984. Monitoring burrowing owl populations: Implications of burrow re-use. *Wildlife Society Bulletin* 12:178-180.

The California Burrowing Owl Consortium (CBOC). 1993. Burrowing owl survey protocol and mitigation guidelines. Tech. Rep. Burrowing Owl Consortium, Alviso, California.

Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. *Condor* 73:177-192.

Zarn, M. 1974. Burrowing owl. U. S. Department of Interior, Bureau of Land Management. Technical Note T-N 250. Denver, Colorado. 25 pp.

Reproductive Success of Burrowing Owls Using Artificial Nest Burrows in Southeastern Idaho

by Bruce Olenick

Artificial nest burrows were implanted in southeastern Idaho for burrowing owls in the spring of 1986. These artificial burrows consisted of a 12" × 12" × 8" wood nesting chamber with removable top and a 6 foot corrugated and perforated plastic drainage pipe 6 inches in diameter (Fig. 1). Earlier investigators claimed that artificial burrows must provide a natural dirt floor to allow burrowing owls to modify the nesting tunnel and chamber. Contrary to this, the artificial burrow introduced here does not allow owls to modify the entrance or tunnel. The inability to change the physical dimensions of the burrow tunnel does not seem to affect the owls' breeding success or deter them from using this burrow design.

In 1986, 22 artificial burrows were inhabited. Thirteen nesting attempts yielded an average clutch size of 8.3 eggs per breeding pair. Eight nests successfully hatched at least 1 nestling. In these nests, 67 of 75 eggs hatched (89.3%) and an estimated 61 nestlings (91.0%) fledged. An analysis of the egg laying and incubation periods showed that incubation commenced well after egg laying began. Average clutch size at the start of incubation was 5.6 eggs. Most eggs tended to hatch synchronously in all successful nests.

Although the initial cost of constructing this burrow design may be slightly higher than a burrow consisting entirely of wood, the plastic pipe burrow offers the following advantages: (1) it lasts several field seasons without rotting or collapsing; (2) it may prevent or retard predation; (3) construction time is minimal; (4) it is easy to transport, especially over long distances; and (5) the flexible tunnel simplifies installation. The use of this artificial nest burrow design was highly successful and may prove to be a great resource technique for future management of this species.

For additional information on constructing this artificial nest burrow, contact Bruce Olenick, Department of Biology, Idaho State University, Pocatello, ID 83209.

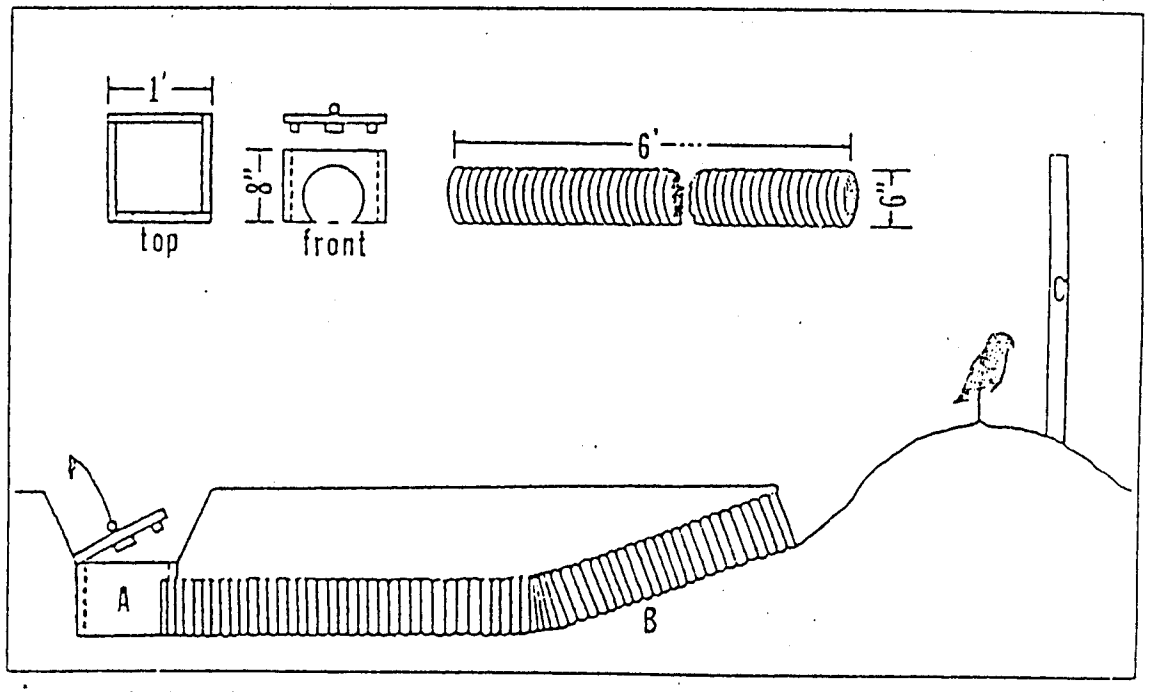


Fig. 1 Artificial nest burrow design for burrowing owls. Entire unit (including nest chamber) is buried 12"-18" below ground for maintaining thermal stability of the nest chamber. A = nest chamber, B = plastic pipe, C = perch.

ATTACHMENT A

Appendix E

Federal Aviation Administration Advisory Circular, Hazardous Wildlife Attractants On or Near Airports, dated May 1, 1997.

U.S. Department of Transportation

Federal Aviation Administration

ADVANCE COPY
APPROVED FOR USE

Advisory Circular

Subject: HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS

Date: 5/1/97
Initiated by: AAS-310 and APP-600

AC No: 150/5200-33
Change:

1. PURPOSE. This advisory circular (AC) provides guidance on locating certain land uses having the potential to attract hazardous wildlife to or in the vicinity of public-use airports. It also provides guidance concerning the placement of new airport development projects (including airport construction, expansion, and renovation) pertaining to aircraft movement in the vicinity of hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.

2. APPLICATION. The standards, practices, and suggestions contained in this AC are recommended by the Federal Aviation Administration (FAA) for use by the operators and sponsors of all public-use airports. In addition, the standards, practices, and suggestions contained in this AC are recommended by the FAA as guidance for land use planners, operators, and developers of projects, facilities, and activities on or near airports.

3. BACKGROUND. Populations of many species of wildlife have increased markedly in the last few years. Some of these species are able to adapt to human-made environments, such as exist on and around airports. The increase in wildlife populations, the use of larger turbine engines, the increased use of twin-engine aircraft, and the increase in air-traffic, all combine to increase the risk, frequency, and potential severity of wildlife-aircraft collisions.

Most public-use airports have large tracts of open, unimproved land that are desirable for added margins of safety and noise mitigation. These areas can present potential hazards to aviation because they often attract hazardous wildlife. During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives world-wide, as well as billions of dollars worth of aircraft damage. Hazardous wildlife attractants near airports could jeopardize future airport expansion because of safety considerations.

DAVID L. BENNETT
Director, Office of Airport Safety and Standards

MAY-09-97 FRI 02:11 PM AIRPORTS FAX NO. 202 267 5383 P. 02

SECTION 1. HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS.

1-1. TYPES OF HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS. Human-made or natural areas, such as poorly-drained areas, retention ponds, roosting habitats on buildings, landscaping, putrescible-waste disposal operations, wastewater treatment plants, agricultural or aquacultural activities, surface mining, or wetlands, may be used by wildlife for escape, feeding, loafing, or reproduction. Wildlife use of areas within an airport's approach or departure airspace, aircraft movement areas, loading ramps, or aircraft parking areas may cause conditions hazardous to aircraft safety.

All species of wildlife can pose a threat to aircraft safety. However, some species are more commonly involved in aircraft strikes than others. Table 1 lists the wildlife groups commonly reported as being involved in damaging strikes to U.S. aircraft from 1993 to 1995.

Table 1. Wildlife Groups Involved in Damaging Strikes to Civilian Aircraft, USA, 1993-1995.

Wildlife Groups	Percent involvement in reported damaging strikes
Gulls	28
Waterfowl	28
Raptors	11
Doves	6
Vultures	5
Blackbirds-Starlings	5
Corvids	3
Wading birds	3
Deer	11
Canids	1

1-2. LAND USE PRACTICES. Land use practices that attract or sustain hazardous wildlife populations on or near airports can significantly increase the potential for wildlife-aircraft collisions. FAA recommends against land use practices, within the siting criteria stated in 1-3, that attract or sustain populations of hazardous wildlife within the vicinity of airports or cause movement of hazardous wildlife onto, into, or across the approach or departure airspace, aircraft movement area, loading ramps, or aircraft parking area of airports.

Airport operators, sponsors, planners, and land use developers should consider whether proposed land uses, including new airport development projects, would increase the wildlife hazard. Caution should be exercised to ensure that land use practices on or near airports do not enhance the attractiveness of the area to hazardous wildlife.

1-3. SITING CRITERIA. FAA recommends separations when siting any of the wildlife attractants mentioned in Section 2 or when planning new airport development projects to accommodate aircraft movement. The distance between an airport's aircraft movement areas, loading ramps, or aircraft parking areas and the wildlife attractant should be as follows:

a. Airports serving piston-powered aircraft. A distance of 5,000 feet is recommended.

b. Airports serving turbine-powered aircraft. A distance of 10,000 feet is recommended.

c. Approach or Departure airspace. A distance of 5 statute miles is recommended, if the wildlife attractant may cause hazardous wildlife movement into or across the approach or departure airspace.

MAY-09-97 FRI 02:12 PM AIRPORTS FAX NO. 202 267 5383 P. 03

SECTION 2. LAND USES THAT ARE INCOMPATIBLE WITH SAFE AIRPORT OPERATIONS.

2-1. GENERAL. The wildlife species and the size of the populations attracted to the airport environment are highly variable and may depend on several factors, including land-use practices on or near the airport. It is important to identify those land use practices in the airport area that attract hazardous wildlife. This section discusses land use practices known to threaten aviation safety.

2-2. PUTRESCIBLE-WASTE DISPOSAL OPERATIONS. Putrescible-waste disposal operations are known to attract large numbers of wildlife that are hazardous to aircraft. Because of this, these operations, when located within the separations identified in the siting criteria in 1-3 are considered incompatible with safe airport operations.

FAA recommends against locating putrescible-waste disposal operations inside the separations identified in the siting criteria mentioned above. FAA also recommends against new airport development projects that would increase the number of aircraft operations or that would accommodate larger or faster aircraft, near putrescible-waste disposal operations located within the separations identified in the siting criteria in 1-3.

2-3. WASTEWATER TREATMENT FACILITIES. Wastewater treatment facilities and associated settling ponds often attract large numbers of wildlife that can pose a threat to aircraft safety when they are located on or near an airport.

a. New wastewater treatment facilities. FAA recommends against the construction of new wastewater treatment facilities or associated settling ponds within the separations identified in the siting criteria in 1-3. During the siting analysis for wastewater treatment facilities, the potential to attract hazardous wildlife should be considered if an airport is in the vicinity of a proposed site. Airport operators should voice their opposition to such sitings. In addition, they should consider the existence of wastewater treatment facilities when evaluating proposed sites for new airport development projects and avoid such sites when practicable.

b. Existing wastewater treatment facilities. FAA recommends correcting any wildlife hazards arising from existing wastewater treatment facilities located on or near airports without delay, using appropriate wildlife hazard mitigation techniques. Accordingly, measures to minimize hazardous wildlife attraction should be developed in consultation with a wildlife damage management biologist. FAA recommends that wastewater treatment facility operators incorporate appropriate wildlife hazard mitigation techniques into their operating practices. Airport operators also should encourage those operators to incorporate these mitigation techniques in their operating practices.

c. Artificial marshes. Waste-water treatment facilities may create artificial marshes and use submergent and emergent aquatic vegetation as natural filters. These artificial marshes may be used by some species of flocking birds, such as blackbirds and waterfowl, for breeding or roosting activities. FAA recommends against establishing artificial marshes within the separations identified in the siting criteria stated in 1-3.

d. Wastewater discharge and sludge disposal. FAA recommends against the discharge of wastewater or sludge on airport property. Regular spraying of wastewater or sludge disposal on unpaved areas may improve soil moisture and quality. The resultant turf growth requires more frequent mowing, which in turn may mutilate or flush insects or small animals and produce straw. The maimed or flushed organisms and the straw can attract hazardous wildlife and jeopardize aviation safety. In addition, the improved turf may attract grazing wildlife such as deer and geese.

Problems may also occur when discharges saturate unpaved airport areas. The resultant soft, muddy conditions can severely restrict or prevent emergency vehicles from reaching accident sites in a timely manner.

e. Underwater waste discharges. The underwater discharge of any food waste, e.g., fish processing offal, that could attract scavenging wildlife is not recommended within the separations identified in the siting criteria in 1-3.

MAY-09-97 FRI 02:12 PM AIRPORTS FAX NO. 202 267 5383 P.04

2-4. WETLANDS.

a. Wetlands on or near Airports.

(1) Existing Airports. Normally, wetlands are attractive to many wildlife species. Airport operators with wetlands located on or nearby airport property should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations.

(2) Airport Development. When practicable, the FAA recommends siting new airports using the separations identified in the siting criteria in 1-3. Where alternative sites are not practicable or when expanding existing airports in or near wetlands, the wildlife hazards should be evaluated and minimized through a wildlife management plan prepared by a wildlife damage management biologist, in consultation with the U.S. Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (COE).

NOTE: If questions exist as to whether or not an area would qualify as a wetland, contact the U.S. Army COE, the Natural Resource Conservation Service, or a wetland consultant certified to delineate wetlands.

b. Wetland mitigation. Mitigation may be necessary when unavoidable wetland disturbances result from new airport development projects. Wetland mitigation should be designed so it does not create a wildlife hazard.

(1) FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in the siting criteria in 1-3. Wetland mitigation banks meeting these siting criteria offer an ecologically sound approach to mitigation in these situations.

(2) Exceptions to locating mitigation activities outside the separations identified in the siting criteria in 1-3 may be considered if the affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or ground water recharge. Such mitigation must be compatible with safe airport operations. Enhancing such mitigation areas to attract hazardous wildlife should be avoided. On-site mitigation plans may be reviewed by the FAA to determine compatibility with safe airport operations.

(3) Wetland mitigation projects that are needed to protect unique wetland functions (see 2-4.b.(2)), and that must be located in the siting criteria in 1-3 should be identified and evaluated by a wildlife damage management biologist before implementing the mitigation. A wildlife damage management plan should be developed to reduce the wildlife hazards.

NOTE: AC 150/5000-3, *Address List for Regional Airports Division and Airports District/Field Offices*, provides information on the location of these offices.

2-5. DREDGE SPOIL CONTAINMENT AREAS. FAA recommends against locating dredge spoil containment areas within the separations identified in the siting criteria in 1-3, if the spoil contains material that would attract hazardous wildlife.

1Y-09-97 FRI 02:13 PM AIRPORTS FAX NO. 202 267 5383 P. 05

SECTION 3. LAND USES THAT MAY BE COMPATIBLE WITH SAFE AIRPORT OPERATIONS.

3-1. GENERAL. Even though they may, under certain circumstances, attract hazardous wildlife, the land use practices discussed in this section have flexibility regarding their location or operation and may even be under the airport operator's or sponsor's control. In general, the FAA does not consider the activities discussed below as hazardous to aviation if there is no apparent attraction to hazardous wildlife, or wildlife hazard mitigation techniques are implemented to deal effectively with any wildlife hazard that may arise.

3-2. ENCLOSED WASTE FACILITIES. Enclosed trash transfer stations or enclosed waste handling facilities that receive garbage indoors; process it via compaction, incineration, or similar manner; and remove all residue by enclosed vehicles, generally would be compatible, from a wildlife perspective, with safe airport operations, provided they are not located on airport property or within the runway protection zone (RPZ). No putrescible-waste should be handled or stored outside at any time, for any reason, or in a partially enclosed structure accessible to hazardous wildlife.

Partially enclosed operations that accept putrescible-waste are considered to be incompatible with safe airport operations. FAA recommends these operations occur outside the separations identified in the siting criteria in 1-3.

3-3. RECYCLING CENTERS. Recycling centers that accept previously sorted, non-food items such as glass, newspaper, cardboard, or aluminum are, in most cases, not attractive to hazardous wildlife.

3-4. COMPOSTING OPERATIONS ON AIRPORTS. FAA recommends against locating composting operations on airports. However, when they are located on an airport, composting operations should not be located closer than the greater of the following distances: 1,200 feet from any aircraft movement area, loading ramp, or aircraft parking space; or the distance called for by airport design requirements. This spacing is intended to prevent material, personnel, or equipment from penetrating any Obstacle Free Area (OFA), Obstacle Free Zone (OFZ), Threshold Siting Surface (TSS), or Clearway (see AC 150/5300-13, *Airport Design*). On-airport disposal of compost by-products is not recommended for the reasons stated in 2-3.d.

a. Composition of material handled. Components of the compost should never include any municipal solid waste. Non-food waste such as leaves, lawn clippings, branches, and twigs generally are not considered a wildlife attractant. Sewage sludge, wood-chips, and similar material are not municipal solid wastes and may be used as compost bulking agents.

b. Monitoring on-airport composting operations. If composting operations are to be located on airport property, FAA recommends that the airport operator monitor composting operations to ensure that steam or thermal rise does not affect air traffic in any way. Discarded leaf disposal bags or other debris must not be allowed to blow onto any active airport area. Also, the airport operator should reserve the right to stop any operation that creates unsafe, undesirable, or incompatible conditions at the airport.

3-5. ASH DISPOSAL. Fly ash from resource recovery facilities that are fired by municipal solid waste, coal, or wood, is generally considered not to be a wildlife attractant because it contains no putrescible matter. FAA generally does not consider landfills accepting only fly ash to be wildlife attractants, if those landfills: are maintained in an orderly manner; admit no putrescible-waste of any kind; and are not co-located with other disposal operations.

Since varying degrees of waste consumption are associated with general incineration, FAA classifies the ash from general incinerators as a regular waste disposal by-product and, therefore, a hazardous wildlife attractant.

3-6. CONSTRUCTION AND DEMOLITION (C&D) DEBRIS LANDFILLS. C&D debris (Class IV) landfills have visual and operational characteristics similar to putrescible-waste disposal sites. When co-located with putrescible-waste disposal operations, the probability of hazardous wildlife attraction to C&D landfills increases because of the similarities between these disposal activities.

FAA generally does not consider C&D landfills to be hazardous wildlife attractants, if those landfills: are maintained in an orderly manner; admit no putrescible-waste of any kind; and are not co-located with other disposal operations.

MAY-09-97 FRI 02:14 PM AIRPORTS FAX NO. 202 267 5383 P. 06

3-7. WATER DETENTION OR RETENTION PONDS. The movement of storm water away from runways, taxiways, and aprons is a normal function on most airports and is necessary for safe aircraft operations. Detention ponds hold storm water for short periods, while retention ponds hold water indefinitely. Both types of ponds control runoff, protect water quality, and can attract hazardous wildlife. Retention ponds are more attractive to hazardous wildlife than detention ponds because they provide a more reliable water source.

To facilitate hazardous wildlife control, FAA recommends using steep-sided, narrow, linearly-shaped, rip-rap lined, water detention basins rather than retention basins. When possible, these ponds should be placed away from aircraft movement areas to minimize aircraft-wildlife interactions. All vegetation in or around detention or retention basins that provide food or cover for hazardous wildlife should be eliminated.

If soil conditions and other requirements allow, FAA encourages the use of underground storm water infiltration systems, such as French drains or buried rock fields, because they are less attractive to wildlife.

3-8. LANDSCAPING. Wildlife attraction to landscaping may vary by geographic location. FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements. All landscaping plans should be reviewed by a wildlife damage management biologist. Landscaped areas should be monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be implemented immediately.

3-9. GOLF COURSES. Golf courses may be beneficial to airports because they provide open space that can be used for noise mitigation or by aircraft during an emergency. On-airport golf courses may also be a concurrent use that provides income to the airport.

Because of operational and monetary benefits, golf courses are often deemed compatible land uses on or near airports. However, waterfowl (especially Canada geese) and some species of gulls are attracted to the large, grassy areas and open water found on most golf courses. Because waterfowl and gulls occur throughout the U.S., FAA recommends that airport operators exercise caution and consult with a wildlife damage management biologist when considering proposals for golf course construction or expansion on or near airports. Golf courses should be monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be implemented immediately.

3-10. AGRICULTURAL CROPS. As noted above, airport operators often promote revenue-generating activities to supplement an airport's financial viability. A common concurrent use is agricultural crop production. Such use may create potential hazards to aircraft by attracting wildlife. Any proposed on-airport agricultural operations should be reviewed by a wildlife damage management biologist. FAA generally does not object to agricultural crop production on airports when: wildlife hazards are not predicted; the guidelines for the airport areas specified in 3-10.a-f. are observed; and the agricultural operation is closely monitored by the airport operator or sponsor to ensure that hazardous wildlife are not attracted.

NOTE: If wildlife becomes a problem due to on-airport agricultural operations, FAA recommends undertaking the remedial actions described in 3-10.f.

a. Agricultural activities adjacent to runways. To ensure safe, efficient aircraft operations, FAA recommends that no agricultural activities be conducted in the Runway Safety Area (RSA), OFA, and the OFZ (see AC 150/5300-13).

b. Agricultural activities in areas requiring minimum object clearances. Restricting agricultural operations to areas outside the RSA, OFA, OFZ, and Runway Visibility Zone (RVZ) (see AC 150/5300-13) will normally provide the minimum object clearances required by FAA's airport design standards. FAA recommends that farming operations not be permitted within areas critical to the proper operation of localizers, glide slope indicators, or other visual or electronic navigational aids. Determinations of minimal areas that must be kept free of farming operations should be made on a case-by-case basis. If navigational aids are present, farm leases for on-airport agricultural activities should be coordinated with FAA's Airway Facilities Division, in accordance with FAA Order 6750.16, *Siting Criteria for Instrument Landing Systems*.

NOTE: Crop restriction lines conforming to the dimensions set forth in Table 2 will normally provide the minimum object clearance required by

AY-09-97 FRI 02:15 PM AIRPORTS FAX NO. 202 267 5383 P. 07

FAA airport design standards. The presence of navigational aids may require expansion of the restricted area.

c. Agricultural activities within an airport's approach areas. The RSA, OFA, and OFZ all extend beyond the runway shoulder and into the approach area by varying distances. The OFA normally extends the farthest and is usually the controlling surface. However, for some runways, the TSS (see AC 150/5300-13, Appendix 2) may be more controlling than the OFA. The TSS may not be penetrated by any object. The minimum distances shown in Table 2 are intended to prevent penetration of the OFA, OFZ, or TSS by crops or farm machinery.

NOTE: Threshold Siting standards should not be confused with the approach areas described in Title 14, Code of Federal Regulations, Part 77, (14 CFR 77), *Objects Affecting Navigable Airspace.*

d. Agricultural activities between intersecting runways. FAA recommends that no agricultural activities be permitted within the RVZ. If the terrain is sufficiently below the runway elevation, some types of crops and equipment may be acceptable. Specific determinations of what is permissible in this area requires topographical data. For example, if the terrain within the RVZ is level with the runway ends, farm machinery or crops may interfere with a pilot's line-of-sight in the RVZ.

e. Agricultural activities in areas adjacent to taxiways and aprons. Farming activities should not be permitted within a taxiway's OFA. The outer portions of aprons are frequently used as a taxilane and farming operations should not be permitted within the OFA. Farming operations should not be permitted between runways and parallel taxiways.

f. Remedial actions for problematic agricultural activities. If a problem with hazardous wildlife develops, FAA recommends that a professional wildlife damage management biologist be contacted and an on-site inspection be conducted. The biologist should be requested to determine the source of the hazardous wildlife attraction and suggest remedial action. Regardless of the source of the attraction, prompt remedial actions to protect aviation safety are recommended. The remedial actions may range from choosing another crop or farming technique to complete termination of the agricultural operation.

Whenever on-airport agricultural operations are stopped due to wildlife hazards or annual harvest, FAA recommends plowing under all crop residue and harrowing the surface area smooth. This will reduce or eliminate the area's attractiveness to foraging wildlife. FAA recommends that this requirement be written into all on-airport farm use contracts and clearly understood by the lessee.

MAY-09-97 FRI 02:16 PM AIRPORTS FAX NO. 202 267 5383 P. 08

Table 2. Minimum Distances Between Certain Airport Features And Any On-Airport Agriculture Crops.

Aircraft Approach Category And Design Group [1]	Distance In Feet From Runway Centerline To Crop		Distance In Feet From Runway End To Crop		Distance In Feet From Centerline Of Taxiway To Crop	Distance In Feet From Edge Of Apron To Crop
	Visual & ≥ ¾ mile	< ¾ mile	Visual & ≥ ¾ mile	< ¾ mile		
Category A & B Aircraft						
Group I	200 [2]	400	300 [3]	600	45	40
Group II	250	400	400 [3]	600	66	58
Group III	400	400	600	800	93	81
Group IV	400	400	1,000	1,000	130	113
Category C, D & E Aircraft						
Group I	530 [3]	575 [3]	1,000	1,000	45	40
Group II	530 [3]	575 [3]	1,000	1,000	66	58
Group III	530 [3]	575 [3]	1,000	1,000	93	81
Group IV	530 [3]	575 [3]	1,000	1,000	130	113
Group V	530 [3]	575 [3]	1,000	1,000	160	138
Group VI	530 [3]	575 [3]	1,000	1,000	193	167

1. Design Groups are based on wing span, and Category depends on approach speed of the aircraft.

Group I: Wing span up to 49 ft.	Category A:	Speed less than 91 knots
Group II Wing span 49ft. up to 78 ft.	Category B	Speed 91 knots up to 120 knots
Group III: Wing span 79 ft. up to 117 ft.	Category C	Speed 121 knots up to 140 knots
Group IV: Wing span 118 ft. up to 170 ft.	Category D	Speed 141 knots up to 165 knots
Group V: Wing span 171 ft. up to 213 ft.	Category E	Speed 166 knots or more
Group VI: Wing span 214 ft. up to 261 ft.		

2. If the runway will only serve small airplanes (12,500 lb. And under) in Design Group I, this dimension may be reduced to 125 feet; however, this dimension should be increased where necessary to accommodate visual navigational aids that may be installed. For example farming operations should not be allowed within 25 feet of a Precision Approach Path Indicator (PAPI) light box.

3. These dimensions reflect the TSS as defined in AC 150/5300-13, Appendix 2. The TSS cannot be penetrated by any object. Under these conditions, the TSS is more restrictive than the OFA, and the dimensions shown here are to prevent penetration of the TSS by crops and farm machinery.

SECTION 4. NOTIFICATION OF FAA ABOUT HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AN AIRPORT.

4-1. GENERAL. Airport operators, land developers, and owners should notify the FAA in writing of known or reasonably foreseeable land use practices on or near airports that either attract or may attract hazardous wildlife. This section discusses those notification procedures.

4-2. NOTIFICATION REQUIREMENTS FOR WASTE DISPOSAL SITE OPERATIONS. The Environmental Protection Agency (EPA) requires any operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal (40 CFR 258, *Criteria for Municipal Solid Waste Landfills*, section 258.10, *Airport Safety*). The EPA also requires owners or operators of new municipal solid waste landfill (MSWLF) units, or lateral expansions of existing MSWLF units that are located within 10,000 feet of any airport runway end used by turbojet aircraft or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft.

a. **Timing of Notification.** When new or expanded MSWLFs are being proposed near airports, MSWLF operators should notify the airport operator and the FAA of this as early as possible pursuant to 40 CFR Part 258. Airport operators should encourage the MSWLF operators to provide notification as early as possible.

NOTE: AC 150/5000-3 provides information on these FAA offices.

b. **Putrescible-Waste Facilities.** In their effort to satisfy the EPA requirement, some putrescible-waste facility proponents may offer to undertake experimental measures to demonstrate that their proposed facility will not be a hazard to aircraft. To date, the ability to sustain a reduction in the numbers of hazardous wildlife to levels that existed before a putrescible-waste landfill began operating has not been successfully demonstrated. For this reason, demonstrations of experimental wildlife control measures should not be conducted in active aircraft operations areas.

c. **Other Waste Facilities.** To claim successfully that a waste handling facility sited within the separations identified in the siting criteria in 1-3 does not attract hazardous wildlife and does not threaten aviation, the developer must establish convincingly that the facility will not handle putrescible material other than that as outlined in 3-2. FAA requests that waste site developers provide a copy of an official permit request verifying that the facility will not handle putrescible material other than that as outlined in 3-2. FAA will use this information to determine if the facility will be a hazard to aviation.

4-3. NOTIFYING FAA ABOUT OTHER WILDLIFE ATTRACTANTS. While U. S. EPA regulations require landfill owners to provide notification, no similar regulations require notifying FAA about changes in other land use practices that can create hazardous wildlife attractants. Although it is not required by regulation, FAA requests those proposing land use changes such as those discussed in 2-3, 2-4, and 2-5 to provide similar notice to the FAA as early in the development process as possible. Airport operators that become aware of such proposed development in the vicinity of their airports should also notify the FAA. The notification process gives the FAA an opportunity to evaluate the effect of a particular land use change on aviation safety.

The land use operator or project proponent may use FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, or other suitable documents to notify the appropriate FAA Regional Airports Division Office.

It is helpful if the notification includes a 15-minute quadrangle map of the area identifying the location of the proposed activity. The land use operator or project proponent should also forward specific details of the proposed land use change or operational change or expansion. In the case of solid waste landfills, the information should include the type of waste to be handled, how the waste will be processed, and final disposal methods.

4-5. FAA REVIEW OF PROPOSED LAND USE CHANGES.

a. The FAA discourages the development of facilities discussed in section 2 that will be located within the 5,000/10,000-foot criteria in 1-3.

14Y-09-97 FRI 02:17 PM AIRPORTS FAX NO. 202 267 5383 P.10

b. For projects which are located outside the 5,000/10,000-foot criteria, but within 5 statute miles of the airport's aircraft movement areas, loading ramps, or aircraft parking areas, FAA may review development plans, proposed land use changes, operational changes, or wetland mitigation plans to determine if such changes present potential wildlife hazards to aircraft operations. Sensitive airport areas will be identified as those that lie under or next to approach or departure airspace. This brief examination should be sufficient to determine if further investigation is warranted.

c. Where further study has been conducted by a wildlife damage management biologist to evaluate a site's compatibility with airport operations, the FAA will use the study results to make its determination.

d. FAA will discourage the development of any excepted sites (see Section 3) within the criteria specified in 1-3 if a study shows that the area supports hazardous wildlife species.

4-6. AIRPORT OPERATORS. Airport operators should be aware of proposed land use changes, or modification of existing land uses, that could create hazardous wildlife attractants within the separations identified in the siting criteria in 1-3. Particular attention should be given to proposed land uses involving creation or expansion of waste water treatment facilities, development of wetland mitigation sites, or development or expansion of dredge spoil containment areas.

a. AIP-funded airports. FAA recommends that operators of AIP-funded airports, to the extent practicable, oppose off-airport land use changes or practices (within the separations identified in the siting criteria in 1-3) that may attract hazardous wildlife. Failure to do so could place the airport operator or sponsor in noncompliance with applicable grant assurances. FAA recommends against the placement of airport development projects pertaining to aircraft movement in the vicinity of hazardous wildlife attractants. Airport operators, sponsors, and planners should identify wildlife attractants and any associated wildlife hazards during any planning process for new airport development projects.

b. Additional coordination. If, after the initial review by FAA, questions remain about the existence of a wildlife hazard near an airport, the airport operator or sponsor should consult a wildlife damage management biologist. Such questions may be triggered by a history of wildlife strikes at the airport or the proximity of the airport to a wildlife refuge, body of water, or similar feature known to attract wildlife.

c. Specialized assistance. If the services of a wildlife damage management biologist are required, FAA recommends that land use developers or the airport operator contact the appropriate state director of the United States Department of Agriculture/Animal Damage Control (USDA/ADC), or a consultant specializing in wildlife damage management. Telephone numbers for the respective USDA/ADC state offices may be obtained by contacting USDA/ADC's Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD, 20737-1234, Telephone (301) 734-7921, Fax (301) 734-5157. The ADC biologist or consultant should be requested to identify and quantify wildlife common to the area and evaluate the potential wildlife hazards.

d. Notifying airmen. If an existing land use practice creates a wildlife hazard, and the land use practice or wildlife hazard cannot be immediately eliminated, the airport operator should issue a Notice to Airmen (NOTAM) and encourage the land owner or manager to take steps to control the wildlife hazard and minimize further attraction.

4Y-09-97 FRI 02:18 PM AIRPORTS FAX NO. 202 267 5383 P. 11

APPENDIX 1. DEFINITIONS OF TERMS USED IN THIS ADVISORY CIRCULAR

1. GENERAL. This appendix provides definitions of terms used throughout this AC.

a. Aircraft movement area. The runways, taxiways, and other areas of an airport which are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft exclusive of loading ramps and aircraft parking areas.

b. Airport operator. The operator (private or public) or sponsor of a public use airport.

c. Approach or departure airspace. The airspace, within 5 statute miles of an airport, through which aircraft move during landing or takeoff.

d. Concurrent use. Aeronautical property used for compatible non-aviation purposes while at the same time serving the primary purpose for which it was acquired; and the use is clearly beneficial to the airport. The concurrent use should generate revenue to be used for airport purposes (see Order 5190.6A, *Airport Compliance Requirements*, sect. 5h).

e. Fly ash. The fine, sand-like residue resulting from the complete incineration of an organic fuel source. Fly ash typically results from the combustion of coal or waste used to operate a power generating plant.

f. Hazardous wildlife. Wildlife species that are commonly associated with wildlife-aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a wildlife-aircraft strike hazard.

g. Piston-use airport. Any airport that would primarily serve FIXED-WING, piston-powered aircraft. Incidental use of the airport by turbine-powered, FIXED-WING aircraft would not affect this designation. However, such aircraft should not be based at the airport.

h. Public-use airport. Any publicly owned airport or a privately-owned airport used or intended to be used for public purposes.

i. Putrescible material. Rotting organic material.

j. Putrescible-waste disposal operation. Landfills, garbage dumps, underwater waste discharges, or similar facilities where activities include processing, burying, storing, or otherwise disposing of putrescible material, trash, and refuse.

k. Runway protection zone (RPZ). An area off the runway end to enhance the protection of people and property on the ground (see AC 150/5300-13). The dimensions of this zone vary with the design aircraft, type of operation, and visibility minimum.

l. Sewage sludge. The de-watered effluent resulting from secondary or tertiary treatment of municipal sewage and/or industrial wastes, including sewage sludge as referenced in U.S. EPA's *Effluent Guidelines and Standards*, 40 C.F.R. Part 401.

m. Shoulder. An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface, support for aircraft running off the pavement, enhanced drainage, and blast protection (see AC 150/5300-13).

n. Turbine-powered aircraft. Aircraft powered by turbine engines including turbojets and turboprops but excluding turbo-shaft rotary-wing aircraft.

o. Turbine-use airport. Any airport that ROUTINELY serves FIXED-WING turbine-powered aircraft.

p. Wastewater treatment facility. Any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes, including Publicly Owned Treatment Works (POTW), as defined by Section 212 of the Federal Water Pollution Control Act (P.L. 92-500) as amended by the Clean Water Act of 1977 (P.L. 95-576) and the Water Quality Act of 1987 (P.L. 100-4). This definition includes any pretreatment involving the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. (See 40 C.F.R. Section 403.3 (o), (p), & (q)).

MAY-09-97 FRI 02:18 PM AIRPORTS FAX NO. 202 267 5383 P. 12

q. Wildlife. Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring there of (50 CFR 10.12. - *Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants*). As used in this AC, WILDLIFE includes feral animals and domestic animals while out of the control of their owners (14 CFR 139.3, *Certification and Operations: Land Airports Serving CAB-Certificated Scheduled Air Carriers Operating Large Aircraft (Other Than Helicopters)*).

r. Wildlife attractants. Any human-made structure, land use practice, or human-made or natural geographic feature, that can attract or sustain hazardous wildlife within the landing or departure airspace, aircraft movement area, loading ramps, or aircraft parking areas of an airport. These attractants can include but are not limited to architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquacultural activities, surface mining, or wetlands.

s. Wildlife hazard. A potential for a damaging aircraft collision with wildlife on or near an airport (14 CFR 139.3).

2. RESERVED.

4Y-09-97 FRI 02:19 PM AIRPORTS FAX NO. 202 267 5383 P. 13

Appendix F

The Natomas Basin Conservancy By-Laws.

AMENDED AND RESTATED

BYLAWS

OF

THE NATOMAS BASIN CONSERVANCY,

A California Non-Profit
Public Benefit Corporation

TABLE OF CONTENTS

Page

ARTICLE I NAME 1

ARTICLE II OFFICES 1

Section 1. Principal Office 1
Section 2. Other Offices 1

ARTICLE III PURPOSES 1

ARTICLE IV MEMBERS 2

ARTICLE V BOARD OF DIRECTORS 2

Section 1. Powers 2
A. General Corporation Powers 2
B. Specific Powers 2

Section 2. Number and Qualifications of Directors 2
A. Number 2
B. Qualifications 3
C. Director as Interested Person 3

Section 3. Term of Office 3
A. City of Sacramento Appointees 3
B. County of Sacramento Appointees 3
C. County of Sutter Appointees 3
D. Natomas Mutual Water Company Appointee 4
E. Reclamation District 1000 Appointee 4

Section 4. Designation of Directors 4
A. Designation by City of Sacramento 4
B. Designation by County of Sacramento 4
C. Designation by County of Sutter 4
D. Designation by Natomas Mutual Water Company 5
E. Designation by Reclamation District 1000 5

Section 5. Vacancies 5

Section 6. Meetings of the Board of Directors 5
A. Place of Meetings 5
B. Annual Meeting 6
C. Regular Meetings 6
D. Special Meetings 6
E. Action by Teleconference 7
F. Posting Agendas/Notices 7
G. Right of Public to Appear and Speak 7
H. Nonagenda Items 7
I. Quorum 8

Page

J. Manner of Voting 8
K. Adjournment 8
L. Brown Act Requirements 8

Section 7. Resignation 9

Section 8. Removal 9

Section 9. Compensation; Expense Reimbursement 9

Section 10. Conflict of Interest 9

Section 11. Inspection by Directors 10

ARTICLE VI COMMITTEES 10

Section 1. Executive Committee 10

Section 2. Special Committee 10

Section 3. Proscribed Committee Actions 10

Section 4. Committee Members 11

Section 5. Meetings and Actions of Committees 11

Section 6. Term of Office of Committee Members 11

Section 7. Technical Advisory Council 11

ARTICLE VII OFFICERS 12

Section 1. Officers of the Corporation 12

Section 2. Election 12

Section 3. Subordinate Officers 12

Section 4. Removal 12

Section 5. Resignation 12

Section 6. Vacancies 13

Section 7. Responsibilities of Officers 13
A. Chair of the Board 13
B. President 13
C. Vice President 13
D. Secretary 13
E. Chief Financial Officer 13
F. Assistant Secretary 13
G. Executive Director 14
H. Compensation 14

ARTICLE VIII INDEMNIFICATION 14

Section 1. Right of Indemnification 14

Section 2. Advancement of Expenses 16

Section 3. Insurance 16

Page

ARTICLE IX AMENDMENT OF BYLAWS 16

ARTICLE X RECORDS AND REPORTS 16

Section 1. Books and Records 16
Section 2. Form of Records 16
Section 3. Annual Report 17
Section 4. Statement of Transactions and Indemnifications 17
Section 5. California Public Records Act Requirements 18

CERTIFICATE OF SECRETARY 19

AMENDED AND RESTATED BYLAWS OF THE NATOMAS BASIN CONSERVANCY, A CALIFORNIA NON-PROFIT PUBLIC BENEFIT CORPORATION

ARTICLE I

NAME

The name of this corporation is The Natomas Basin Conservancy, a California Non-Profit Public Benefit Corporation.

ARTICLE II

OFFICES

Section 1. Principal Office.

The principal office for the transaction of the activities and the affairs of the corporation shall be located in the County of Sacramento, California. The Board of Directors may change the principal office from one location to another, provided such location is within either the County of Sacramento or County of Sutter, State of California. Any change of location of the principal office shall be noted by the Secretary of the corporation on these Bylaws opposite this section or this section may be amended to state the new location.

Section 2. Other Offices.

The corporation may establish such other offices as the Board of Directors deems necessary from time to time on a geographical or functional basis.

ARTICLE III

PURPOSES

This corporation is formed for public, scientific and educational purposes, including but not limited to, the study, preservation, protection or enhancement of land in its natural, scenic, historical, agricultural, or open space condition or use in order to preserve habitat values necessary for the plants and wildlife which inhabit such lands; the preservation, study and enhancement of habitat values on such lands used by candidate, threatened and endangered species listed under the Federal Endangered Species Act and the California Endangered Species Act, species of "Special Concern" as denominated by the California Department of Fish and Game ("CDFG"), and other species of plant and wildlife; to acquire by fee title or by conservation easement lands pursuant to the Natomas Basin Habitat Conservation Plan, to preserve, enhance and/or restore the habitat values of such lands, to manage such lands and make productive use thereof as allowed by the Natomas Basin Habitat Conservation Plan; and any other lawful purpose allowed for a corporation organized pursuant to the California Nonprofit Public Benefit Corporation Law.

ARTICLE IV

MEMBERS

This corporation shall have no members. Any action which would otherwise require a vote of members shall require only a vote of the Board of Directors. Except as otherwise provided herein, all rights which would otherwise vest in members shall vest in the Board of Directors.

ARTICLE V

BOARD OF DIRECTORS

Section 1. Powers.

A. General Corporation Powers. Subject to the provisions and limitations of the Articles of Incorporation, other sections of these Bylaws, the California Nonprofit Public Benefit Corporation Law, and any other applicable law, all corporate powers of the corporation shall be exercised by or under the authority of, and the business and affairs of the corporation shall be controlled by, the Board of Directors.

B. Specific Powers. Without prejudice to the general powers set forth in Section 1 of Article V of these Bylaws, but subject to the same limitations, the Directors shall have the authority to:

(1) Select and remove, at the pleasure of the Board of Directors, officers, agents, and employees of the corporation; prescribe such powers and duties for them as may be consistent with the law, the Articles of Incorporation, and these Bylaws; and fix their compensation and require from them security for faithful performance of their duties.

(2) Conduct, manage, and control the affairs and business of the corporation, and to make rules and regulations consistent with the law, the Articles of Incorporation, and these Bylaws.

(3) Borrow money and incur indebtedness on behalf of the corporation, and cause to be executed and delivered for the corporation's purposes, in the corporate name, promissory notes, bonds, debentures, deeds of trust, mortgages, pledges, hypothecation, or evidence of debt and securities.

(4) Change the principal office from one location to another within Sacramento County or Sutter County, California.

Section 2. Number and Qualifications of Directors.

A. Number. The authorized number of Directors shall be a minimum of three (3) and a maximum of twelve (12). No reduction of the authorized number of Directors shall have the effect of removing any Director before that Director's term of office expires.

B. Qualifications. The Directors in every case shall be individuals who are willing to participate as members of the Board of Directors of the corporation. To avoid conflicts of interest, no Director shall be a current employee of the United States Fish and Wildlife Service ("USFWS"), the United States Department of the Interior, CDFG or the State of California's Resources Agency at the time of serving as a Director.

C. Director as Interested Person. Not more than twenty-five percent (25%) of the persons serving on the Board of Directors at any time may be interested persons. For the purpose of the foregoing, "interested person" means any person currently being compensated by the corporation for services rendered to it within the previous twelve (12) months, whether as a full-time or part-time employee, independent contractor or otherwise (excluding any reasonable compensation paid to a Director as a Director), or any brother, sister, ancestor, descendant, spouse, brother-in-law, sister-in-law, son-in-law, daughter-in-law, mother-in-law or father-in-law of any such person.

Section 3. Term of Office.

The members of the Board of Directors shall be designated in accordance with Section 4 below. Each Director, including a Director designated to fill a vacancy, shall hold office until expiration of the term for which designated and until a successor has been designated. Members of the Board of Directors shall serve staggered terms of one, two or three years as follows:

A. City of Sacramento Appointees. The three (3) Directors appointed by the City of Sacramento shall have one (1) Director who serves for an initial one (1)-year term, one (1) Director who serves for an initial two (2)-year term, and one (1) Director who serves for an initial three (3)-year term; provided, however, that if the City of Sacramento in accordance with Section 4.A, as amended, appoints five (5) Directors, then two (2) Directors shall serve for an initial one (1)-year term, two (2) Directors who serve for an initial two (2)-year term, and one (1) Director who serve for an initial three (3)-year term;

If, following the appointment of five (5) Directors, the number of Directors appointed by the City of Sacramento is reduced to three (3), as soon as practicable thereafter, the terms of office to which the next three (3) Directors are appointed may be shorter or longer than the Directors' predecessors so as to return to the one (1), two (2) and three (3)-year staggering of terms.

B. County of Sacramento Appointees. At such time as the County of Sacramento executes an Implementation Agreement with the USFWS and CDFG and receives a Federal Endangered Species Act of 1973 Section 10(1)(1)(B) Permit from USFWS and a Section 2081 Management Authorization (the "Permits"), the County may appoint one (1) Director who serves for an initial one (1)-year term, one (1) Director who serves for an initial two (2)-year term, and one (1) Director who serves for an initial three (3)-year term, except as provided for in Section 4, "Designation of Directors" below.

C. County of Sutter Appointees. At such time as the County of Sutter executes an Implementation Agreement with the USFWS and CDFG and receives the Permits, the County may appoint one (1) Director who serves for an initial one (1)-year term, one (1) Director who serves for an initial two (2)-year term, and one (1) Director

who serves for an initial three (3)-year term, except as provided for in Section 4, "Designation of Directors" below.

D. Natomas Central Mutual Water Company Appointee. At such time as the Natomas Central Mutual Water Company executes an Implementation Agreement with the USFWS and CDFG and receives the Permits, it may appoint one (1) Director who serves for a one (1)-year term.

E. Reclamation District 1000 Appointee. At such time as Reclamation District 1000 executes an Implementation Agreement with the USFWS and CDFG and receives the Permits, it may appoint one (1) Director who serves for a one (1)-year term.

If not otherwise designated by the appointing agency, selection of terms for the first Directors appointed by an agency shall be conducted by drawing lots at the first meeting attended by the Directors following their respective appointments. Except for the terms necessary to create the staggering of terms, members of the Board of Directors shall serve three (3)-year terms, except as otherwise provided for.

Section 4. Designation of Directors.

A. Designation by City of Sacramento. The Mayor of the City of Sacramento, with the concurrence of a majority of the City Council, shall be entitled to designate three (3) Directors when the City of Sacramento has received the Permits; provided, however, that the Mayor of the City of Sacramento may, with the concurrence of a majority of the City Council, designate five (5) Directors when the City of Sacramento has received the Permits, if at that time neither the County of Sacramento nor the County of Sutter has received a Permit. If five (5) Directors are appointed pursuant to this provision, and if both the County of Sacramento and the County of Sutter thereafter receives a Permit, the Sacramento City Council shall forthwith act to reduce the number of Directors to three (3), unless the Natomas Basin Habitat Conservation Plan and the Implementation Agreement have been previously amended to increase the number of Directors.

B. Designation by County of Sacramento. The Chair of the Board of Supervisors of the County of Sacramento, with the concurrence of a majority of the Board of Supervisors, shall be entitled to designate five (5) Directors when the County of Sacramento has received the Permits unless the City of Sacramento and Sutter County have both received Permits. If the City of Sacramento and Sutter County have received Permits, then Sacramento County may appoint three (3). If five (5) Directors are appointed pursuant to this provision, and if both the City of Sacramento and the County of Sutter thereafter receive Permits, the County of Sacramento shall forthwith act to reduce the number of Directors to three (3), unless the Natomas Basin Habitat Conservation Plan and the Implementation Agreement have been previously amended to increase the number of Directors.

C. Designation by County of Sutter. The Chair of the Board of Supervisors of the County of Sutter, with the concurrence of a majority of the Board of Supervisors, shall be entitled to designate five (5) Directors when the County of Sutter has received the Permits unless the City of Sacramento and Sacramento County have received Permits. If the City of Sacramento and Sacramento County have both received Permits, then Sutter County may appoint three (3). If five (5) Directors are appointed pursuant

to this provision, and if both the City of Sacramento and the County of Sacramento thereafter receive Permits, the County of Sutter shall forthwith act to reduce the number of Directors to three (3), unless the Natomas Basin Habitat Conservation Plan and the Implementation Agreement have been previously amended to increase the number of Directors.

D. Designation by Natomas Central Mutual Water Company. The Chair of the Board of Directors of Natomas Central Mutual Water Company, with the concurrence of a majority of the Board of Directors, shall be entitled to designate one (1) Director when it has received the Permits.

E. Designation by Reclamation District 1000. The Chair of the Board of Directors of Reclamation District 1000, with the concurrence of a majority of the Board of Directors, shall be entitled to designate one (1) Director when it has received the Permits.

All Directors shall possess the qualifications described in these Bylaws for Directors of the corporation.

Section 5. Vacancies.

Vacancies on the Board of Directors because of death, resignation, removal, disqualification or otherwise shall be filled by the entity or person empowered in Section 4 to designate the member for such seat on the Board. A successor Director so designated shall serve for the remainder of the term for which designated.

Section 6. Meetings of the Board of Directors.

A. Place of Meetings. Except as provided below, regular and special meetings of the Board of Directors shall be held at the principal office of the corporation, or at any other place within the County of Sacramento or County of Sutter that has been designated from time to time in writing by resolution of the Board of Directors or by written consent of all members of the Board. In the absence of any such designation, regular meetings shall be held at the principal office of the corporation. Meetings may be held outside the County of Sacramento or County of Sutter for any of the following:

(1) To comply with state or federal law or court order, or attend a judicial or administrative proceeding to which the corporation is a party.

(2) To inspect real or personal property which cannot be conveniently brought within the boundaries of the County of Sacramento or the County of Sutter, provided that the topic of the meeting is limited to items directly related to the real or personal property.

(3) To participate in meetings or discussions of multiagency significance that are outside the County of Sacramento or the County of Sutter. However, any meeting or discussion held pursuant to this subdivision shall take place within the jurisdiction

of one of the participating local agencies and be noticed by all participating agencies as provided for in this chapter.

(4) To meet in the closest meeting facility if the corporation has no meeting facility within the County of Sacramento or the County of Sutter, or at the principal office of the corporation if that office is located outside the County of Sacramento or the County of Sutter.

(5) To meet outside the County of Sacramento or the County of Sutter with elected or appointed officials of the United States or the State of California when a local meeting would be impractical, solely to discuss a legislative or regulatory issue affecting the corporation and over which the federal or state officials have jurisdiction.

(6) To meet outside the County of Sacramento or the County of Sutter if the meeting takes place in or nearby a facility owned by the agency, provided that the topic of the meeting is limited to items directly related to the facility.

(7) To visit the office of the corporation's legal counsel for a closed session on pending litigation held pursuant to Government Code ("Code") Section 54956.9, when to do so would reduce legal fees or costs.

B. Annual Meeting. The annual meeting of the Board of Directors shall be for the purposes of orientation and organization of the Board and the transaction of other business. The annual meeting of the Board of Directors shall be held no later than March 31 of each year at a place within the County of Sacramento or the County of Sutter as the Board of Directors may designate. Such meetings shall be held with notice as provided herein.

C. Regular Meetings. The regular meetings of the Board of Directors shall be held with notice at such time and place within the County of Sacramento or County of Sutter as shall from time to time be fixed by the Board of Directors. In the event the date of a regular meeting shall fall on a legal holiday, the meeting shall be held on the next succeeding business day.

D. Special Meetings. A special meeting may be called at any time by the Chair or President or by a majority of the Board of Directors by written notice delivered personally or by any other means to each member of the Board and received at least twenty-four (24) hours before the time of the meeting as specified in the notice. The call and notice shall specify the time and place of the special meeting and the business to be transacted or discussed and shall be posted as set forth in Section F below. No other business shall be considered at these meetings by the Board of Directors. The written notice may be dispensed with as to any member who at or prior to the time the meeting convenes files with the Secretary or clerk of the corporation a written waiver of notice. The waiver may be given by telegram. The written notice may also be dispensed with as to any member who is actually present at the meeting at the time it convenes.

E. Action by Teleconference. The Board of Directors may use teleconferencing in connection with any meeting or proceeding authorized by law. The teleconferenced meeting or proceeding shall comply with all requirements of this Section 7 and all otherwise applicable provisions of law relating to a specific type of meeting or proceeding.

Teleconferencing may be used for all purposes in connection with any meeting. All votes taken during a teleconferenced meeting shall be by roll call.

If the Board of Directors elects to use teleconferencing, it shall post agendas at all teleconference locations and conduct teleconference meetings in a manner that protects the statutory and constitutional rights of the parties or the public appearing before the Board. Each teleconference location shall be identified in the notice and agenda of the meeting or proceeding, and each teleconference location shall be accessible to the public. During the teleconference, at least a quorum of the members of the Board of Directors shall participate from locations within the County of Sacramento and the County of Sutter. The agenda shall provide an opportunity for members of the public to address the Board directly at each teleconference location.

For the purposes of this section, "teleconference" means a meeting of the Board of Directors, the members of which are in different locations, connected by electronic means, through either audio or video, or both. Nothing in this section shall prohibit the corporation from providing the public with additional teleconference locations.

F. Posting Agendas/Notices. The Secretary or his or her authorized representative shall post an agenda for each regular Board of Directors meeting or a notice for each special Board of Directors meeting containing a brief description of each item of business to be transacted or discussed at the meeting, together with the time and location of the meeting. Agendas/notices shall be posted at the corporation's principal office (at a location readily accessible to the public) at least seventy-two (72) hours in advance of each regular meeting and at least twenty-four (24) hours in advance of each special meeting. The Secretary shall maintain a record of such posting.

G. Right of Public to Appear and Speak. At every regular meeting, members of the public shall have an opportunity to address the Board of Directors on matters within the corporation's subject matter jurisdiction. Except for matters scheduled for formal public hearing, public input and comment on matters on the agenda, as well as public input and comment on matters not otherwise on the agenda, shall be made during the time set aside for public comment; provided, however, that the Board of Directors may direct that public input and comment on matters on the agenda be heard when the matter regularly comes up on the agenda.

The Chair or presiding officer may limit the total amount of time allocated for public discussion by particular issues and/or the time allocated for each individual speaker.

H. Nonagenda Items. Matters brought before the Board of Directors at a regular meeting which were not placed on the agenda of the meeting shall not be acted upon by the Board at that meeting unless action on such matters is permissible pursuant to the Brown Act (Code § 54950 et seq.). Those nonagenda items brought before the Board of Directors which the Board determines will require consideration

and action and where Board action at that meeting is not so authorized shall either be placed on the agenda for the next regular meeting or referred to staff, as directed by the Chair or the presiding officer.

I. Quorum. A majority of the members of the Board of Directors shall constitute a quorum for the purpose of conducting the corporation's business, exercising Board's powers, and for all other purposes, but a smaller number may adjourn from time to time until the quorum is obtained. Every official act of the Board of Directors shall be adopted by a majority vote. A "majority vote" shall mean a majority of all members present when a quorum is present. A meeting at which a quorum is initially present may continue to transact business, notwithstanding the withdrawal of enough Directors to leave less than a quorum, if any action taken is approved by at least a majority of the required quorum for such meeting.

J. Manner of Voting. The voting on formal resolutions, matters to any federal, state, county or city agency, and on such other matters as may be requested by a majority of the Board of Directors members, shall be by roll call, and the ayes, noes and members present not voting shall be entered upon the minutes of such meeting, except on the election of officers, which may be by ballot.

K. Adjournment. The Board of Directors may adjourn any regular, adjourned regular, special or adjourned special meeting to a time and place specified in the order of adjournment. Less than a quorum may so adjourn from time to time. If all members are absent from any regular or adjourned regular meeting, the secretary or clerk of the corporation may declare the meeting adjourned to a stated time and place and he or she shall cause a written notice of the adjournment to be given in the same manner as provided for special meetings, unless such notice is waived as provided for special meetings. A copy of the order or notice of adjournment shall be conspicuously posted on or near the door of the place where the regular, adjourned regular, special or adjourned special meeting was held within twenty-four (24) hours after the time of adjournment. When an order of adjournment of any meeting fails to state the hour at which the adjourned meeting is to be held, it shall be held at the hour specified for regular meetings or by resolution.

L. Brown Act Requirements. The provisions contained in this Section 6 are consistent with the provisions set forth in the Ralph M. Brown Act, Code Section 54950 et seq (the "Act"). In the event any provision contained herein is inconsistent with the Brown Act as it currently exists or as it may be subsequently amended, the provisions contained in the Act shall prevail, provided, however, that the provisions of the Act regarding the disclosure of information with respect to real property transactions (including but not limited to Gov. Code, §§ 54954.5(b); 54956.8 and 54957.1(a)(1)) whether such transactions are pending or completed, shall not apply. As used herein, "real property transactions" shall include options to purchase or lease, purchases, and leases of real property, as well as farming contracts affecting real property that NBC has acquired or is in negotiations to acquire. This exception to the Act shall only apply if the applicable habitat conservation plans (HCPs) and implementation agreements (IAs) have been amended to provide for this exception.

Section 7. Resignation.

Any Director may resign at any time by giving written notice of such resignation to the Chair of the Board, the President, the Secretary or the Board of Directors of the corporation and to the Mayor of the City of Sacramento if appointed by the Mayor, or the Clerk of the Board of Supervisors of the appointing county if appointed by the county. Such resignation shall take effect at the time specified in the notice; provided, however, that if the resignation is not to be effective upon receipt of the notice by the corporation, the corporation must accept the effective date specified. Except upon notice to the Attorney General, no Director may resign where the corporation would then be left without a duly elected Director or Directors in charge of its affairs. If the resignation is effective at a future time, a successor may be elected to take office when the resignation becomes effective.

Section 8. Removal.

A. The Board of Directors may declare vacant the office of a Director who has: (a) become subject to an entry by a court of competent jurisdiction that appoints a guardian or conservator for the Director or estate of the Director; (b) been convicted of a felony; or (c) been found by a final order or judgment of a court of competent jurisdiction to have breached any duty under California Corporations Code ("Corporations Code") Sections 5230 through 5239 or any successor provisions thereto.

B. Any or all Directors may be removed by the Board of Directors, with or without cause.

C. No reduction of the authorized number of Directors shall have the effect of removing any Director prior to the expiration of such Director's term of office.

Section 9. Compensation; Expense Reimbursement.

The corporation shall pay members of the Board of Directors a fee fixed by resolution of the Board for each meeting they attend. The fee shall be fixed from time to time by resolution of the Board. Directors shall receive no other compensation or expense reimbursement for attending meetings of the Board of Directors. The Board may, however, authorize reimbursement for such actual expenses paid while acting on behalf of the corporation as may be determined by the Board be just and reasonable.

Section 10. Conflict of Interest.

In accordance with the provisions of that certain Implementation Agreement for the Natomas Basin Habitat Conservation Plan, dated December 8, 1997, and entered into by and between the USFWS, CDFG, the City of Sacramento and the corporation as of December 31, 1997 ("Implementation Agreement"), Directors and employees of the corporation shall be subject to and shall comply with the provisions set forth in Code Section 1090 et seq.

In addition, in furtherance of the provisions of the Implementation Agreement, the corporation has voluntarily approved and adopted a Conflict of Interest Code ("Conflict Code") that is identical to the requirements and provisions set forth in the

Political Reform Act, Code Section 81000 et seq., and the regulations adopted by the Fair Political Practices Commission, Title 2, California Code of Regulations, Section 18730. A copy of the Conflict Code shall be maintained in the offices of the corporation, and shall be available for public inspection and reproduction in accordance with Article X, Section 5 of these Bylaws. All Directors and employees of the corporation shall be subject to and shall comply with the requirements and provisions set forth in the Conflict Code, including without limitation the disclosure and reporting requirements set forth in the Conflict Code.

Section 11. Inspection by Directors.

Every Director shall have the absolute right at any reasonable time to inspect the corporation's books, records, documents of every kind, physical properties, and the records of each of its subsidiaries, if any. The inspection may be made in person or by the Director's agent or attorney. The right of inspection includes the right to copy and make extracts of documents.

ARTICLE VI

COMMITTEES

Section 1. Executive Committee.

There may be an Executive Committee of the Board of Directors comprised of three (3) Directors appointed by a majority of the Directors then in office, which shall have all the authority of the Board, except with respect to those matters specified in Section 3 of this Article VI of these Bylaws. The Executive Committee of the Board shall consist of the Chair of the Board or if none and the President is a Director, the President and two (2) other Directors. The Chair of the Board (or President) shall serve as Chair of the Executive Committee and in his or her absence a Vice Chair shall be appointed to serve. Committee Chairs of other special committees created by the Board, if any, will report to the Executive Committee on a regular basis. Committee Chairs are nominated by the Chair (or President) and appointed by the Board. The Executive Director of the corporation shall serve as a nonvoting member of the Executive Committee.

Section 2. Special Committee.

The Board of Directors, by resolution adopted by a majority of the Directors then in office, provided a quorum is present, may create one (1) or more special committees, each consisting of two (2) or more Directors to serve at the pleasure of the Board. Any such special committee shall have such authority of the Board as provided in the Board resolution, except that no committee, regardless of Board resolution, may take any action proscribed by Section 3 of this Article VI of these Bylaws.

Section 3. Proscribed Committee Actions.

Regardless of any Board resolution, no committee of the Board, including the Executive Committee, shall have the authority to do any of the following:

(a) Fill vacancies on the Board or on any committee that has the authority of the Board;

(b) Fix compensation of the Directors for serving on the Board or on any committee;

(c) Amend or repeal Bylaws or adopt new Bylaws;

(d) Amend or repeal any resolution of the Board that by its express terms is not so amendable or repealable;

(e) Create any other committees of the Board or appoint the members of a committee of the Board; or

(f) Approve any contract or transaction to which the corporation is a party and in which one (1) or more of its Directors have a material financial interest, except as special approval is provided for in Corporations Code Section 5233(d)(3).

Section 4. Committee Members.

Appointments to special committees shall be by a majority vote of the Board of Directors then in office.

Section 5. Meetings and Actions of Committees.

Meetings and actions of committees of the Board shall be governed by, held and taken in accordance with the provisions of these Bylaws concerning meetings and Board actions, except that regular meetings of such committees and the calling of special meetings of such committees may be determined either by Board resolution or, if there is none, by resolution of the committee of the Board. Minutes of each meeting of any committee of the Board shall be kept and filed with the corporate records. The Board may adopt rules for the government of any committee, provided they are consistent with these Bylaws, or, in the absence of rules adopted by the Board, the committee may adopt such rules.

Section 6. Term of Office of Committee Members.

Each committee member shall serve at the pleasure of the Board of Directors but not to exceed such committee member's term as a Director.

Section 7. Technical Advisory Council.

The Board of Directors shall be counseled by a Technical Advisory Council which shall assist it in matters of policy and habitat management for the lands controlled by the corporation. The Technical Advisory Council shall have at least one (1) member appointed by the USFWS, at least one (1) member appointed by the Region II Manager of CDFG, and at least one (1) member appointed to represent the public interest by the Board of Directors. The Technical Advisory Council shall make recommendations and provide guidance to the Board of Directors on the following topics: acquisition of habitat mitigation lands, in fee and by way of conservation easements; pursuit of funding from state and federal grant programs; pursuit of grants from private foundations and other nongovernmental sources; the creation of policies to guide

habitat restoration and enhancement activities; administration of the Implementation Agreement for the Natomas Basin Habitat Conservation Plan; and management and income generating activities on lands owned or controlled by the corporation. Members of the Technical Advisory Council may be reimbursed in such amounts as may be determined from time to time by the Board of Directors to be just and reasonable for expenses paid while acting on behalf of the corporation.

ARTICLE VII

OFFICERS

Section 1. Officers of the Corporation.

The officers of this corporation shall be a President, a Vice President, a Secretary, and a Chief Financial Officer. The corporation may also have, at the discretion of the Board of Directors, a Chair of the Board, one (1) or more additional Vice Presidents, one (1) or more Assistant Secretaries, and such other officers as may be appointed in accordance with the provisions of Section 3. Any number of offices may be held by the same person; provided, however, that neither the Secretary nor the Chief Financial Officer may serve concurrently as the President or Chair of the Board.

Section 2. Election.

The Board of Directors shall elect officers of the corporation at the annual meeting. Officers shall serve at the pleasure of the Board, subject to the rights, if any, of any officer engaged under any contract of employment. The Board may appoint and may authorize the Chair of the Board, the President, or other officer, to appoint any other officers that the corporation may require. Each officer so appointed shall have the title, hold office for the period, have the authority, and perform the duties specified in these Bylaws or as determined by the Board. Officers need not be chosen from among the Directors.

Section 3. Subordinate Officers.

The Board of Directors may appoint such other officers as the business of the corporation may require, each of whom shall hold office for such period, have such authority and perform such duties as are required in these Bylaws or as the Board of Directors may from time to time determine.

Section 4. Removal.

Without prejudice to any rights of an officer under any contract of employment, any officer may be removed with or without cause by the Board, and, if the officer was not chosen by the Board, by any officer on whom the Board may confer the power of removal.

Section 5. Resignation.

Any officer may resign at any time by giving written notice to the corporation, subject to the rights, if any, of the corporation under any contract to which the officer is a party. Any such resignation shall take effect at the date of the receipt of such notice or

at any later time specified therein; and, unless otherwise specified therein, the acceptance of such resignation shall not be necessary to make it effective.

Section 6. Vacancies.

A vacancy in any office because of death, resignation, removal, disqualification or otherwise shall be filled in the manner prescribed in these Bylaws for regular appointments to that office.

Section 7. Responsibilities of Officers.

A. Chair of the Board. The Chair of the Board, if there shall be such an officer, shall, if present, preside at meetings of the Executive Committee and the Board of Directors, and exercise and perform such other powers and duties as, from time to time may be assigned to him or her by the Board of Directors or prescribed by the Bylaws.

B. President. The President shall have the general powers and duties usually vested in the office of president of a corporation and shall have such other powers and duties as may be prescribed by the Board or these Bylaws. In the absence of the Chair of the Board or if there is no Chair, the President shall preside at all meetings of the Board of Directors. Further, in the absence of the designation of a Chief Executive Officer of the corporation, the President shall be the Chief Executive Officer and shall, subject to the control of the Board of Directors, have general supervision, direction and control of the business and officers of the corporation.

C. Vice President. If the President is absent or disabled, the Vice President, if any, shall perform all duties of the President. When so acting, a Vice President shall have all of the powers of and be subject to all restrictions on the President. The Vice President shall have such other powers and perform such other duties as may be prescribed by the Board or these Bylaws.

D. Secretary. The Secretary shall keep a full and complete record of all meetings and actions of the Board and committees of the Board, and shall keep the seal of the corporation (if any) and affix the same to such papers and instruments as may be required in the regular course of business, shall make service of such notice as may be necessary or proper, and shall supervise the keeping of the corporate records of the corporation. The Secretary shall have such other powers and perform other duties as may be prescribed by the Board or these Bylaws.

E. Chief Financial Officer. The Chief Financial Officer shall receive and safely keep all funds of the corporation and deposit the same in such financial institution(s) as may be designated by the Board. Such funds shall be paid out only on the check of the corporation signed by such person or persons as may be designated by the Board as authorized to sign the same. The Chief Financial Officer shall have such other powers and perform other duties as may be prescribed by the Board or these Bylaws.

F. Assistant Secretary. The Assistant Secretary, if there shall be such an officer, shall have all the powers and perform all the duties of the Secretary in the absence or inability of the Secretary to act.

G. Executive Director. The Board shall select and appoint an individual to act as the Executive Director of the corporation. The Executive Director shall be responsible for implementing and administering the policies and decisions of the Board of Directors and managing the affairs of the corporation in harmony with the policies and goals of the Natomas Basin Habitat Conservation Plan. The Executive Director shall have such other powers and perform such other duties as may be prescribed by the Board.

H. Compensation. The compensation, if any, of the officers who are also employees of the corporation shall be fixed from time to time by the Board of Directors, and no officer shall be prevented from receiving such compensation because the officer is also a Director of the corporation.

ARTICLE VIII

INDEMNIFICATION

Section 1. Right of Indemnification.

A. For the purposes of this Section 1, "agent" means any person who is or was a Director, officer, employee or other agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another foreign or domestic corporation, partnership, joint venture, trust or other enterprise, or was a director, officer, employee or agent of a foreign or domestic corporation which was a predecessor corporation of the corporation or of another enterprise at the request of such predecessor corporation; "proceeding" means any threatened, pending or completed action or proceeding, whether civil, criminal, administrative or investigative; and "expenses" includes, without limitation, attorneys' fees and any expenses of establishing a right to indemnification under these Bylaws.

B. The corporation shall, to the fullest extent permitted by law, indemnify any person who was or is a party or is threatened to be made a party to any proceeding (other than an action by or in the right of the corporation to procure a judgment in its favor, an action brought under Corporations Code Section 5233, or an action brought by the Attorney General or a person granted relator status by the Attorney General for any breach of duty relating to assets held in charitable trust) by reason of the fact that such person is or was an agent of the corporation, against expenses, judgments, fines, settlements and other amounts actually and reasonably incurred in connection with such proceeding if such person acted in good faith and in a manner which such person reasonably believed to be in the best interests of the corporation and, in the case of a criminal proceeding, had no reasonable cause to believe the conduct of such person was unlawful. The termination of any proceeding by judgment, order, settlement, conviction or upon a plea of nolo contendere, or its equivalent, shall not, of itself, create a presumption that the person did not act in good faith and in a manner which the person reasonably believed to be in the best interests of the corporation or that the person had reasonable cause to believe that the person's conduct was unlawful.

C. The corporation shall have power to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action by or in the right of the corporation, or brought under Corporations Code Section 5233, or brought by the Attorney General or a person granted relator status by

the Attorney General for a breach of duty relating to assets held in charitable trust, to procure a judgment in its favor by the corporation, against expenses actually and reasonably incurred by such person in connection with the defense or settlement of such action if such person acted in good faith, in a manner such person believed to be in the best interests of the corporation and with such care, including reasonable inquiry, as an ordinarily prudent person in a like position would use under similar circumstances. No indemnification shall be made under this Section 1.C:

(1) In respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation in the performance of such person's duty to the corporation, unless and only to the extent that the court in which such proceeding is or was pending shall determine upon application that, in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for the expenses which such court shall determine;

(2) Of amounts paid in settling or otherwise disposing of a threatened or pending action, with or without court approval; or

(3) Of expenses incurred in defending a threatened or pending action which is settled or otherwise disposed of without court approval unless it is settled with the approval of the Attorney General.

D. To the extent that an agent of the corporation has been successful on the merits in defense of any proceeding referred to in Section 1.B or Section 1.C above, or in defense of any claim, issue or matter therein, the agent shall be indemnified against expenses actually and reasonably incurred by the agent in connection therewith.

E. Except as provided in Section 1.D above, any indemnification under this Section 1 shall be made by the corporation only if authorized in the specific case, upon a determination that indemnification of the agent is proper in the circumstances because the agent has met the applicable standard of conduct set forth in Section 1.B or Section 1.C, above, by:

(1) A majority vote of a quorum consisting of Directors who are not parties to such proceeding; or

(2) The court in which such proceeding is or was pending upon application made by the corporation or the agent or the attorney or other person rendering services in connection with the defense, whether or not such application by the agent, attorney or other person is opposed by the corporation.

F. No indemnification or advance shall be made under this Section 1, except as provided in Section 1.D or Section 1.E(2) above, in any circumstance where it appears that:

(1) It would be inconsistent with a provision of the Articles, the Bylaws or an agreement in effect at the time of the occurrence of the alleged cause of action asserted in the proceeding in which the

expenses were incurred or other amounts were paid, which prohibits or otherwise limits indemnification; or

(2) It would be inconsistent with any condition expressly imposed by a court in approving a settlement.

Section 2. Advancement of Expenses.

To the fullest extent permitted by law, and except as otherwise determined by the Board in a specific instance, expenses incurred by a person seeking indemnification under these Bylaws in defending any proceeding shall be advanced by the corporation before final disposition of the proceeding, on receipt by the corporation of an undertaking by or on behalf of that person that the advance will be repaid unless it is ultimately determined that the person is entitled to be indemnified by the corporation for those expenses.

Section 3. Insurance.

The corporation shall have the right to purchase and maintain insurance to the fullest extent permitted by law on behalf of its Directors, officers, employees, and other agents, against any liability asserted against or incurred by any Director, officer, employee, or agent in such capacity or arising out of the Director's, officer's, employee's, or agent's status as such; provided, however, that the corporation shall have no power to purchase and maintain such insurance to indemnify any agent of the corporation for a violation of Corporations Code Section 5233 (relating to self-dealing transactions).

ARTICLE IX

AMENDMENT OF BYLAWS

These Bylaws may be amended or repealed and new Bylaws adopted by the affirmative vote of the majority of the members of the Board of Directors at any Board meeting; except that a Bylaw fixing or changing the number of Directors may be adopted, amended or repealed only by the vote or written consent of the majority of the Directors of the corporation.

ARTICLE X

RECORDS AND REPORTS

Section 1. Books and Records.

The corporation shall keep adequate and correct books and records of account and written minutes of the proceedings of its Board of Directors and its committees. At its principal place of business, the corporation shall keep the original or a copy of its Articles of Incorporation and Bylaws, as amended to date.

Section 2. Form of Records.

Minutes shall be kept in written form. Other books and records shall be kept either in written form or in any other form capable of being converted into written

form. If any record subject to inspection pursuant to the Corporations Code is not maintained in written form, a request for inspection is not complied with unless and until the corporation, at its expense, makes such record available in written form.

Section 3. Annual Report.

The Board of Directors shall cause the corporation to prepare an annual report within one hundred twenty (120) days after the end of the corporation's fiscal year. Such annual report shall be sent to the City Manager of the City of Sacramento, the County Executive of the County of Sacramento, the County Executive of the County of Sutter, the Regional Director of USFWS, the Regional IX Manager of CDFG, the Executive Director of Reclamation District 1000, the President of the Natomas Mutual Water Company, the Executive Director of the Pleasant Grove Water District, the Executive Director of the Pleasant Grove Community Services District, and the Director of the Sacramento Area Flood Control Agency. In addition to any other matters which the Board of Directors may require to be included in the Annual Report, such report shall contain the following information, in appropriate detail, for the fiscal year:

(a) The assets and liabilities of the corporation as of the end of the fiscal year;

(b) The principal changes in assets and liabilities;

(c) The revenue or receipts of the corporation, both restricted and unrestricted;

(d) The amount of any charitable donations to the corporation;

(e) The expenses and disbursements of the corporation for both general and restricted purposes.

The annual report shall be accompanied by a report on it prepared by independent accountants or, if there is no such accountants' report, by the certificate of the President and Secretary of the corporation that the annual report was prepared without audit from the corporation's books and records.

This requirement of an annual report shall not apply if the corporation receives less than Twenty-Five Thousand Dollars ($25,000) in gross receipts during the fiscal year; provided, however, that the information specified above for inclusion in an annual report must be furnished annually to all Directors and to the other specified parties above.

Section 4. Statement of Transactions and Indemnifications.

As part of the annual report described above, the corporation shall annually prepare a statement of any transaction or indemnification of the following kind within one hundred twenty (120) days after the end of the corporation's fiscal year:

(a) Any transaction: (i) in which the corporation, or its subsidiary, if any, was a party; (ii) in which an "interested person" (as defined by Corporations Code Section 5227) had a direct or indirect material financial interest; and (iii) which involved more than Fifty Thousand Dollars ($50,000), or was

one of a series of transactions with the same interested person involving, in the aggregate, more than Fifty Thousand Dollars ($50,000), during the fiscal year.

(b) Any indemnifications or advances aggregating more than Ten Thousand Dollars ($10,000) paid during the fiscal year to any officer or Director of the corporation under these Bylaws.

Section 5. California Public Records Act Requirements.

Public records shall be open to inspection at all times during the office hours of the corporation for inspection by any person as required by the California Public Records Act (Code § 6250 et seq.). Any reasonably agreeable portion of a record shall be available for inspection by any person requesting the record after deletion of the portions that are exempted by law, provided, however, that any documents relating to real property transactions, either pending or completed, of NBC shall be exempt from disclosure. As used herein, "real property transactions" shall include options to purchase or lease, purchases and leases of real property, as well as farming contracts affecting real property that NBC has acquired or is negotiations to acquire. This exemption from disclosure shall only apply if the applicable HCPs and IAs have been amended to provide for this exception.

Except with respect to public records exempt from disclosure by express provisions of law, the corporation, upon a request for a copy of records that reasonably describes an identifiable record or records, shall make the records promptly available to any person, upon payment of fees covering direct costs of duplication, or a statutory fee, if applicable. Upon request, an exact copy shall be provided unless impracticable to do so. Computer data shall be provided in a form determined by the corporation.

"Public records" includes any writing containing information relating to the conduct of the public's business prepared, owned, used or retained by the corporation regardless of physical form or characteristics.

CERTIFICATE OF SECRETARY

I certify that I am the duly elected and acting Secretary of The Natomas Basin Conservancy, a California Non-Profit Public Benefit Corporation, that the above Amended and Restated Bylaws, consisting of twenty-one (21) pages, are the Bylaws of this corporation as adopted by the Board of Directors on May 3, ~~1999~~ 2000, and that they have not been amended or modified since that date.

Executed on November 8, 2000, at Sacramento, California.

SECRETARY

Appendix G

Pacific Region, USFWS and ACOE, Biological Opinion for 404 Permitted Projects with Relatively Small Effects to Vernal Pools, dated February 1996.

Outdated information has been corrected or deleted.
Programmatic consultation is suspended in San Joaquin Valley except where there are approved HCPs (habitat conservation plans).

U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

In Reply Refer To:
1-1-96-F-1

February 28, 1996

Mr. Art Champ
Regulatory Branch
Department of the Army
U.S. Army Engineer District, Sacramento
Corps of Engineers
Sacramento, CA 95814-2922

Subject: Programmatic Formal Endangered Species Act Consultation on Issuance of 404 Permits for Projects with Relatively Small Effects on Listed Vernal Pool Crustaceans Within the Jurisdiction of the Sacramento Field Office, California

Dear Mr. Champ:

This document serves as a programmatic formal consultation document pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act), on issuance of Clean Water Act section 404 permits for projects with limited environmental impacts on vernal pools within the jurisdiction of the Sacramento Field Office (SFO) of the U.S. Fish and Wildlife Service (Service). The issues addressed in this document are the effects of these projects on the endangered Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool tadpole shrimp (*Lepidurus packardi*), and/or the threatened vernal pool fairy shrimp (*Branchinecta lynchi*). These animals (species) were listed on September 19, 1994 (59 **FR** 48136). This consultation document has been prepared pursuant to 50 CFR 402 of our interagency regulations governing section 7 of the Act.

The purpose of this programmatic consultation document is to expedite consultations on proposed projects with relatively small impacts on listed species. Future projects that meet the conditions specified below, or that the SFO determines will have similar impacts, may be appended to this consultation document. Contributions from the State resources agencies, U.S. Army Corps of Engineers (Corps), and U.S. Environmental Protection Agency have aided the development of this consultation document. Continued assistance of these entities in implementing its provisions will facilitate the purpose of streamlining the consultation process.

This consultation document is based on information provided in biological assessments and biological data reports submitted to the SFO by the Corps. Information obtained during site visits and meetings between members of my staff, Corps personnel, applicants, and other Federal and State entities has also has been used. These meetings resulted in the development of appropriate mitigation measures that are outlined in the Description of the Proposed Action section below.

This document supersedes the Service's prior programmatic consultation document on vernal pool crustaceans dated April 4, 1995. The Service will reevaluate the effectiveness of this programmatic consultation at least every six (6) months to ensure that continued implementation will not result in unacceptable effects on the ecosystem upon which the listed species depend. This opinion may be modified during reevaluation to alleviate excessive effects on listed species or problems with the programmatic process.

BIOLOGICAL OPINION

Description of the Proposed Action

This consultation collectively covers projects with small effects on listed vernal pool crustaceans in the Sacramento Basin of California. For the purposes of this consultation, all applicants will have either surveyed habitat of these species (habitat) and confirmed the presence of listed species, or chosen to assume that all potential habitat contains listed species.

Habitat is considered to include any areas that seasonally pond water in which one or more of the listed vernal pool species could exist. Such areas include, but may not be restricted to, vernal pools and swales. Vernal pools and swales are ephemeral wetlands that typically form in shallow depressions underlain by a substrate near the surface that restricts the percolation of water. They are characterized by a barrier to overland flow that causes water to collect and pond. These depressions fill with rainwater and runoff from adjacent areas during the winter and may remain inundated until spring or early summer, sometimes filling and emptying more than once during the wet season. Vernal pools and swales are frequently clustered into assemblages known as vernal pool complexes. Individual pools within a vernal pool complex are mutually interdependent in supporting listed vernal pool species; when a species is extirpated from an individual pool, other pools in the complex may serve as recolonization sources. Upland habitat and swales around and within a vernal pool complex are essential to the hydrological and biological integrity of the complex.

All projects implemented under this programmatic consultation will meet the following conditions or will be determined by the Service to have impacts similar in nature:

1. Less than one acre of habitat will be affected, including habitat filled or otherwise destroyed (directly affected) and habitat indirectly affected by the proposed action.

Habitat indirectly affected includes all habitat supported by destroyed upland areas and swales, and all habitat otherwise damaged by loss of watershed, human intrusion, introduced species, and pollution caused by the project (see Effects of the Proposed Action below). Where the reach of these effects cannot be determined definitively, all habitat within 250 feet of proposed development may be considered to be indirectly affected. If any habitat within a vernal pool complex is destroyed, then all remaining habitat within the complex may potentially be indirectly affected. If any part of a vernal pool is destroyed, then the entire pool is directly affected.

2. Projects proposed in areas with known populations of the Conservancy fairy shrimp or longhorn fairy shrimp (in Butte, Tehama, Solano, Glenn, Merced, San Luis Obispo, and Contra Costa Counties) will not proceed until the Corps has initiated consultation and the Service has reviewed the proposed projects to ensure that impacts to these species are adequately mitigated.

3. Projects with listed or proposed plant species will undergo individual review, but, upon determination by the Service, may be included as part of this consultation.

Projects that are not consistent with these conditions may be appended to this biological opinion only as the Service deems appropriate. For example, a project that affects 5 acres of habitat, but has effects similar in scope and nature to those analyzed in this biological opinion, may be appended in the future. If the project is implemented in a manner consistent with the process described within this biological opinion, take resulting from implementation of the proposed project may be permitted.

The impacts of projects that will be authorized under this biological opinion on vernal pool species will be minimized as follows:

A. **Preservation component.** For every acre of habitat directly or indirectly affected, at least two vernal pool credits will be dedicated within a Service-approved ecosystem preservation bank, or, based on Service evaluation of site-specific conservation values, three acres of vernal pool habitat may be preserved on the project site or on another non-bank site as approved by the Service (Table 1).

B. **Creation component.** For every acre of habitat directly affected, at least one vernal pool creation credit will be dedicated within a Service-approved habitat mitigation bank, or, based on Service evaluation of site-specific conservation values, two acres of vernal pool habitat will be created and monitored on the project site or on another non-bank site as approved by the Service (Table 1).

Table 1. Mitigation ratios for credits dedicated in Service-approved mitigation banks or for acres of habitat outside of mitigation banks.

	bank	non-bank
preservation	2:1	3:1
creation	1:1	2:1

Mitigation ratios for non-bank mitigation may be adjusted to approach those for banks if the Service considers the conservation value of the non-bank mitigation area to approach that of Service-approved mitigation banks.

For non-natural habitat (habitat created *de novo* by human activity), habitat that is significantly altered and without restoration potential, and habitat indirectly affected by agricultural practices, mitigation may be adjusted. Certain agricultural practices have no adverse effect on vernal pool habitat and therefore may be entirely exempt from mitigation. In particular, low intensity grazing may approximately reproduce the natural conditions to which vernal pool crustaceans are adapted (i.e., prehistoric grazing by native herbivores). Consequently, such levels of grazing incur neither the creation nor the preservation component of mitigation.

C. Vernal pool habitat and associated upland habitat used as on-site mitigation will be protected from adverse impacts and managed in perpetuity or until the Corps, the applicant, and the Service agree on a process to exchange such areas for credits within a Service-approved mitigation banking system.

D. If habitat is avoided (preserved) on site, then a Service-approved biologist (monitor) will inspect any construction-related activities at the proposed project site to ensure that no unnecessary take of listed species or destruction of their habitat occurs. The biologist will have the authority to stop all activities that may result in such take or destruction until appropriate corrective measures have been completed. The biologist also will be required to report immediately any unauthorized impacts to the Service and the California Department of Fish and Game.

E. Adequate fencing will be placed and maintained around any avoided (preserved) vernal pool habitat to prevent impacts from vehicles.

F. All on-site construction personnel will receive instruction regarding the presence of listed species and the importance of avoiding impacts to these species and their habitat.

G. The applicant will ensure that activities that are inconsistent with the maintenance of the suitability of remaining habitat and associated on-site watershed are prohibited. This includes, but is not limited to (i) alteration of existing topography or any other alteration or uses for any purposes, including the exploration for or development of mineral extraction; (ii) placement of any new structures on these parcels; (iii) dumping, burning, and/or burying of rubbish, garbage, or any other wastes or fill materials; (iv) building of

any new roads or trails; (v) killing, removal, alteration, or replacement of any existing native vegetation; (vi) placement of storm water drains; (vii) fire protection activities not required to protect existing structures at the project site; and (viii) use of pesticides or other toxic chemicals.

To ensure that incremental losses of habitat authorized by this biological opinion do not significantly hinder conservation of the ecosystem upon which listed vernal pool crustaceans depend, the following measures will be taken:

H. Before implementation of each proposed project, the Service will be supplied with a 7.5 minute U. S. Geological Survey topographic map that clearly delineates the project area and habitat contained within this area.

I. The Service will implement a tracking system to ensure that the total amount of listed crustacean habitat affected by projects permitted under this consultation is not so great that it jeopardizes the listed crustacean species in any county within the jurisdiction of the SFO. The Service is conducting a county-by-county survey to determine the extent of existing habitat of listed vernal pool crustaceans. Pending completion of that survey, the Service will ensure that no more than fifty [50] acres of listed crustacean habitat are filled per county, from the date of issuance of this consultation prior to completion of reinitiated formal consultation.

Limiting this programmatic consultation to projects involving relatively minor impacts will minimize effects on the listed vernal pool crustaceans and their habitat. Through the tracking of project impacts over time, effects will be further minimized at local and regional levels.

The emphasis in this programmatic biological opinion on mitigating in ecosystem mitigation banks is justified for projects that meet the conditions listed above, because generally the isolated pools and small complexes to be affected are expected to be less ecologically stable than pools that are part of the larger complexes in mitigation banks. Chance extinctions are more likely to occur in isolated pools and small complexes than in larger complexes. Such stochastic extinctions can result in lower species diversity if they are not balanced by recolonization. In addition, waterfowl are thought to be an important dispersal vehicle for cysts, especially over great distances (e.g., between vernal pool complexes). Large preserve areas are likely to be more attractive to larger numbers of these species.

The use of a habitat banking system has several additional advantages. By combining the mitigation of many applicants, an economy of scale is achieved (i.e., project mitigations have overlapping buffer zones and shared costs of monitoring; larger preserve areas that can maintain the integrity of the ecosystem, are created).

Creation and preservation areas will be established within each county. Thus, it will be assured that mitigation will occur in the same general areas as the destruction, and that local planning

efforts will have foundations for conservation planing efforts appropriate for the level of destruction that occurs during the short-term.

The option of on-site mitigation also is included in this biological opinion because of the potential importance of maintaining some remnant of the historic distribution of vernal pool clusters outside of large vernal pool mitigation banks. If these intervening "islands" of habitat are large enough and adequately protected, they may serve as "stepping stones," enabling listed species to disperse and recolonize between the major vernal pool complexes that will be preserved in banks. Such stepping stones may be especially important if wind plays a role in the dispersal of the cysts of listed crustacean species, because wind is probably only effective as a dispersal agent over short distances. An array of on-site reserves, if they are large enough to sustain populations, also may serve to maintain the full range of intraspecific genetic diversity better than reliance solely on a relatively few large reserves. A larger number of reserves also may provide better insurance against local natural disasters, disease, and predation (Simberloff and Abele 1976 and 1982; Quinn and Robinson 1987; Quinn and Hastings 1987).

The comprehensive review of the baseline (the number and location of acres destroyed within each county) that will be conducted at the end of each six-month period will limit the extent of impacts that occur as a result of the implementation of this opinion. During these reviews it may be determined that habitat destruction can continue with the same or otherwise necessary mitigation processes in place, or that further destruction in specific areas will jeopardize listed species. The Service will work closely with recovery efforts to ensure that created and preserved areas are distributed across the landscape in such a manner as to allow them to function effectively.

The following process will be used when implementing proposed projects under this biological opinion:

1. After reviewing the permit request, the Corps will forward to the Sacramento Field Office all biological and other pertinent information along with a letter requesting that the proposed project be appended to this biological opinion;

2. The Service will review the proposed project to determine appropriate mitigation.

3. The Service will deliver to the Corps a letter specifying measures that will adequately mitigate for the impacts of the proposed project (note that this could entail the approval of the applicant's proposed mitigation). Also, the Service will designate a staff biologist to serve as the contact regarding the proposed project.

4. The Corps will forward the above letter to the applicant, approving the applicant's mitigation plan, or presenting the mitigation requirements and instructing the applicant to contact the Service's staff biologist for assistance in fulfilling the applicant's mitigation responsibilities.

5. After the mitigation responsibilities are fulfilled, the Service will forward a letter to the Corps describing habitat monitoring requirements (if any) and stating that the proposed project is in compliance with requirements of the Act.

Species Accounts

Descriptions of the Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool tadpole shrimp, and the vernal pool fairy shrimp are found in 59 **FR** 48136, the publication of the final rule to list these species under the Act. These crustaceans are restricted to vernal pools, swales, and other seasonal pools in California. Eng *et al.* (1990) and Simovich *et al.* (1992) provide further details on the life history and ecology of the Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool tadpole shrimp, and the vernal pool fairy shrimp.

Fairy shrimp have delicate elongate bodies, large stalked compound eyes, no carapace, and 11 pairs of swimming legs. They swim or glide gracefully upside down by means of complex beating movements of the legs that pass in a wavelike, anterior-to-posterior direction. Nearly all fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of detritus. The females carry the eggs in an oval or elongate ventral brood sac. The eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. The "resting" or "summer" eggs are known as "cysts." They are capable of withstanding heat, cold, and prolonged desiccation. When the pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch. The cyst bank in the soil may comprise the cysts from several years of breeding. The cysts hatch when the vernal pools fill with rainwater. The early stages of the fairy shrimp develop rapidly into adults. These non-dormant populations often disappear early in the season long before the vernal pools dry up.

The Conservancy fairy shrimp inhabits vernal pools with highly turbid water. The species is known from six disjunct populations: Vina Plains, north of Chico, Tehama County; south of Chico, Butte County; Jepson Prairie, Solano County; Sacramento National Wildlife Refuge, Glenn County; near Haystack Mountain northeast of Merced in Merced County; and the Lockewood Valley of northern Ventura County.

The longhorn fairy shrimp inhabits clear to turbid grass-bottomed vernal pools in grasslands and clear-water pools in sandstone depressions. This species is known only from four disjunct populations along the eastern margin of the central coast range from Concord, Contra Costa County south to Soda Lake in San Luis Obispo County: the Kellogg Creek watershed, the Altamont Pass area, the western and northern boundaries of Soda Lake on the Carrizo Plain, and Kesterson National Wildlife Refuge in the San Joaquin Valley.

The vernal pool fairy shrimp inhabits vernal pools with clear to tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands. The vernal pool fairy shrimp has been collected from early December to early May. There are 32 known populations of the vernal pool fairy shrimp, extending from Stillwater Plain

in Shasta County through most of the length of the Central Valley to Pixley in Tulare County, and along the central coast range from northern Solano County to Pinnacles National Monument in San Benito County. Four additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County, one in the mountain grasslands of northern Santa Barbara County, one on the Santa Rosa Plateau in Riverside County, and one near Rancho California in Riverside County.

The vernal pool tadpole shrimp has dorsal compound eyes, a large shield-like carapace that covers most of the body, and a pair of long cercopods at the end of the last abdominal segment. Tadpole shrimp climb or scramble over objects, as well as plow along or in bottom sediments. Their diet consists of organic detritus and living organisms, such as fairy shrimp and other invertebrates. The vernal pool tadpole shrimp is known from 18 populations in the Central Valley, ranging from east of Redding in Shasta County south to the San Luis National Wildlife Refuge in Merced County, and from a single vernal pool complex located on the San Francisco Bay National Wildlife Refuge in the City of Fremont, Alameda County. This animal inhabits vernal pools containing clear to highly turbid water, ranging in size from 54 square feet in the former Mather Air Force Base area of Sacramento County, to the 89-acre Olcott Lake at Jepson Prairie. The life history of the vernal pool tadpole shrimp is linked to the phenology of the vernal pool habitat. After winter rainwater fills the pools, the populations are reestablished from diapaused cysts which lie dormant in the dry pool sediments. Sexually mature adults have been observed in vernal pools three to four weeks after the pools had been filled. Some of the cysts hatch immediately and the rest enter diapause and remain in the soil to hatch during later rainy seasons.

The listed species of fairy shrimp and tadpole shrimp are imperiled by habitat loss caused by a variety of human-caused activities, primarily urban development, water supply/flood control projects, and conversion of land to agricultural use. Only a small proportion of the habitat of these species is protected from these threats. State and local laws and regulations have not been passed to protect these species, and other regulatory mechanisms necessary for the conservation of the habitat of these species have proven ineffective.

Environmental Baseline

Holland (1978) estimated that between 60 and 85 percent of the habitat that once supported vernal pools, the endemic habitat of the vernal pool fairy shrimp, had been destroyed by 1973. In the ensuing twenty-one years, a substantial amount of remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at two to three percent per year (Holland and Jain 1988). Rapid urbanization of the Central Valley of California currently poses the most severe threat to the continued existence of the listed vernal pool crustaceans. The Sacramento District of the U. S. Army Corps of Engineers has several thousand vernal pools under its jurisdiction (Coe 1988), which includes most of the known populations of these listed species. It is estimated that within 20 years 60 to 70 per cent of these will be destroyed by human activities (Coe 1988).

The habitat of the listed vernal pool crustaceans is highly fragmented throughout their ranges due to conversion of natural habitat for urban and agricultural uses. This fragmentation results in small isolated fairy shrimp populations. Ecological theory predicts that such populations will be highly susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance (Gilpin and Soule 1986; Goodman 1987*a*,*b*). Should an extinction event occur in a population that has been fragmented, the opportunities for recolonization are thought to be greatly reduced due to physical (geographical) isolation from other (source) populations.

In accordance with measure I on page five of this biological opinion, the Service has been tracking losses of habitat permitted under this consultation in each county under the jurisdiction of the SFO and within the ranges of the listed crustaceans covered by this consultation. A summary of the results is displayed in Table 2 below.

Table 2. Amount of habitat of listed vernal pool crustaceans that has been permitted for fill under this programmatic consultation since its issuance on April 4, 1995, until February 14, 1996.

County	Acres of Habitat Destroyed
Shasta	0
Tehama	0
Plumas	0
Butte	0.02
Glenn	0
Colusa	0
Sutter	0
Placer	3.378
Yolo	0
Sacramento	3.9
Solano	0.55
San Joaquin	0
Contra Costa	0
Stanislaus	0

Tuolumne	0
Mariposa	0
Merced	0
Madera	0
Fresno	0
Kings	0
Tulare	0
Kern	0
San Luis Obispo	0
TOTAL	7.848

Effects of the Proposed Action

Direct effects

Individuals of listed crustaceans and their cysts may be directly injured or killed by activities leading to the destruction (i.e., the filling of habitat) of the pools in which they exist. The proposed action may directly affect all listed vernal pool crustaceans associated with up to 50 acres of habitat in each of the following counties: Shasta, Tehama, Plumas, Butte, Glenn, Colusa, Sutter, Placer, Yolo, Sacramento, Solano, San Joaquin, Contra Costa, Stanislaus, Tuolumne, Mariposa, Merced, Madera, Fresno, Kings, Tulare, Kern, and San Luis Obispo. Therefore, all listed species associated with up to a total of 1150 acres of habitat may be affected (23 counties times 50 acres per county).

Indirect effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Individuals and their cysts may be injured or killed by several indirect effects:

Changes in hydrology: In addition to the direct impacts associated with filling, development can have impacts on the hydrology of remaining habitat (e.g., pools/swales) and surrounding areas. Projects involving storm water drains, deep ripping, or the coverage of land surfaces with concrete, asphalt, or irrigated recreation parks, etc., can affect the amount and quality of water available to the perched water tables characteristic of vernal pool areas. Changes to the perched water table can lead to alterations in the rate, extent, and duration of inundation (water regime) of remaining habitat. The biota of vernal pools and swales can change when the hydrologic regime is altered (Bauder 1986, 1987). Survival of aquatic organisms like fairy shrimp is directly linked

to the water regime of their habitat (Zedler 1987). Therefore, development near vernal pool areas may, at times, result in the failure of local sub-populations of vernal pool organisms, including fairy shrimp and tadpole shrimp.

Roads: Grading for roads may affect the water regime of vernal pool habitat, particularly when grading involves cutting into the substrata in or near habitat areas. Exposure of sub-surface layers of soil at road cuts may hasten the loss of water from adjacent habitat by mass flow through networks of cracks, lenses of coarser material, animal burrows, old root channels, or other macroscopic channels. Any decrease in the duration of inundation of habitat can affect the reproductive success of species present, including the listed vernal pool crustacea. Erosion associated with road building can contaminate vernal habitat through the transport and deposition of sediments into these areas. In addition, roads or other changes in drainage patterns could result in an increase in surface runoff and conversion of vernal pool habitat.

Roads in or near the watersheds of habitat areas can lead to additional impacts through the introduction of chemically laden runoff (i.e., petroleum products) from the road surfaces. Chemical contamination of habitat can kill listed species by poisoning. Roads in close proximity to habitat areas may encourage additional impacts through other human activities.

Human intrusion: Development frequently results in human intrusion into surrounding areas. Human intrusion is a mechanism by which trash or hazardous waste can be introduced into remaining habitat areas (Bauder 1986, 1987). Disposal of waste materials can eliminate habitat, disrupt pool hydrology, or release substances into pools that are toxic or that adversely affect water chemistry. In addition, off-road vehicle use and other recreational activities associated with humans can lead to wheel ruts, soil compaction, increased siltation, destruction of native vegetation, and an alteration of pool hydrology.

Pesticides/Herbicides: Development often results in the introduction of pesticides or herbicides into the environment. These chemical compounds are thought to have adverse effects on all of the listed vernal pool crustacea and/or their cysts. Individuals may be killed directly or suffer reduced fitness through physiological stress or a reduction in their food base due to the presence of these chemicals.

Introduced predators: Development may produce conditions that are favorable for exotic predators such as bullfrogs, and mosquito fish. The stomachs of bullfrogs captured in vernal pools near Chico, California were found to contain large numbers of vernal pool tadpole shrimp (Hayes, pers. com., 1993 in 59 **FR** 48136). Mosquito fish can be equally devastating as predators when introduced into vernal pool habitat. Thus, listed species and their cysts may be adversely affected by the introduction of exotic predators.

Cumulative Effects

Cumulative effects are those impacts of future State, local, and private actions affecting endangered and threatened species that are reasonably certain to occur in the action areas. Future

Federal actions will be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project.

Because the Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool tadpole shrimp, and vernal pool fairy shrimp are endemic to vernal pools in the Central Valley, coast ranges, and a limited number of sites in the transverse range and Santa Rosa plateau of California, the Service anticipates that a wide range of activities will be determined to affect these species. Such activities include, but are not limited to, urban, water, flood control, highway, and utility projects, chemical contaminants, as well as conversion of vernal pools to agricultural use. Many of these activities will be reviewed under section 7 of the Act as a result of the Federal nexus provided by section 404 of the Federal Water Pollution Control Act, as amended (Clean Water Act). The Service is currently unaware of any State, local, or private actions which, when considered in conjunction with the known environmental baseline for these species, would be likely to preclude the survival and recovery of the Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool tadpole shrimp, and vernal pool fairy shrimp.

Conclusion

After reviewing the current status of the endangered longhorn fairy shrimp, Conservancy fairy shrimp, vernal pool tadpole shrimp, and the threatened vernal pool fairy shrimp; the environmental baseline for the area within the jurisdiction of the SFO; the effects of the proposed projects; and the cumulative effects; it is the Service's biological opinion that the proposed projects, as described in this consultation document, are not likely to jeopardize the continued existence of these species. Critical habitat has not been proposed for these species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act prohibits take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harass is defined as an intentional or negligent act that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Incidental take is any take of listed animal species which result from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered a prohibited taking provided that such taking is in compliance with this incidental take statement.

The measures described below are nondiscretionary, and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as

appropriate, in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates the following forms of incidental take:

1. An unknown number of adult and juvenile Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool tadpole shrimp, and vernal pool fairy shrimp per pool affected will be killed as a result of proposed projects that will destroy or modify habitat.

2. An unknown number of cysts of the Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool tadpole shrimp, and vernal pool fairy shrimp will be lost per pool affected due to changes in hydrology of habitat that will occur as a result of proposed development projects.

The proposed action may result in incidental take of all listed vernal pool crustaceans associated with up to 50 acres of habitat in each of the following counties: Shasta, Tehama, Plumas, Butte, Glenn, Colusa, Sutter, Placer, Yolo, Sacramento, Solano, San Joaquin, Contra Costa, Stanislaus, Tuolumne, Mariposa, Merced, Madera, Fresno, Kings, Tulare, Kern, and San Luis Obispo.

Effect of the Take

In the accompanying biological opinion, the Service has determined that this level of anticipated take is not likely to result in extinction or a reduction of opportunity for recovery of Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool tadpole shrimp, or vernal pool fairy shrimp.

Reasonable and Prudent Measures

The following reasonable and prudent measures are necessary and appropriate to minimize incidental take of Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool tadpole shrimp, and vernal pool fairy shrimp:

1. The impact of habitat loss to vernal pool species shall be minimized;

2. Loss of listed vernal pool crustacean habitat shall be confined to the proposed project site, and habitat and associated upland remaining on site shall be protected from adverse impacts; and,

3. The baseline condition for vernal pool species shall be adequately tracked to ensure that no more than 50 acres of habitat per county are authorized for fill under this biological opinion.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the following terms and conditions, which implement the reasonable and prudent measures described above, must be complied with.

1. To implement reasonable and prudent measure (1), mitigation measures A through C as described on pages three and four of this biological opinion shall be accomplished. These measures are hereby incorporated into these terms and conditions as requirements of the proposed projects.

2. To implement reasonable and prudent measure (2), mitigation measures D through G as described on page four of this biological opinion shall be accomplished. These measures are hereby incorporated into these terms and conditions as requirements of the proposed projects.

3. To implement reasonable and prudent measure (3), mitigation measures H and I as described on page five of this biological opinion shall be accomplished. These measures are hereby incorporated into these terms and conditions as requirements of the proposed projects.

Reporting Requirements

Any unauthorized deviation from the Description of the Proposed Action will be reported, within one working day of discovery, to the Assistant Field Supervisor at (916) 414-6600. Written notification must be made within three calendar days and include the date, time, and precise location of the event indicated on a U.S. Geological Survey 7.5 minute topographic map, and any other pertinent information. Additionally, color photographs should be taken of the specific site and provided with the notification.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term "conservation recommendations" has been defined as suggestions from the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information.

The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's 7(a)(1) responsibilities for these species.

1. The Corps should work with the Service to establish functioning preserve and creation banking systems in each county to further the conservation of listed crustacean species. Such banking systems could incorporate other Corps-required mitigation (i.e., seasonal wetlands, riparian habitats, etc.);

2. As recovery plans for listed crustacean species are developed, the Corps should assist the Service in their implementation;

3. The Corps should work with the Service to ensure that its wetland delineation techniques fully assess the impacts of proposed projects on listed crustacean species; and,

4. The uppermost layer of soil in seasonally ponded habitat may contain cysts of listed crustaceans as well as seeds of vernal pool plants. Therefore, before these wetlands are filled, the top layer of soil should be made available to any vernal pool creation bank that requests it, with Service approval, for inoculating newly created pools. Soil stockpiled for this purpose or for on-site creation should be shielded from rain with a water-proof cover to ensure that it remains completely dry.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the project described in this biological opinion. As provided for in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law), and if (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take should cease pending reinitiation.

LITERATURE CITED

Bauder, E. T. 1986. San Diego vernal pools: recent and projected losses, their condition, and threats to their existence. California Department of Fish and Game, Sacramento, California.

Bauder, E. T. 1987. Threats to San Diego vernal pools and a case study in altered pool hydrology. Pages 209-214 *in* T. S. Elias, ed. Conservation and management of rare and endangered plants. California Native Plant Society, Sacramento, California.

Coe, T. 1988. The application of section 404 of the Clean Water Act to vernal pools. Pages 356-358 *in* J. A. Kusler, S. Daly, and G. Brooks, eds. Urban wetlands. Proceedings of the National Wetland Symposium, Oakland, California.

Eng, L. L., D. Belk, and C. H. Erickson. 1990. California anostraca: distribution, habitat, and status. J. Crus. Biol. 10:247-277.

Gilpin, M. E. and M. E. Soule. 1986. Minimum viable populations: processes of species extinction. Pages 19-34 *in* M. E. Soule, ed. Conservation biology: the science of scarcity and diversity. Sinauer Associates, Inc., Sunderland, Massachusetts.

Goodman, D. 1987*a*. The demography of chance extinction. Pages 11-34 *in* M. E. Soule, ed. Viable populations for conservation. Cambridge University Press, Cambridge, Great Britain.

Goodman, D. 1987*b*. How do any species persist? Lessons for conservation biology. Conservation Biology 1:59-62.

Holland, R. F. 1978. The geographic and edaphic distribution of vernal pools in the Great Central Valley, California. California Native Plant Society, Special Publication 4:1-12.

Holland, R. F., and S. Jain. 1988. Vernal pools. Pages 515-533 *in* M. E. Barbour and J. Major, eds. Terrestrial vegetation of California, new expanded edition. California Native Plant Society, Special Publication Number 9, Sacramento, California.

Quinn, J. F., and G. R. Robinson. 1987. Habitat fragmentation, species diversity, extinction and the design of nature reserves. Pages 223-248 *in* S. K. Jain, and L. W. Botsford, eds. Applied population biology. Kluwer Academic Publishers, Netherlands.

Quinn, J. F., and A. Hastings. 1987. Extinction in subdivided habitats. Conservation Biology 1:198-208.

Simberloff, D. S., and L. G. Abele. 1976. Island biogeography theory and conservation practice. Science 191:284-286.

Simberloff, D. S., and L. G. Abele. 1982. Refuge design and island biogeographic theory: effects of fragmentation. American Naturalist 120:41-50.

Simovich, M., R. Brusca, and J. King. 1992. Invertebrate survey 1991-1993 PGT-PGE/Bechtel pipeline expansion project. University of San Diego, Alcala Park, San Diego, California.

U.S. Fish and Wildlife Service. 1994. Endangered and threatened wildlife and plants; determination of endangered status for the Conservancy fairy shrimp, longhorn fairy shrimp, and vernal pool tadpole shrimp; and threatened status for the vernal pool fairy shrimp. Federal Register 59:48136-48153. September 19, 1994.

Zedler, P.H. 1987. The ecology of southern California vernal pools: a community profile. Biological Report 85 7.11. U.S. Fish and Wildlife Service, Washington, D.C.

Appendix H

Biological Resources Technical Memo,
prepared by CH2MHill,
dated February 25, 2002.

Final Report

Natomas Basin Habitat Conservation Plan Impacts to Proposed Covered Species

Prepared for

City of Sacramento and Sutter County

July 1, 2002

CH2MHILL
2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833-2937

Contents

Section **Page**

1.0 Introduction **1-1**

2.0 Proposed Natomas Basin HCP **2-1**
2.1 Purpose of the Proposed Natomas Basin HCP 2-1
2.2 Summary of Provisions 2-1
2.2.1 Habitat Reserves 2-1
2.2.2 O&M Activities Conducted by RD 1000 and Natomas Mutual 2-4
2.2.3 Take Avoidance 2-5

3.0 Methods **3-1**

4.0 Plan Area Acreage **4-1**

5.0 Species Assessment **5-1**
5.1 Giant Garter Snake (*Thamnophis gigas*) 5-1
5.1.1 Species Description 5-1
5.1.2 Environmental Effects 5-3
5.2 Northwestern Pond Turtle (*Clemmys marmorata marmorata*) 5-11
5.2.1 Species Description 5-11
5.2.2 Environmental Effects 5-12
5.3 White-faced Ibis (*Plegadis chihi*) 5-16
5.3.1 Species Description 5-16
5.3.2 Environmental Effects 5-17
5.4 Tricolored Blackbird (*Agelaius tricolor*) 5-20
5.4.1 Species Description 5-20
5.4.2 Environmental Effects 5-21
5.5 Swainson's Hawk (*Buteo swainsoni*) 5-24
5.5.1 Species Description 5-24
5.5.2 Environmental Effects 5-25
5.6 Aleutian Canada Goose (*Branta canadensis leucopareia*) 5-34
5.6.1 Species Description 5-34
5.6.2 Environmental Effects 5-34
5.7 Burrowing Owl (*Athene cunicularia*) 5-36
5.7.1 Species Description 5-36
5.7.2 Environmental Effects 5-37
5.8 Bank Swallow (*Riparia riparia*) 5-40
5.8.1 Species Description 5-40
5.8.2 Environmental Effects 5-41
5.9 Loggerhead Shrike (*Lanius ludovicianus*) 5-43

5.9.1 Species Description 5-43
5.9.2 Environmental Effects 5-43
5.10 Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) 5-46
5.10.1 Species Description 5-46
5.10.2 Environmental Effects 5-47
5.11 Delta Tule Pea (*Lathyrus jepsonii* var. *jepsonii*) 5-49
5.11.1 Species Description 5-49
5.11.2 Environmental Effects 5-49
5.12 Sanford's Arrowhead (*Sagittaria sanfordii*) 5-51
5.12.1 Species Description 5-51
5.12.2 Environmental Effects 5-51
5.13 Vernal Pool Species 5-53
5.13.1 Species Description 5-53
5.13.2 Environmental Effects 5-57
5.14 California Tiger Salamander (*Ambystoma californiense*) 5-59
5.14.1 Species Description 5-59
5.14.2 Environmental Effects 5-60
5.15 Western Spadefoot Toad (*Scaphiopus intermontanus*) 5-61
5.15.1 Species Description 5-61
5.15.2 Environmental Effects 5-62

6.0 References 6-1

Tables

2-1 Proposed HCP Covered Species 2-3

3-1 Description of Land Use/Habitat Categories 3-2

4-1 Land Uses in the Natomas Basin by Jurisdiction (acres) 4-1
4-2 Canals and Drains in the Natomas Basin by Jurisdiction (miles) 4-2
4-3 Canals and Drains in the Natomas Basin by Jurisdiction (acres) 4-2
4-4 Land Use Acreage in the Natomas Basin Under the HCP Baseline and Future Conditions (acres) 4-3
4-5 Canals and Drains in the Natomas Basin by Jurisdiction (miles) 4-3
4-6 Canals and Drains in the Natomas Basin by Jurisdiction (acres) 4-4

5-1 Change in Potential Habitat for Giant Garter Snake (acres) 5-4
5-2 Change in Potential Habitat for Northwestern Pond Turtle (acres) 5-13
5-3 Change in Potential Habitat for White-faced Ibis (acres) 5-17
5-4 Change in Potential Habitat for Tricolored Blackbird (acres) 5-21
5-5 Change in Potential Habitat for Swainson's Hawk (acres) 5-27
5-6 Change in Foraging Habitat Within 1 Mile of Swainson's Hawk Nest Sites (acres) 5-29
5-7 Change in Potential Habitat for Aleutian Canada Goose (acres) 5-34
5-8 Change in Potential Habitat for Burrowing Owl (acres) 5-38
5-9 Change in Potential Habitat for Bank Swallow (acres) 5-41

5-10 Change in Potential Habitat for Loggerhead Shrike (acres) 5-44
5-11 Change in Potential Habitat for Delta Tule Pea (acres) 5-50
5-12 Change in Potential Habitat for Sanford's Arrowhead (acres) 5-52

Figures

2-1 Regional Location 2-2

5-1 Active Swainson's Hawk Nests 5-26

SECTION 1.0

Introduction

The proposed Natomas Basin Habitat Conservation Plan (HCP) has been developed to provide and implement a conservation strategy to minimize impacts of planned land development and water facility operations and maintenance (O&M) in the Natomas Basin. The HCP conservation measures apply to 22 special-status species ("covered species") in the Natomas Basin. The effects to the covered species from these planned activities and from ongoing and future water agencies' O&M activities are addressed in this report.

On the basis of the HCP that was previously prepared in 1997, the City of Sacramento (City) received incidental take authorization from the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG) in December 1997. Environmental review under the National Environmental Policy Act and the California Environmental Quality Act was conducted by the USFWS and the City, respectively. In August 2000, parts of a legal challenge to the validity of the USFWS's action to issue an incidental take permit to the City were upheld by the U.S. District Court for the Eastern District of California (Court), which issued a Memorandum of Opinion and Order (Opinion) on the plaintiffs' claims.[1] In addition, in the interim since the 1997 HCP, Sutter County, Reclamation District No. 1000 (RD 1000), and the Natomas Central Mutual Water Company (Natomas Mutual) have joined the HCP process as applicants.[2]

The City, Sutter County, RD 1000, and Natomas Mutual are preparing an HCP for the Natomas Basin that includes new and updated information and addresses the issues raised in the Court's Opinion. In addition, the HCP being prepared is incorporating measures applicable to the parties that joined process subsequent to 1997. This technical memorandum (TM) presents the expected impacts to the covered species in the Natomas Basin resulting from implementation of the HCP. The analysis in this TM is based on the proposed HCP dated January 14, 2002, with the exception that four species (American peregrine falcon, greater sandhill crane, Conservancy fairy shrimp, and longhorn fairy shrimp) were subsequently removed from the list of covered species proposed in the January 14, 2002 draft.

The TM is presented in the following sections:

Section 1.	Introduction
Section 2.	Proposed Natomas Basin Habitat Conservation Plan
Section 3.	Methods
Section 4.	Plan Area Acreage
Section 5.	Species Assessment
Section 6	References

---

[1] *National Wildlife Federation, et al. v. Secretary of the Interior Bruce Babbitt*, August 15, 2000.

[2] Sutter County, RD 1000, and Natomas Mutual joined the HCP process subsequent to the Court Opinion on the prior HCP. The HCP addresses Sutter County's land development plans for the southern part of the county. It also includes Natomas Mutual's and RD 1000's O&M activities for the water facilities under their separate management.

SECTION 2.0

Proposed Natomas Basin HCP

This section presents an overview of the purpose of the HCP and summarizes its key measures to provide a context for the analysis conducted in this report. The conservation measures assessed in this report are contained in the January 14, 2002 HCP.

2.1 Purpose of the Proposed Natomas Basin HCP

The purpose of the HCP, as described in Section 1.A. of the HCP, is to promote biological conservation in conjunction with economic and urban development within the Natomas Basin (Figure 2-1). The HCP would establish a multi-species conservation program to mitigate the expected loss of habitat values and incidental take of covered species that could result from urban development, O&M of canal and drain systems, and certain agricultural activities associated with the management of the habitat reserves established under the HCP. The goal of the HCP is to preserve, restore, and enhance habitat values and maintain viable populations of species found in Natomas Basin while allowing covered activities to proceed. The covered species are presented in Table 2-1.

2.2 Summary of Provisions

Implementation of the HCP would result in the establishment and management of permanent habitat reserves. The HCP also requires minimization measures during urban development activities and for the O&M activities of RD 1000 and Natomas Mutual for the canals and drains under their administration. Key provisions of the HCP are summarized in the following subsections.

2.2.1 Habitat Reserves

The HCP would establish a comprehensive program for the preservation and protection of habitat for threatened and endangered species potentially present in the Natomas Basin. The acquisition of lands or conservation easements for the purpose of creating and managing permanent habitat reserves would be the primary mechanism for mitigating impacts to listed species. The HCP describes a method of funding the land acquisition and the general restoration and management goals for the acquired lands. It identifies the Natomas Basin Conservancy (Conservancy) as the "plan operator" to implement the plan.

The primary component of the HCP's conservation strategy for funding habitat reserve acquisition would be the use of mitigation fees to set aside 0.5 acres of habitat land for each gross acre of development that occurs in the Natomas Basin. Land development would result in 17,500 acres in the Natomas Basin being converted to urban and associated uses, in addition to the existing urban uses as of December 1997. Thus, under the 0.5-to-1 mitigation ratio, approximately 8,750 acres of land would be acquired by the Conservancy (or conservation easement purchased) as habitat reserves. Habitat reserves would be managed by the Conservancy and would consist of managed marsh habitats, upland habitats, rice

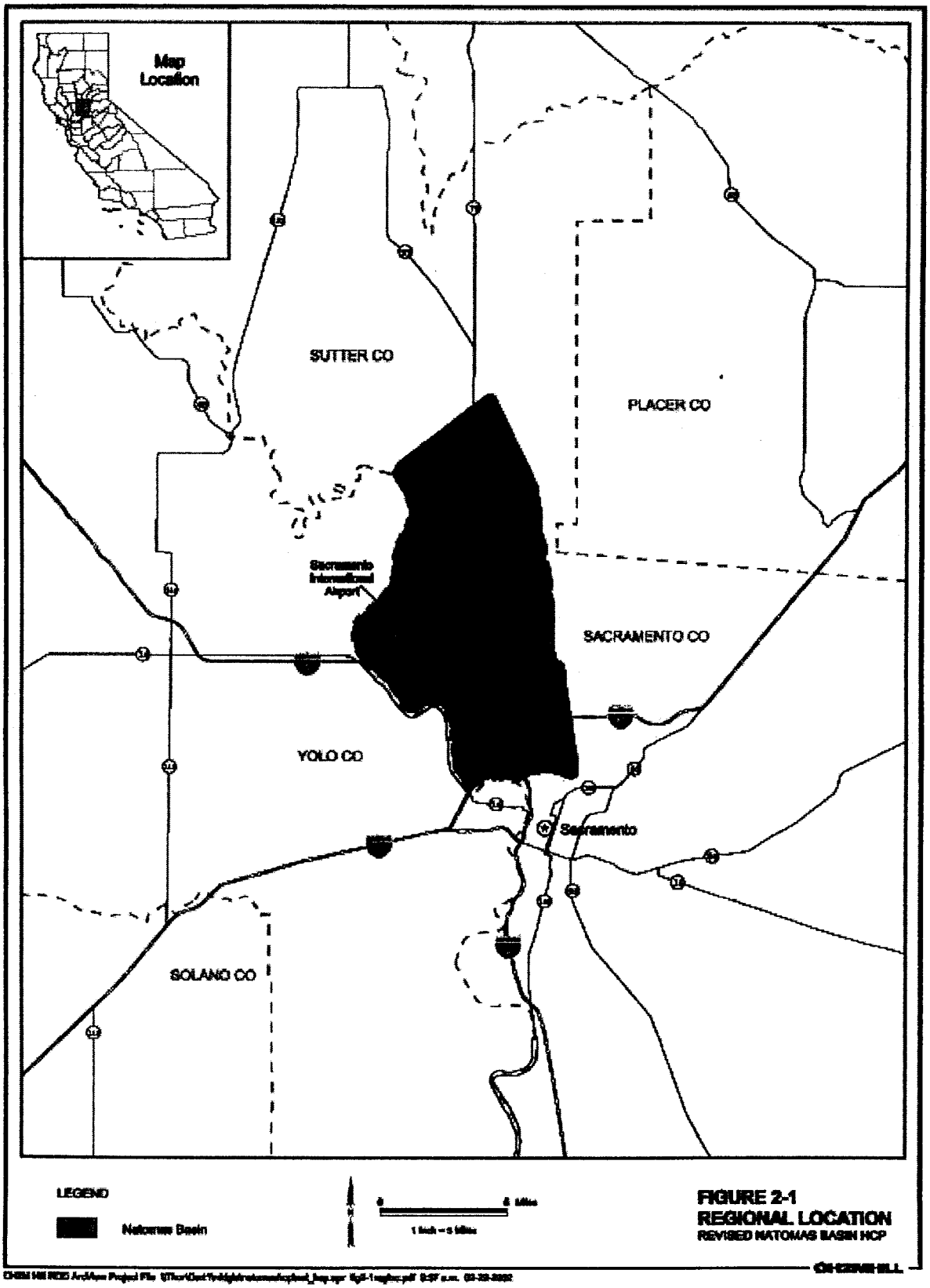

Map Location
SUTTER CO
PLACER CO
Sacramento International Airport
SACRAMENTO CO
YOLO CO
Sacramento
SOLANO CO
LEGEND
Natomas Basin
1 inch = 5 Miles
FIGURE 2-1
REGIONAL LOCATION
REVISED NATOMAS BASIN HCP

TABLE 2-1
Proposed HCP Covered Species

Habitat and Species	Federal Status	State Status
Wetland Associated Species		
Aleutian Canada goose *Branta canadensis leucopareia*	Species of Concern (recently delisted)	NA
Swainson's hawk *Buteo swainsoni*	NA	Threatened
giant garter snake *Thamnophis gigas*	Threatened	Threatened
white-faced ibis *Plegadis chihi*	Species of Concern	Species of Special Concern
bank swallow *Riparia riparia*	NA	Threatened
tricolored blackbird *Agelaius tricolor*	Species of Concern	Species of Special Concern
northwestern pond turtle *Clemmys marmorata marmorata*	Species of Concern	Species of Special Concern
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	Threatened	NA
delta tule pea *Lathyrus jepsonii* ssp.*jepsonii*	Species of Concern	NA
Sanford's arrowhead *Sagittaria sanfordii*	Species of Concern	NA
Upland Associated Species		
Swainson's hawk *Buteo swainsoni*	NA	Threatened
tricolored blackbird *Agelaius tricolor*	Species of Concern	Species of Special Concern
loggerhead shrike *Lanius ludovicianus*	Species of Concern	Species of Special Concern
burrowing owl *Athene cunicularia*	Species of Concern	Species of Special Concern
Vernal Pool Associated Species		
vernal pool fairy shrimp *Branchinecta lynchi*	Threatened	NA
vernal pool tadpole shrimp *Lepidurus packardi*	Endangered	NA
midvalley fairy shrimp *Branchinecta mesovallensis*	NA	NA
California tiger salamander *Ambystoma californiense*	Candidate	Candidate Protected Amphibian
western spadefoot toad *Scaphiopus hammondii*	Species of Concern	Protected Amphibian
Colusa grass *Neostapfia colusana*	Threatened	NA

TABLE 2-1
Proposed HCP Covered Species

Habitat and Species	Federal Status	State Status
Boggs Lake hedge-hyssop *Gratiaola heterosepala*	NA	Endangered
Sacramento Orcutt grass *Orcuttia viscida*	Endangered	Endangered
slender Orcutt grass *Orcuttia tenuis*	Threatened	Endangered
legenere *Legenere limosa*	Species of Concern	NA

Source: Natomas Basin Habitat Conservation Plan, January 2002.
NA The status is not applicable to this species

fields (which would typically be leased to rice farmers), and associated buffers and infrastructure. The HCP does not specify any particular land area for acquisition as habitat reserves because many factors, including the quality and availability of parcels and the willingness of owners to sell, could affect the land areas ultimately purchased. Rather, the HCP relies on a detailed, science-based acquisition criteria, and land purchases are subject to review by a Technical Advisory Committee that includes representatives from the USFWS and CDFG. Additional information about the proposed system of habitat reserves is in Section IV.C of the HCP.

2.2.2 O&M Activities Conducted by RD 1000 and Natomas Mutual

RD 1000's and Natomas Mutual's primary O&M efforts focus on keeping the canal systems under their administration functioning in a manner that maximizes the timely movement of irrigation water for agricultural purposes and ensures drainage of agricultural water and storm flows from lands within the Natomas Basin. RD 1000 and Natomas Mutual carry out these activities to provide water and drainage for agricultural production, and to minimize potential damage to property from flooding. Specific measures to be implemented by RD 1000 and Natomas Mutual are described in Section V.B of the HCP, and include the following measures:

- Restrictions on the extent of canal and ditch maintenance operations that could occur in any calendar year
- Restrictions on the timing of canal and ditch maintenance operations
- Restrictions on the de-watering and filling of canals and drains
- Detailed measures for control of weedy vegetation (e.g., restrictions on mowing, aquatic and other herbicide use, burning), traffic, and rodents
- A program for educating staff regarding awareness of potential for O&M activities to impact giant garter snakes
- Provisions to allow emergency activities

2.2.3 Take Avoidance

In addition to the summarized measures that are intended to address incidental take of covered species, the HCP also includes measures to minimize the potential for incidental take to occur during covered activities (i.e., land development, O&M of canals and drains). These minimization measures include canal/drain dewatering and seasonal grading restrictions for giant garter snakes, and nest site protection and replacement measures for Swainson's hawks. These and other minimization measures are described throughout Section V of the HCP.

SECTION 3.0

Methods

The objective of the analysis in this report is to identify impacts to covered species in the Natomas Basin as a result of expected land use changes (i.e., planned land development of 17,500 acres; a habitat reserve system of 8,750 acres). This section describes the methods for the development of the land use/habitat categories used to demonstrate the changes in Natomas Basin acreage in Section 4 and the species assessment in Section 5 of this report. The methods presented below were discussed and approved by the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) team at various meetings conducted in support of the preparation of the HCP and the EIR/EIS.[3]

To assist in the analysis of expected habitat changes, standard categories of existing land uses and a Geographic Information System (GIS) database were developed to provide a framework for predicting future land areas assigned to each of these categories. The year 1997 is the initial year in which land use characteristics are considered, because the previous take permits were approved then. Additional information available since 1997 and field data gathered in 2001 were used to supplement and update the 1997 data. In this report, this updated scenario is referred to as the baseline. The primary steps in developing the land use database are presented below.

- Digital aerial photos were obtained from the U.S. Geological Survey and assembled into a mosaic containing the entire Natomas Basin. The boundary of the Basin was set at the toe of the surrounding levees, providing a total area of 53,537 acres.
- A land use classification system was developed, focusing on the habitat information necessary for this specific analysis. Eighteen land use categories were developed, which are described in Table 3-1.
- Land use data from the Department of Water Resources (DWR) were added to the GIS database, and the DWR categories were translated to match the eighteen land use categories developed for the project.
- The resulting land use map was modified based on field data collected by May & Associates. This resulted in a greater level of detail (a one-acre minimum "polygon") and a more accurate map. Jurisdictional boundaries were added to the GIS database.

An additional component of the GIS database is the system of canals and drains owned and maintained by RD 1000 and Natomas Mutual. Existing digital information on the canals and drains was obtained from RD 1000 and Natomas Mutual and added to the database as linear features. Based on the field data collected by May & Associates, the canals and drains were divided into four categories: Class I (the canal land use category including the primary

[3] The HCP EIR/EIS team consists of representatives from the City, Sutter County, USFWS, CDFG, RD 1000, and Natomas Mutual. The meetings at which the methodology was discussed and agreed upon occurred in Spring 2001.

TABLE 3-1
Description of Land Use/Habitat Categories

Category	Description
Airport	Lands within the ownership boundary for the Sacramento International Airport, including all land use types (e.g., facilities, runways, open lands and farmlands adjacent to runways) within boundary. Does not include airport buffer lands (e.g., south of I-5). Also includes the former Natomas Air Park and several small rural airstrips (one in Sacramento County and two in Sutter County).
Alfalfa	Based on a subset of the DWR "Pasture" land use category that includes alfalfa production, as estimated for the HCP baseline. Includes known alfalfa fields along Garden Highway in Sutter County.
Canals	The largest (Class I) canals and drains (including adjacent maintenance roads) in the Natomas Basin, primarily the ones already digitized for the DWR land use maps. Includes the East Drain, West Drain, Main Drain, North Drain, and the Central Main Canal. Does not include smaller canals and drains, which are recorded in the project database as linear features.
Grassland	Based on DWR "Native Vegetation" land use category with additional information provided by May & Associates field data and aerial photo interpretation, as estimated for the HCP baseline. Includes known uncultivated grasslands, primarily along the eastern border of the Natomas Basin.
Highways	Includes I-5, I-80, S.R. 99/70, and interchanges, including all areas within medians.
Idle	Based on DWR "Idle" land use category - agricultural lands temporarily out of production.
Non-Rice Crops	Based on the DWR land use categories of "Grain and Hay Crops," "Field Crops," and "Tilled Lands." In the Natomas Basin, this category includes primarily wheat, corn, safflower, and tomatoes.
Oak Groves	Includes several isolated pockets of mature oak trees east of Garden Highway.
Orchard	Based on the DWR land use categories of "Deciduous Fruits/Nuts" and "Citrus and Subtropical." In the Natomas Basin, this includes primarily pear, peach, and walnut orchards adjacent to Garden Highway.
Other	Miscellaneous land uses not captured by other land use categories. Includes Teal Bend Golf Course, the wastewater plant at Sacramento International Airport, and several utility substations.
Pasture	Based on DWR "Pasture" land use category, including primarily irrigated pasture in the Natomas Basin.
Ponds and Seasonally Wet Areas	Wetland/marsh areas including Pritchard's Lake and several isolated locations throughout the Natomas Basin. Based on DWR's "Water Surface" land use category and some "Riparian Vegetation" categories, with additional information provided by May & Associates data and aerial photo interpretation.
Rice	Based on DWR's "Rice" land use category.
Riparian	Based on DWR's primary "Riparian" category, with additional information provided by May & Associates data. Includes cottonwood/willow areas along primary canals and drains, including the Fisherman's Lake area.
Ruderal	Includes former agricultural lands that are no longer in production, primarily as a result of their proximity to urbanized areas (e.g., surrounding Arco Arena). Includes DWR's "Barren" and "Vacant" land use categories. Ruderal lands typically consist of non-native grasses, and most are occasionally tilled for fire control.
Rural Residential	Includes farmhouses and farm equipment yards. Includes DWR's "Semi-Agricultural" land use category, with additional information provided by aerial photo interpretation.
Tree Groves	Includes non-riparian stands of trees other than mature oaks. Based on DWR's "Native Vegetation" land use category, with additional information by May & Associates data and aerial photo interpretation.
Urban	Urbanized areas. Primarily in the City of Sacramento, but also including unincorporated areas along El Centro Road in Sacramento County and Pacific Avenue in Sutter County.

drainage system), Class II (large), Class III (medium), and Class IV (small). Following the completion of the baseline scenario described above, the last step in the development of the database was to create a future land use scenario corresponding to buildout conditions in the Natomas Basin. This buildout conditions include the planned land development activities of the City and Sutter County, and the development of the Metro Air Park project in unincorporated Sacramento County. Although Sacramento County is not an applicant, the HCP includes Metro Air Park in the 17,500 acres of planned development to be included in the HCP. A separate HCP application has been filed for the 1,983-acre Metro Air Park property (Metro Air Park Property Owners' Association, 2001).

SECTION 4.0

Plan Area Acreage

On the basis of the methodology described in Section 3.0, the acreage assignments for the land use classes and other features, by jurisdiction, are presented in this section. Table 4-1 shows the acreage of land use classes for the areas that would be covered by the conservation measures of the proposed HCP. Tables 4-2 and 4-3 show the miles and acres, respectively, of canals and drains, by jurisdiction. Table 4-4 shows the total HCP baseline acreage by land use class and jurisdiction, and the expected future acreage in the basin as a result of urban development. Tables 4-5 and 4-6 show the miles and acres, respectively, of canals and drains for the HCP baseline, changes in the miles and acres of canals and drains in each jurisdiction, and the expected future condition for the basin as a result of urban development.

TABLE 4-1
Land Uses in the Natomas Basin by Jurisdiction (acres)

Land Use Class	City of Sacramento[a]	Metro Air Park	Other Sacramento County	Sutter County	Total
Airport	18	0	1,512	21	1,551
Alfalfa	0	0	137	234	371
Canals[b]	129	0	308	66	503
Grassland	454	0	293	138	886
Highways	450	0	414	571	1,435
Idle	839	50	480	94	1,464
Non-rice Crops	4,905	325	8,591	2,866	16,686
Oak groves	15	2	70	11	98
Orchard	13	0	169	0	182
Other	148	0	305	15	468
Pasture	35	22	261	355	674
Ponds and seasonally wet areas	7	4	75	10	96
Rice	987	1,541	8,427	11,737	22,693
Riparian	24	0	93	6	124
Ruderal	1,429	6	261	274	1,970
Rural residential	49	10	170	148	377
Tree groves	36	23	39	8	106
Urban	3,298	0	229	327	3,854
Total	**12,836**	**1,983**	**21,836**	**16,881**	**53,537**

TABLE 4-1
Land Uses in the Natomas Basin by Jurisdiction (acres)

Land Use Class	City of Sacramento[a]	Metro Air Park	Other Sacramento County	Sutter County	Total

[a] City lands include the unincorporated panhandle area proposed for annexation.

[b] The Canal land use category includes only Class I canals and drains, the largest canals and drains that are digitized as area features in the GIS database. Class II, III, and IV canals and drains are not included in this table because they are linear features in the GIS database.

TABLE 4-2
Canals and Drains in the Natomas Basin by Jurisdiction (miles)

Canal Type	City of Sacramento	Metro Air Park	Other Sacramento County	Sutter County	Total
Class I	12.9	0	15.0	7.1	36.0
Class II	4.0	4.0	18.0	24.5	50.5
Class III	15.1	3.5	50.5	28.5	97.6
Class IV	5.1	4.1	31.4	22.3	62.9
Total	**37.1**	**11.6**	**114.9**	**82.3**	**247.0**

TABLE 4-3
Canals and Drains in the Natomas Basin by Jurisdiction (acres)

Canal Type	City of Sacramento	Metro Air Park	Other Sacramento County	Sutter County	Total
Class I	129	0	308	66	503
Class II[a]	32	32	144	196	404
Class III[a]	90	21	301	170	582
Class IV[a]	23	19	145	103	289
Total	**274**	**72**	**898**	**535**	**1,778**

[a] Class II, III, and IV canals and drains are linear features in the GIS database. Conversion to area features required using a standard width for each canal type, which was determined to be 65.9, 49.2, and 38.0 feet for Class II, III, and IV canals, respectively, based on information from Natomas Mutual. These standard widths include adjacent upland areas (e.g., maintenance roads) in addition to channel width.

TABLE 4-4
Land Use Acreage in the Natomas Basin Under the HCP Baseline and Future Conditions (acres)

Habitat Class	HCP Baseline	Change from Development – City of Sacramento	Change from Development – Metro Air Park	Change from Development – Sutter County	Total Change from Development	Future Condition[a]
Airport	1,551	(18)	0	(21)	(39)	1,513
Alfalfa	371	0	0	0	0	371
Canals	503	0	0	0	0	503
Grassland	886	(427)	0	(134)	(560)	325
Highways	1,435	0	0	0	0	1,435
Idle	1,464	(675)	(50)	(8)	(733)	731
Non-rice crops	16,686	(4,663)	(325)	(1,529)	(6,517)	10,169
Oak groves	98	(6)	(2)	0	(8)	89
Orchard	182	(13)	0	0	(13)	169
Other	468	(31)	0	0	(31)	437
Pasture	674	(23)	(22)	(101)	(147)	527
Ponds and seasonally wet areas	96	(7)	(4)	(10)	(21)	75
Rice	22,693	(970)	(1,541)	(5,577)	(8,087)	14,606
Riparian	124	(24)	0	0	(24)	100
Ruderal	1,970	(1,137)	(6)	(88)	(1,231)	739
Rural residential	377	(46)	(10)	0	(56)	321
Tree groves	106	(10)	(23)	0	(33)	73
Urban	3,854	8,050	1,983	7,467	17,500	21,354
Total	**53,537**	**0**	**0**	**0**	**0**	**53,537**

[a] Does not include the effects associated with the creation of habitat reserves.
(#) Decrease in age
Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

TABLE 4-5
Canals and Drains in the Natomas Basin by Jurisdiction (miles)

Canal Type	HCP Baseline	Change from Development - City of Sacramento	Change from Development - Metro Air Park	Change from Development - Sutter County	Total Change from Development	Future Condition
Class I	35.9	0	0	0	0	35.9
Class II	50.5	(3.6)	(4.0)	(13.9)	(21.5)	29.0
Class III	97.6	(12.1)	(3.5)	(9.8)	(25.5)	72.1
Class IV	62.8	(3.6)	(4.1)	(9.9)	(17.5)	45.3
Total	**246.8**	**(19.3)**	**(11.6)**	**(33.6)**	**(64.5)**	**182.3**

(#) Decrease in age
Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

TABLE 4-6
Canals and Drains in the Natomas Basin by Jurisdiction (acres)[a]

Canal Type	HCP Baseline	Change from Development - City of Sacramento	Change from Development – Metro Air Park	Change from Development - Sutter County	Total Change from Development	Future Condition
Class I	503	0	0	0	0	494
Class II	404	(29)	(32)	(111)	(172)	232
Class III	582	(72)	(21)	(59)	(152)	430
Class IV	289	(16)	(19)	(45)	(80)	209
Total	**1,778**	**(117)**	**(72)**	**(215)**	**(404)**	**1,365**

[a] Class II, III, and IV canals and drains are linear features in the GIS database. Conversion to area features required using a standard width for each canal type, which was determined to be 65.9, 49.2, and 38.0 feet for Class II, III, and IV canals, respectively, based on information from Natomas Mutual. These standard widths include adjacent upland areas (e.g., maintenance roads) in addition to channel width.
(#) Decrease in age
Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

SECTION 5.0

Species Assessment

The impacts of implementing the HCP on species proposed for coverage under the HCP are described in this section. The assessment includes a species description that summarizes the habitat needs of each of the species considered in the analysis, and an impact evaluation that describes the expected response of the species to changed habitat conditions with implementation of the HCP. Three categories of potential impacts have been identified: (1) effects of overall changes in habitat within the Natomas Basin; (2) direct effects during construction activities; and (3) ongoing effects of O&M activities of canal and drainage systems conducted by Natomas Mutual and RD 1000 as well as effects of O&M activities conducted by the Conservancy in managing the habitat reserves.

- **Effects from Changes in Habitat.** This component of the analysis discusses the viability of each species in the Natomas Basin given expected future habitat conditions. This portion of the analysis, therefore, addresses the effectiveness of the HCP measures in mitigating the loss of habitat resulting from planned urban development. Habitat changes and the effectiveness of the HCP measures are evaluated for land use jurisdictions individually and collectively.
- **Construction Effects.** This component of the analysis discusses potential impacts to each species during construction for urban development and for creation of habitat on the Conservancy reserves. The analysis, therefore, addresses the effectiveness of the HCP measures in avoiding and minimizing take (mortality) associated with construction.
- **O&M Effects.** This component of the analysis discusses potential impacts to each species during O&M activities by RD 1000 and Natomas Mutual required to maintain the canal and drains, and by the Conservancy during O&M (including farming operations) on the habitat reserves. This analysis, therefore, addresses the effectiveness of the HCP measures in avoiding and minimizing take (mortality) associated with O&M.

Based on the evaluations of the effect of habitat changes, construction activities, and O&M activities, overall effects of the HCP on the species persistence in the Natomas Basin are assessed assuming that all of the four potential permittees (City, Sutter County, Natomas Mutual, and RD 1000) participate in the HCP.

5.1 Giant Garter Snake (*Thamnophis gigas*)

5.1.1 Species Description

The giant garter snake is listed as Threatened under both the Federal Endangered Species Act and the California Endangered Species Act. The giant garter snake is an endemic species of wetlands in the Central Valley of California. Historically, giant garter snakes were found from the vicinity of Butte County southward to Bakersfield in Kern County. Today, populations of giant garter snake are found in the Sacramento Valley and in isolated pockets of the San Joaquin Valley.

The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, irrigation and drainage canals, riceland, and adjacent uplands in the Central Valley. Essential habitat components consist of: (1) adequate water during the snake's active season (early spring through mid-fall) to provide adequate permanent water to maintain dense populations of food organisms; (2) emergent, herbaceous wetland vegetation such as cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.) for escape cover and foraging habitat during the active season; (3) upland habitat with grassy banks and openings in waterside vegetation for basking; and (4) higher elevation upland habitats for cover and refuge from flood waters during the snake's inactive season in winter (Hansen, 1988; 1993; Hansen and Brode, 1980; Brode and Hansen, 1992). The giant garter snake feeds on aquatic prey, including small fish and frogs, carp, mosquitofish, bullfrogs, and treefrogs.

In the Natomas Basin, giant garter snakes begin entering their winter retreats in rodent burrows excavated in channel and canal banks, rubble piles, and other upland sites by the end of October. After emergence from winter retreats (late March or early April), giant garter snakes use canals with water that persists through the summer months. These canals could contain adequate emergent aquatic vegetation and steep, vegetated banks that provide cover, and a food supply. Rice fields are also used by giant garter snakes after rice growth is sufficiently high to provide cover. Following pre-harvest rice field draining, giant garter snakes move out of rice fields and re-enter canals, where they feed on the high concentration of prey species that washout from the rice fields into the canals. Following the heavy feeding, they enter winter retreats.

Giant garter snakes are known to use rice fields and associated features of the Natomas Basin's rice-growing landscape for some of their habitat needs (Brode and Hansen, 1992), including the canals, ditches, and drains of the Basin's water conveyance systems, the higher ground of levees, and sloughs and marshes. Giant garter snakes use constructed waterways, such as those of the Natomas Basin's water conveyance system. The irrigation canals and drainage ditches, together with their associated levees and adjacent embankments, are important components of giant garter snake habitat in the Basin. Irrigation canals can provide all the habitat components described above and create dispersal corridors allowing garter snakes to move from one area to another in search of mates, new territories, and summer habitat. In a radio-telemetry study of giant garter snakes in the Elverta area of the Natomas Basin, from 40 to 90 percent of the occurrences of snakes were in irrigation canals and ditches (Wylie and Cassaza, 2000). Snakes used canals and ditches to a greater degree in the spring but reduced use in the summer when rice fields were flooded. Hansen and Brode (1992) also provide data illustrating use of water conveyance structures by giant garter snakes. Giant garter snakes move around to find suitable habitat as conditions in the rice fields, marshes, and canals and ditches change, especially during the dry summer months. Thus, connectivity between canals and ditches in different areas and between these systems and other habitat types is important for genetic interchange and ability to find summer habitat.

Previous surveys and other historical information indicate a fairly widespread distribution of giant garter snakes within the Natomas Basin. Virtually all these sightings are from areas where rice is grown. Within these areas, they are strongly associated with the rice fields themselves and the associated ditch/drain components of the water conveyance system. On this basis, a surrogate for estimating the amount of giant garter snake habitat in the

Natomas Basin is the acreage of rice fields in the basin and ditch/drain habitat embedded in the rice landscape. These are estimated at approximately 23,000 acres of rice fields and 250 miles of ditches and drains in the Basin based on 1997 data. A study conducted from 1998 to 1999 recorded 277 individual giant garter snakes in the Natomas Basin (Wylie and Casazza, 2000). Giant garter snakes were found in a network of ditches and rice field habitats, including several occurrences in Fisherman's Lake and other RD 1000's canals within the Basin.

5.1.2 Environmental Effects

Effects of Changes in Habitat

Potential habitat for the giant garter snake in the Natomas Basin currently consists of rice fields, irrigation canals/ditches, ponds and seasonally wet areas, and uplands adjacent to these habitat types. Wetland habitats are used by snakes during the summer months for foraging and cover. During winter, snakes use upland areas for hibernation. Upland areas that snakes use for overwintering are always in close proximity to wetland-type habitats, typically within 100 feet but up to 820 feet (Hansen, 1988, cited in USFWS 1999a; Wylie et al., 1997).

The amount of rice fields, irrigation canals/ditches, ponds and seasonally wet areas is used to represent total habitat for giant garter snake (both marsh and upland habitat) in the Natomas Basin. For rice and ponds and seasonally wet areas, the GIS did not distinguish small-scale features such as rice checks, berms and road embankments that could provide upland habitat. Rather, these features were incorporated into the overall habitat designation so that the acreage estimates for rice and ponds and seasonally wet areas encompassed both marsh and upland areas. The acreage estimates for canals/ditches also included both the wetted portion of the canal and the adjacent embankments that could provide upland habitat for giant garter snake.

Based on the GIS, the Natomas Basin supports about 24,567 acres of potential habitat (marsh and upland combined) for giant garter snakes, consisting of rice fields, irrigation canals/ditches, and ponds and seasonally wet areas. Only a portion of this acreage would be expected to be used by giant garter snakes. Giant garter snakes appear to be an edge-associated species, concentrating their activities at wetland/upland interfaces (Wylie and Casazza, 2000). In rice fields, snakes primarily use edges along the field perimeter or along check structures (Wylie and Casazza, 2000). The future acreage of rice shown in Table 5-1, however, would not all serve as giant garter snake habitat because they associate with the edges of rice fields.

Although about 45 percent of the Natomas Basin provides potential habitat for the giant garter snake, that habitat consists almost entirely of rice fields and irrigation canals/ditches. Rice fields are intensively managed monocultures that are highly altered from the natural marsh conditions in which the giant garter snake evolved. Native marsh habitats are virtually absent from the Natomas Basin, occurring on only about 97 acres (about 0.2 percent) of the basin.

Urban development under the HCP would reduce giant garter snake habitat in the Natomas Basin by about 8,512 acres. The habitat classes (from Tables 4-3 and 4-4) that provide potential habitat for giant garter snakes and the changes in acreage from

TABLE 5-1
Change in Potential Habitat for Giant Garter Snake (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	(7)	(4)	(10)	(21)	75
Rice	22,693	(970)	(1,541)	(5,577)	(8,087)	14,606
Canals (all)	1,778	(117)	(72)	(215)	(404)	1,374
Total	**24,567**	**(1,094)**	**(1,617)**	**(5,802)**	**(8,512)**	**16,055**

(#) decrease in acreage

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

implementing the HCP are presented in Table 5-1. Portions of Sacramento County and Sutter County outside of the urban development areas would not be affected by urban development permitted under the HCP and are assumed to continue to provide habitat for snakes as rice fields or in managed marsh in the habitat reserve system created under the HCP. Under the planned development scenario, habitat for the giant garter snake would be lost on the fringes of the basin (i.e., City of Sacramento and the Industrial-Commercial Reserve) with an extensive area in the middle and northwestern portion remaining as habitat predominantly as rice or managed marsh.

About 16,055 acres of potential habitat for giant garter snakes would remain in the Natomas Basin (assuming no change in land use in Sacramento County other than at MAP), a reduction of 8,512 acres from the existing level of 24,567 acres. With HCP implementation, permanent habitat reserves would be created consisting of 4,375 acres of rice and 2,187.5 acres of managed marsh. The rice within the reserves would most likely be derived from existing rice fields. Thus, 4,375 of the 14,606 acres of rice projected in the basin under the future condition would be incorporated into the reserve system. The 2,187.5 acres of managed marsh could be created from existing rice fields or lands that do not currently provide habitat for giant garter snake. If all of the managed marsh was derived from rice, the net reduction in the acreage of habitat for giant garter snake would be the 8,512 acres attributable to urban development. If all of the managed marsh component of the habitat reserves was created from non-habitat, then the net reduction habitat for giant garter snake would be about 6,324.5 acres.

The land use analysis shows a reduction of 8,512 acres in land use types used by the giant garter snake in the Natomas Basin; however, the acreage of habitat loss probably would be less than this amount because giant garter snakes predominantly use field edges. Managed marsh habitat would be created with implementation of the HCP. The conceptual designs for 1,296 acres of reserve lands already acquired include creating marsh habitat with a high degree of edge habitat (Natomas Basin Conservancy, 2000). Because of the large amount of edge in the managed marsh, the managed marsh would provide a greater amount of useable habitat than an equivalent acreage of rice.

Although rice provides important habitat for giant garter snakes, the managed-marsh habitat reserves created under the HCP are expected to provide greater quality habitat

(on an acre-for-acre basis) than acreage cultivated for rice. Some of the limitations of rice in providing habitat for giant garter snake are described below.

- Rice fields do not provide habitat for giant garter snakes until late spring when the rice plants have grown enough to provide cover and prey levels have developed. Use of rice fields by giant garter snakes is relatively low until summer when the rice plants are established (Wylie and Casazza, 2000).
- Rice fields typically are drained in September, and habitat for snakes can become limited to canals and drains during the last weeks of their active period (Wylie and Casazza, 2000).[4]
- Agricultural practices (tilling, grading, and harvesting) and canal maintenance practices in support of agriculture can directly kill or injure snakes (Leidy, 1992).
- Rice fields are periodically rotated to other crops or fallowed and, therefore, do not provide stable, reliable habitat over time. Furthermore, fluctuations in the amount and distribution of rice could affect the distribution, survival, and reproductive success of giant garter snake.

The managed marsh would be designed and managed specifically to provide optimal habitat conditions for giant garter snake and avoid these limitations. Design features/management practices of managed marsh habitat that would benefit giant garter snakes include:

- A high amount of wetland/upland edge habitat to maximize the amount of useable habitat.
- Potholes (i.e., areas of deeper water) to provide habitat in late summer/fall after the rice fields have been drained
- A water management regime that provides habitat throughout the snakes' active period.
- Year-round wetland habitat to maintain prey populations and avoid a delay in development of prey populations in the spring when snakes emerge from hibernation.
- Integration of upland habitat with marsh habitat such that snakes are not exposed to hazards such as crossing roads when they move into overwintering habitats
- Absence of mortality sources associated with rice production (e.g., canal maintenance activities, pesticide use)

Finally, the creation of marsh and upland habitat in the reserves would emphasize restoration to a natural marsh ecosystem. The habitat reserves would replace rice, an artificial, intensively managed monoculture, with a native ecosystem characterized by a complex structure and high habitat diversity. With the recreation of the native ecosystem, the habitat reserves would provide the natural habitat conditions under which the giant

[4] There is some uncertainty over whether the timing of draining rice fields is beneficial or detrimental. It has been suggested that the timing of rice field dewatering benefits snakes by concentrating prey in the ditches such that snakes can feed heavily prior to entering hibernation (City of Sacramento et al., 2001).

garter snake evolved. As noted above, natural marsh habitat is nearly absent from the Natomas Basin, consisting of only about 97 acres. Under the HCP, marsh habitat acreage would be increased by over 20 times. Wylie and Casazza (2000) found that giant garter snakes at Fisherman's Lake seldom ventured into surrounding rice fields. These observations indicate that snakes were able to find adequate resources (e.g., prey, basking sites, cover, overwintering habitat) in Fisherman's Lake to support themselves. Wylie and Casazza (2000) suggested that created marsh, such as would be created under the HCP, similarly could fulfill these habitat requirements for snakes.

The rice fields in the reserve system also could provide higher habitat quality than the rice fields that would be lost to urban development. Rice in the reserve system would be managed using snake-friendly techniques, including:

- Maintenance of rice checks, berms, and other water control structures in as natural a state as practicable by limiting mowing or herbicide treatment
- Maintenance of prey species (e.g., mosquito fish) in or near the rice fields through appropriate management
- Other measures, as appropriate

Specific measures for managing rice fields in the reserve system would be determined by the Technical Advisory Committee.

In addition to the direct removal of habitat, urban development can indirectly impact snakes through increased predation and vehicle strikes as follows.

- Free-ranging domestic cats often are introduced to an area by the establishment of residential areas. Residential development close to areas inhabited by snakes can lead to increased predation by cats. While predation by cats on giant garter snakes is believed to occur, its impact on snake populations has not been determined.
- Mortality to snakes from vehicle strikes also has been reported (Leidy, 1992). Snakes could experience increased mortality from increased motor vehicle activity associated with urbanization.

Under the HCP, habitat reserves would be located at least 800 feet from urban areas and areas designated for urban development in applicable plan (unless a smaller distance is approved by CDFG and USFWS on a case-by-case basis) and a buffer at least 30 feet wide established within the reserve between marsh habitat and roadways. By locating habitat for snakes away from urban areas and creating a buffer between snake habitat and roads, death or injury to snakes from vehicle strikes, as well as predation by cats could be reduced although not eliminated.

In summary, implementation of the HCP is expected to result in a net loss of habitat for giant garter snake in the Natomas Basin. The reduction in habitat value, however, is expected to be less than the acreage reduction because:

- Snakes primarily use the edges of rice fields, not the entire rice field. Because snakes would not use all the acreage identified as rice habitat, the actual amount of giant garter

snake habitat in the Natomas Basin is not directly correlated to the changes in land use acreages that resulted from the land use analysis

- Managed marsh habitat would provide more habitat for snakes than rice fields on an acre-for-acre basis because of the larger amount edge habitat
- Managed marsh habitat would be designed to accommodate year-round habitat requirements, as previously described
- Rice in the reserve system would be managed to provide better habitat quality than existing rice fields.

Effects of Construction Activities

Urban development and the construction of habitat reserves is anticipated to affect habitat for the giant garter snake as described above. Giant garter snakes also could be killed or injured during construction by vehicle strikes on roads, crushing beneath heavy construction equipment, or entombment in their winter retreats. Death or injury to snakes has been reported because of vehicle strikes on roads (Leidy, 1992) and excavation from winter retreats (Wylie and Casazza, 2000). The HCP includes measures to avoid and minimize direct loss of giant garter snakes from construction (Section V). Both the Conservancy and individual developers would implement the following measures to avoid and minimize the potential to take snakes during construction activities.

- **Timing restrictions:** No grading, excavating or filling activities will take place within 30 feet of existing giant garter snake habitat between October 1 and May 1, unless approved by CDFG. By conducting earth-moving activities during the summer months when snakes are active, it is expected that snakes in the construction area will be able to avoid construction equipment such that direct injury or mortality would be avoided. Further, snakes will not be in their winter retreats where they are vulnerable to injury during earth-moving activities.
- **Dewatering requirements:** Dewatering of existing habitat will begin after November 1, but no later than April 1 of the following year. All water must be removed from existing habitat by April 15, or as soon thereafter as weather permits, and the habitat will be kept dry without any standing water for 15 consecutive days after April 15 and prior to excavating or filling the dewatered habitat. By dewatering habitat between November 1 and April 1, snakes would not be attracted to construction zones when they emerge from their winter retreats. If habitat must be dewatered after April 15, it must remain dry for 15 consecutive days prior to excavating or filling the habitat. Snakes have been found to leave habitat within a few days of dewatering (USFWS, 1999a). By waiting for 15 days after dewatering, it reasonable to expect that any snakes would have left the construction zone prior to the start of construction activities and injury to snakes would be avoided.

In combination, these measures would minimize direct injury and mortality to giant garter snakes.

Effects of O&M Activities

Water Agencies

Canals and ditches provide important habitat for giant garter snakes in the Natomas Basin. In Wylie and Casazza's (2000) radio-telemetry study, about half of the snake locations during the summer were in rice and half were in ditches. In the spring (before the rice fields had developed), however, the majority of snake locations were in ditches. During the spring and fall, ditches can be the only habitat available to snakes in rice producing areas (Wylie and Casazza 2000). In addition to providing habitat, ditches could be important in maintaining population connectivity.

RD 1000 and Natomas Mutual are responsible for maintaining and operating the ditches and canals in the Natomas Basin. The quality of ditches as habitat for snakes can be influenced by operation and maintenance practices that affect the amount of vegetation, the presence of water in the ditches, and the availability of burrows in canal banks that snake's can use for escape or as winter retreats. Further, giant garter snakes can be killed or injured by maintenance equipment, such as mowers and construction equipment used for sediment removal and bank resloping (Leidy, 1992).

Under the HCP, RD 1000 and Natomas Mutual would implement practices to avoid and minimize adverse effects to giant garter snakes from their operation and maintenance activities. These measures include:

- **Restrictions on timing of management activities.** Where giant garter snakes are known to exist, maintenance activities (excluding vegetation control, road maintenance, and rodent control) will be restricted to after May 1 and before October 1 in any calendar year. By conducting in-channel maintenance activities during the summer when the snakes are active, it is expected that snakes will be able to avoid equipment and thereby avoid injury. Further, the potential for snakes to be killed or injured in their winter retreats by ditch cleaning (e.g., sediment removal) would be avoided.
- **Dewatering of ditches/canals identified for maintenance.** Dewatering two weeks prior to construction removes an essential element (aquatic features) of giant garter snake habitat. Snakes have been found to leave dewatered habitat within a few days of dewatering such that it is reasonable to expect that snakes would leave the construction area in search of more suitable habitat and would not reenter the construction area.
- **Restrictions on management intensity.** RD 1000 and Natomas Mutual will limit canal and ditch maintenance activities (excluding vegetation control, road maintenance, and rodent control) during any calendar year to not more than ten percent (10%), of the total miles of canals and ditches within each Water Agencies' respective service area. Vegetation control would be limited to one side of the ditch per year. Fitch (1940, cited in Leidy, 1992) noted that the banks of ditches where he was searching for snakes were usually overgrown with tules, willows and weeds making it difficult to see snakes. Later, Hansen (1980, cited in Leidy, 1992) reported that canals cleared of vegetation were rarely used by snakes, while ditches supporting tules and willows appeared to be good habitat. Thus, vegetation that potentially provides habitat for snakes would be retained on one side of the ditch and the ditch could continue to provide cover for snakes following maintenance activities.

- Management of vegetation control measures in giant garter snake habitat. Burning would be restricted to October 1 through April 30, when snakes are active and would be expected to leave areas treated through burning. When mowing for weed control, vegetation would be retained at least 6 inches tall. By keeping mower blades at least 6 inches high, the blades would not contact snakes on the banks.

Natomas Basin Conservancy

Some of the activities conducted by the conservancy to manage the habitat reserves have the potential to kill or injure giant garter snakes. For example, the conservancy conducts ditch and canal maintenance activities similar to those conducted by RD 1000 and Natomas Mutual to maintain appropriate water delivery and drainage from rice and managed marsh units. The conservancy will implement take avoidance measures to minimize potential take that may occur during on reserve lands (e.g., road kills, take during construction of managed marsh wetlands, etc.). To accomplish this, the conservancy will, where applicable, ensure that all take avoidance measures described in Chapter V (e.g., dewatering of irrigation ditches owned by the conservancy) are implemented during management of reserve lands. The Conservancy also will ensure that all such take avoidance measures as are necessary and appropriate are included in reserve management plans, as well as additional measures determined to be necessary during the development of management plans.

In managing rice fields on the habitat reserves, the conservancy will implement Best Management Practices (BMPs) to enhance habitat values and minimize the potential for injury to snakes. The BMP's include guidelines related to vegetation management (including weed management, treatment of crop stubble through burning, and disking and use of herbicides), and maintenance of those ditches that are owned by the conservancy (time of maintenance, alternating bank maintenance on an annual basis). These practices would have similar beneficial effects for snakes as described for the water agencies.

Overall Effects on Giant Garter Snake

The current distribution and abundance of the giant garter snake is considerably reduced from former times (FR 58:54053). The population reduction and range restriction has been largely attributed to conversion and loss of wetland habitat in the Central Valley. Loss of habitat is considered the primary threat to the persistence of giant garter snake and the primary factor limiting the abundance and distribution of the population (USFWS, 1999a).

Within suitable wetland habitat, the factors determining the population size and distribution of giant garter snake are poorly understood. Prey availability can influence the total population size as well as reproductive success. Whether prey availability drops to levels that limit the population, however, has not been determined. Hypothesized or documented sources of mortality include predation, dormant season flooding, road kill, mechanical injury, pest control, collection and vandalism, disease and parasites, and toxic substances (Leidy, 1992). The relative importance of these sources of mortality in determining the size, distribution, and trend of the population remains uncertain.

The Natomas Basin is located within the American Basin population area of the giant garter snake which, when combined with the Colusa Basin and Sutter Basin, represents the largest extant population of giant garter snakes. Giant garter snakes have been reported in the

American Basin since the 1970s (Leidy, 1992). Recent investigations of giant garter snakes in the Natomas Basin found a wide range of size classes (Wylie and Cassaza, 2000). The range of size classes suggests that the population is reproducing, juveniles are being recruited into the population, and adults are surviving to older age classes.

Implementation of the HCP is expected to result in a net loss of habitat for giant garter snake. Despite a net loss of habitat, implementation of the HCP would encourage the persistence of giant garter snakes in the Natomas Basin for several reasons. First, the loss of habitat is expected to be less than the average loss predicted using the GIS because: (1) the acreage of rice that is used by snakes is likely overestimated; and (2) the managed marsh habitat would be designed to provide a large amount of edge habitat. Second, the quality of both the managed marsh and rice in the reserve system would be greater than the affected habitat. This greater quality habitat could support a larger population of snakes as a result of better habitat conditions (e.g., more prey) or reduced mortality (e.g., fewer road kills). Third, the habitat reserves would provide habitat that is stable in location, amount, availability, and quality within and among years over the long term, thereby providing conditions conducive to supporting a stable population of giant garter. Fourth, management actions undertaken by RD 1000 and Natomas Mutual would minimize the potential for death or injury of snakes and, more importantly, improve the availability and stability of habitat for snakes in the canal and ditch system over the long term by allowing suitable habitat conditions to persist in the canals and ditches. This habitat would have the dual benefit of providing additional habitat for snakes and travel corridors to maintain population connectivity.

Finally, lands west of Fisherman's Lake would be protected and RD 1000 would prepare a management plan for the lake to maintain or improve its habitat value for species covered by the HCP. In addition, RD1000 will prepare a management plan for Fisherman's Lake that addresses the maintenance and enhancement of its habitat value for giant garter snakes and other species covered by the HCP. Fisherman's Lake is a well-documented area for giant garter snakes. Wylie and Casazza (2000) found that snakes using Fisherman's Lake remained within the lake, and did not exploit surrounding ricelands. They suggest that Fisherman's Lake provided a stable habitat so that snakes rarely needed to leave to fulfill their life requisites. With maintenance of lands around Fisherman's Lake and management to maintain its habitat value, this known population of snakes would be protected. Creation of managed marsh habitat under the HCP would result in additional "stable" habitats, and in combination with Fisherman's Lake and remaining rice fields, encourage the persistence of giant garter snakes in the Natomas Basin.

A primary goal of the HCP is to ensure connectivity between individual reserves, and connectivity between reserves and surrounding agricultural lands. Connections can be provided along land, through water and through air to enable the necessary mobility of species within their ranges. The primary opportunity for connectivity among reserves is the system of channels maintained and operated by RD 1000 and Natomas Mutual. These water agencies have noted that the elimination of existing channels would generally only occur in response to urban development. RD 1000 and Natomas Mutual would manage ditches and canals in a manner the would allow and encourage continued use by snakes.

With regard to basin-wide connectivity, RD 1000 identified key drainage channels within the Basin that would be retained regardless of urban development (see Figure 17 of the

Natomas Basin HCP). With the exception of one property in the northeastern portion of the basin, all of the existing Conservancy lands are interconnected by drainage channels that would remain despite urban development. In addition to these drainage channels, canals and ditches would remain in areas continuing to be in agricultural production. Because snakes readily and routinely use canals and ditches in the Natomas Basin (Wylie and Cassaza, 2000), the canal and drainage systems would provide for movement of snakes among the habitat reserves, thereby minimizing the potential occurrence of adverse effects resulting from small and isolated populations.

Under the HCP, it is reasonable to expect that the creation and management of habitat reserves that support 6,562 acres of habitat for giant garters snake would provide similar or better overall habitat value to that of the 8,512 acres of potential habitat consisting predominantly of rice that would be lost to urban development. Thus, impacts to giant garter snake attributable to the 17,500 acres of urban development covered by the HCP are expected to be mitigated adequately. The conservation strategy of the HCP mitigates the impacts to giant garter snakes from the planned development and is an important component in maintaining giant garters snakes in the Natomas Basin.

5.2 Northwestern Pond Turtle (*Clemmys marmorata marmorata*)

5.2.1 Species Description

The northwestern pond turtle is considered a Species of Concern by USFWS and is a state Species of Special Concern. The turtle is uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest. Western pond turtles are active all year where climates are warm but are known to hibernate in cold climes. This species is typically associated with permanent or nearly permanent water in a wide variety of habitat types including permanent ponds, lakes, streams, irrigation ditches, or permanent pools along intermittent streams. Primarily omnivorous, the western pond turtle feeds on aquatic plant material, including pond lilies, beetles and a variety of aquatic invertebrates as well as fish, frogs, and carrion (Stebbins, 1972; Nussbaum et al., 1983). Western pond turtles require basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks. Hibernation in colder areas occurs underwater in bottom mud. Breeding occurs in large slow-moving streams; eggs are deposited in nests constructed in sandy banks. Western pond turtles are highly aquatic but leave the water for basking and egg-laying. Egg-laying may occur along sandy wetland margins or at upland locations as far as 1,300 feet from water (Holland and Bury, 1992). Hatchling and adult turtles have the potential to overwinter in upland sites (Q.C. Holland, pers. comm.).

The western pond turtle occurs in suitable aquatic habitats west of the crest of the Sierra Nevada in California and in parts of Oregon, Washington, and Mexico (Stebbins, 1985; Zeiner et al., 1988). The northwestern subspecies is generally found from San Francisco Bay north to the Columbia River drainage in Oregon and Washington (57 FR 45761-45762, October 5, 1992). The northwestern pond turtle still occupies most of its historic range. However, populations are declining throughout the range (Holland and Bury 1992) and local populations, particularly of the southwestern subspecies, have been extirpated from many areas within this range (57 FR 45762, October 5, 1992). The few remaining areas in the

western pond turtle's range that support moderate to large viable populations of the northwestern pond turtle are considered threatened (57 FR 45761-45762, October 5, 1992).

There are 117 known occurrences of northwestern pond turtle in California one of which is considered extirpated (CDFG, 2001). Of these, 13 known occurrences are in Sacramento County and 2 are in Sutter County. During habitat mapping surveys (March 2001), many pond turtles were observed along the Natomas Main Drain, suggesting that the Natomas Basin supports a limited northwestern pond turtle population. No systematic surveys for pond turtles in the Natomas Basin have been conducted to date. Pond turtles have been reported on some of the Conservancy's lands.

The canals throughout the Natomas Basin are considered suitable aquatic habitat for pond turtles. Currently, there are about 250 miles of canals and ditches in the Natomas Basin. Fisherman's Lake in the southwestern portion of the Basin is high-quality aquatic habitat for pond turtles. Because most of the Basin is developed agricultural land or commercial/residential development, many of the potential breeding habitats have been eliminated. Despite this, potential breeding habitat occurs along many of the canals and aquatic habitats.

5.2.2 Environmental Effects

Effects of Changes in Habitat

Western pond turtles are highly aquatic and are closely associated with wetland and aquatic habitats. In the Natomas Basin, potential habitat consists of canals, rice, ponds and seasonally wet areas, and riparian. Turtles use upland areas for hibernation and for nesting. Upland areas used by turtles typically are close to aquatic habitats but can be as far as 1,300 feet from water.

The amount of rice fields, irrigation canals/ditches, ponds and seasonally wet areas, and rice is used to represent total habitat for western pond turtle (both marsh and upland habitat) in the Natomas Basin. For rice and ponds and seasonally wet areas, the GIS did not distinguish small-scale features such as rice checks, berms and road embankments that could provide upland habitat. Rather, these features were incorporated into the overall habitat designation such that the acreage estimates for rice and ponds and seasonally wet areas encompassed both marsh and upland areas. The acreage estimates for canals/ditches also included both the wetted portion of the canal and the adjacent embankments that could provide upland habitat for turtles. The classes of canals and drains (from Tables 4-2 and 4-3) that provide potential habitat for northwestern pond turtle and the changes in acreage from implementing the HCP are presented in Table 4-8. Based on the habitat and land use assessment conducted for this analysis, the Natomas Basin supports about 24,691 acres of habitat (marsh and upland combined) for pond turtles (Table 5-2).

TABLE 5-2
Change in Potential Habitat for Northwestern Pond Turtle (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	(7)	(4)	(10)	(21)	75
Rice	22,693	(970)	(1,541)	(5,577)	(8,087)	14,606
Riparian	124	(24)	0	0	(24)	100
Canals (all)	1,778	(117)	(72)	(215)	(404)	1,374
Total	**24,691**	**(1,118)**	**(1,617)**	**(5,802)**	**(8,536)**	**16,155**

(#) decrease in acreage

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

Under the HCP, potential habitat for western pond turtle would decline by about 8,536 acres as a result of planned urban development. This reduction in habitat would predominantly consist of rice fields, although about 404 acres would be canals. No change in riparian habitat would occur because the 24 acres of riparian habitat predicted to be lost in the City of Sacramento occurs along Fisherman's Lake. Under the Settlement Agreement and as part of the HCP, lands immediately adjacent to Fisherman's Lake would not be developed. The riparian habitat adjacent to Fisherman's Lake, thus, would be retained.

About 16,155 acres of potential habitat for western pond turtles would remain in the Natomas Basin (assuming no change in land use in Sacramento County other than at MAP and no loss of riparian in the City as described above), a reduction of 88,536 acres from the existing level of 24,691 acres. Under the HCP, permanent habitat reserves would be created consisting of 4,375 acres of rice and 2,187.5 acres of managed marsh. The rice within the reserves would most likely consist of existing rice fields. Thus, 4,375 of the 14,606 acres of rice projected in the basin under the future condition would be incorporated into the reserve system. The 2,187.5 acres of managed marsh could be created from existing rice fields or lands that do not currently provide habitat for western pond turtle. If all of the managed marsh was derived from rice, the net reduction in the acreage of habitat for western pond turtle would be the 8,536 acres attributable to urban development. If all of the managed marsh component of the habitat reserves was created from non-habitat, then the net reduction habitat for western pond turtle would be about 6,348.5 acres.

The 2,187.5 acres of upland habitat in the habitat reserves could be equally important to supporting pond turtles on the habitat reserves than the managed marsh. Pond turtles require upland sites for overwintering and nesting. The availability and suitability of nesting habitat could be contributing to poor recruitment in western pond turtle populations (Jennings and Hayes 1994). The habitat reserves would provide this critical element in the maintenance of pond turtle populations.

In addition to reducing habitat availability, urban development in areas adjacent to areas inhabited by pond turtles can indirectly impact this species. Free-ranging domestic cats are often introduced to an area by the establishment of residential areas. Residential development close to areas inhabited by turtles can lead to increased predation by cats.

While predation by cats on western pond turtles has not been specifically identified as a concern, predation by other terrestrial predators (e.g., non-native red fox and raccoons) has been noted (Jennings and Hayes, 1994). Mortality to turtles from vehicles also is possible and turtles could experience increased mortality from increased motor vehicle activity associated with urbanization. Under the HCP, habitat reserves would be located at least 800 feet from urban areas and areas designated for urban development in applicable plan (unless a smaller distance is approved by CDFG and USFWS on a case-by-case basis) and a buffer at least 30 feet wide established within the reserve between marsh habitat and roadways. By locating habitat reserves away from urban areas, the potential for death or injury to turtles from vehicle strikes, as well as predation by cats could be reduced although not eliminated.

Despite the net reduction in the total amount of potential habitat, the HCP likely would improve habitat conditions for western pond turtles through the creation and protection of marsh complexes on the habitat reserves. Rice fields provide poor habitat quality for western pond turtles, as they are intensively managed monocultures with little structural or biological diversity. In particular, an abundance of basking sites (a key element of pond turtle aquatic habitat) is lacking in rice fields. Beneficial components of the habitat reserves include:

- Long-term certainty of habitat availability. Created marsh habitat would be protected in perpetuity.
- Higher quality habitat than rice. Created marsh habitat would provide all essential habitat elements for northwestern pond turtle (e.g., basking sites, cover, and prey availability).
- Nearby suitable and undisturbed nesting and overwintering habitat.
- Provision of large areas of contiguous, suitable habitat.
- Reduced exposure to agricultural practices. Current agricultural practices involve the routine use of pesticides and fertilizers as well as exposure to heavy farm machinery (e.g., disking or harvesting). The created marsh would not be subject to this type of maintenance and rice would be managed using wildlife-friendly techniques.
- The Conservancy would consult with pond turtle experts during implementation of the HCP to identify management actions to further improve habitat quality for pond turtles.

Lastly, under the Settlement Agreement and HCP, lands adjacent to Fisherman's Lake would be protected and RD 1000 would prepare a management plan for Fisherman's Lake to maintain and/or improve its habitat value for species covered by the HCP. Fisherman's Lake is known to be inhabited by pond turtles. With acquisition of the buffer lands adjacent to the lake and beneficial management practices implemented by RD 1000, the probability of this population persisting would be improved.

Effects of Construction Activities

Urban development and the construction of habitat reserves is anticipated to reduce the amount of habitat for western pond turtle in the Natomas Basin as described above. Pond turtles could be killed or injured during the construction by vehicle strikes on roads,

crushing beneath heavy construction equipment, or entombment in their winter retreats. Measures in the HCP to avoid and minimize these types of direct impacts to giant garter snakes also would benefit pond turtles because of their similar habitat requirements and life history traits. The avoidance measures for giant garter snakes would have similar beneficial effects to pond turtles.

Effects of O&M Activities

Water Agencies

Operation and maintenance activities by RD 1000 and Natomas Mutual could affect western pond turtles because these activities typically focus on canals and drains that provide suitable habitat for this species. Pond turtles could be killed or injured by construction equipment used for sediment removal. O&M activities also could result in the removal of bank and emergent vegetation, important components of cover for the northwestern pond turtle.

Under the HCP, RD 1000 and Natomas Mutual would implement measures to avoid and minimize potential impacts of O&M activities on giant garter snake. Pond turtles have similar seasonal activity patterns and habitat requirements as giant garter snakes. The effects of the water agencies' O&M activities (including implementation of the avoidance and minimization measures of HCP) on pond turtles would be the same as described for giant garter snakes.

Natomas Basin Conservancy

Some of the activities conducted by the Conservancy to manage the habitat reserves have the potential to kill or injure pond turtles. For example, the Conservancy conducts ditch and canal maintenance activities similar to those conducted by RD 1000 and Natomas Mutual to maintain appropriate water delivery and drainage from rice and managed marsh units.The Conservancy will implement take avoidance measures to minimize potential take that may occur during on reserve lands (e.g., road kills, take during construction of managed marsh wetlands, etc.). To accomplish this, the Conservancy will, where applicable, ensure that all take avoidance measures described in Chapter V (e.g., dewatering of irrigation ditches owned by the Conservancy) are implemented during management of reserve lands.The Conservancy also will ensure that all such take avoidance measures as are necessary and appropriate are included in reserve management plans, as well as additional measures determined to be necessary during the development of management plans.

In managing rice fields on the habitat reserves the Conservancy will implement BMPs to enhance habitat values and minimize the potential for injury to pond turtles. The BMPs include guidelines related to vegetation management (including weed management, treatment of crop stubble through burning, and disking and use of herbicides), and maintenance of those ditches that are owned by the Conservancy (time of maintenance, alternating bank maintenance on an annual basis). These practices would have similar effects for pond turtles as described for the water agencies.

Overall Effects on Northwestern Pond Turtle

Jennings and Hayes (1994) characterized western pond turtles as endangered from the Salinas River south along the California coast, and from the Mokelumne River south in inland portions of the state. In the remainder of the state, Jennings and Hayes (1994) considered the species to be threatened. Although loss of habitat has probably been the

primary cause of population reductions of this species, other factors threaten the persistence of pond turtles in remaining habitat. Pond turtles in many locales do not appear to be reproducing well as evidenced by populations increasingly dominated by adults (Jennings and Hayes, 1994). Potential contributors to their poor recruitment include predation on hatchlings and juveniles by bullfrogs and introduced fishes, competition with introduced fish, lack of suitable nesting habitat, and impacts to nesting habitat during egg incubation (e.g., agricultural practices, grazing) (Jennings and Hayes, 1994).

The current status of western pond turtle in the Natomas Basin and factors limiting the population are uncertain. Nevertheless, the HCP would be expected to improve the likelihood that pond turtles would persist in the Natomas Basin. The majority of the potential habitat that would be lost to urban development would be rice. Rice provides poor quality aquatic habitat for western pond turtle and suitable nesting and overwintering habitats might not be available near many rice fields. The habitat reserves created under the HCP would provide high-quality aquatic habitat interspersed with and in close proximity to upland habitat suitable for nesting and overwintering. As part of the HCP, the Conservancy would work with experts on pond turtles to improve and maintain habitat for pond turtles. Through these consultations, the Conservancy will be able to avoid or minimize factors that are believed to reduce recruitment. Pond turtles are known to occur on some of the Conservancy's lands. If successfully-reproducing populations of pond turtles can be established and/or maintained on the habitat reserves, it would substantially benefit this species given its poor recruitment success elsewhere in its range and potentially in the Natomas Basin.

The habitat reserves would improve the likelihood that successfully-reproducing populations of turtles will be supported in the Basin. In addition, areas currently known to be inhabited by ponds turtles (East Main Drain and Fisherman's Lake) will remain under the HCP. Under the HCP, lands adjacent to Fisherman's Lake would be managed by the Conservancy for habitat values. Under the Settlement Agreement, RD 1000 will prepare a management plan for Fisherman's Lake to maintain its habitat values for covered species. The East Main Drain would not be affected by urban development. If turtles are currently reproducing in these areas, they could persist under the HCP.

5.3 White-faced Ibis (*Plegadis chihi*)

5.3.1 Species Description

The white-faced ibis is considered a Species of Concern by the USFWS and is a state Species of Special Concern. The white-faced ibis is found in the Sacramento area during its migration. This species forages in fresh emergent wetland, shallow flooded pond margins, and muddy ground of wet meadows and irrigated, or flooded, pastures and croplands. The white-faced ibis requires extensive marshes for nesting (Zeiner et al., 1990). Large tule stands surrounded by open water provide high-quality nesting habitat for this species. The white-faced ibis typically nests in dense tule and cattail stands, but would sometimes nest in trees with other colonial-nesting species (Eckert, 1981). The white-faced ibis winters mainly in San Joaquin Valley and Imperial Valley, but is recorded widely as a transient (Zeiner et al., 1990). The largest breeding colonies in the Central Valley have been reported

from the Mendota Wildlife Area and the Colusa National Wildlife Refuge. The wintering population concentrates near Los Banos in Merced County (McCaskie et al., 1979). Historically, the white-faced ibis was a locally common summer resident in California and its breeding distribution was centered in the San Joaquin Valley. White-faced ibis populations have declined in California, probably due to habitat deterioration or removal.

There are seven known occurrences (rookeries) in California (CDFG, 2001). There are no known nesting occurrences in Sutter or Sacramento Counties. The nearest known nesting occurrence is in Yolo County, north of the City of Woodland. No suitable nesting habitat occurs in the Natomas Basin for white-faced ibis, although suitable winter foraging habitat (i.e., rice, alfalfa, and other agricultural fields) exists in the Natomas Basin for this species. In the Sacramento Valley, wintering ibis were very rare in the 1970s with the highest counts numbering only 11 birds in 1978 and 1979. In 1996, Hickey and Shufford estimated that a minimum of 10,000 to 11,000 ibis were in the Sacramento Valley (Thomas Reid Associates, 2000). White-faced ibis are now common winter visitors to the Natomas Basin, but are not known to breed in the basin.

5.3.2 Environmental Effects

Effects of Changes in Habitat

White-faced ibis winter in the Natomas Basin. Potential foraging habitat includes alfalfa, rice, canals, and ponds and seasonally wet areas. The habitat classes (from Tables 4-3 and 4-4) that provide potential habitat for white-faced ibis and the changes in acreage from implementing the HCP are presented in Table 5-3. The Natomas Basin supports about 25,000 acres of these habitats (Table 5-3).

TABLE 5-3
Change in Potential Habitat for White-faced Ibis (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Ponds and seasonally wet areas	96	(7)	(4)	(10)	(21)	75
Rice	22,693	(970)	(1,541)	(5,577)	(8,087)	14,606
Canals (all)	1,778	(117)	(72)	(215)	(404)	1,374
Total	**24,938**	**(1,094)**	**(1,617)**	**(5,802)**	**(8,512)**	**16,426**

(#) decrease in acreage

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

Under the HCP, urban development would convert about 8,512 acres of potential habitat for white-faced ibis to non-habitat. Most of the reduction in potential habitat would be rice. As explained for giant garter snakes, the characteristics and management of rice can limit its value to wildlife. For white-faced ibis (which currently occur in the Natomas Basin during winter), only flooded rice fields in the winter provide habitat; fields that are not flooded provide little or no value. White-faced ibis are associated with emergent wetland habitats,

particularly for nesting. Native marsh habitat has been largely eliminated from the Natomas Basin. While they are able to exploit flooded rice fields and other agricultural field types (e.g., alfalfa) as wintering habitat, these habitats are not suitable for nesting.

The reduction in potential foraging habitat would be at least partially offset by creation and long-term protection of marsh and upland habitat in the reserves. Under the HCP, 8,750 acres of permanent habitat reserves would be created consisting of 4,375 acres of rice, 2,187.5 acres of managed marsh, and 2,187.5 acres of upland habitat. All of this habitat could be used by white-faced ibis. There would still be a net loss of habitat for white-faced ibis in the Natomas Basin, but it is expected that the habitat in the reserves would be of higher quality than the rice fields and canals converted to urban development. Marsh and upland habitat in the habitat reserves would be managed to restore native marsh/upland habitat and to promote wildlife habitat values.

White-faced ibis are more flexible in their use of foraging habitat than nesting habitat and probably are not limited by foraging habitat availability in winter. Under the HCP, foraging habitat would remain abundant in the Natomas Basin (about 16,500 acres plus 8,570 acres in the habitat reserves) and in agricultural areas adjacent to the basin. As a result, the decline in foraging habitat would not be expected to adversely affect ibis using the Natomas Basin. Further, with their long-term protection and management for habitat that is stable in quality and location, the reserves would support continued foraging by white-faced ibis in the Natomas Basin.

White-faced ibis are known to nest in the Central Valley but have not been reported to nest in the Natomas Basin. Managed marsh habitat on the habitat reserves could attract white-faced ibis to nest. White-faced ibis typically nest in large emergent wetlands with minimal disturbance. These types of conditions would be created in the habitat reserves and could result in the establishment of additional nesting colonies.

Effects of Construction Activities

Construction activities would be required for urban development and for habitat creation/restoration actions for the habitat reserves. These activities have little potential to adversely affect white-faced ibis. This species is not known to nest in the Natomas Basin, but rather uses the basin for foraging during the winter. Potential effects would be limited to displacement of birds foraging or roosting on a field during the initial phases of construction when fields are graded. Because grading typically is done in the spring and summer and ibis occur in the basin in winter, no adverse effects to foraging or roosting birds are expected during construction activities.

White-faced ibis could nest in the Natomas Basin in the future and disturbance or displacement of nesting birds could occur from construction for urban development on nearby properties or habitat creation. Because habitat reserves are to be located at least 800 feet away from urban development or areas designated for urban development unless an exception is granted, the potential for this type of impact would be minimized. Finally, under the HCP, surveys would be conducted prior to construction activities. If white-faced ibis occur, disturbance would be avoidance during the nesting season to the maximum extent possible. Similarly, the Conservancy would avoid disturbance to white-faced ibis nest

sites during reserve management and enhancement activities to the maximum extent practicable.

Effects of O&M Activities

Water Agencies

White-faced ibis could forage in canals and ditches, and O&M activities by RD 1000 and Natomas Mutual could displace ibis foraging in the drains. Avoidance and minimization measures for the giant garter snake would reduce the potential for O&M activities to affect ibis. These measures include:

- **Implementation of timing restrictions.** Canal and ditch maintenance primarily would be conducted during the summer. White-faced ibis currently are winter residents in the Natomas Basin. By conducting O&M activities during the summer, potential impacts to ibis would be avoided.
- **Dewatering of ditches/canals identified for maintenance.** By dewatering canals and ditches two weeks prior to construction, white-faced ibis would seek foraging opportunities in other locations and therefore would not be in the vicinity when maintenance/construction activities are conducted.
- **Restrictions on management intensity.** RD 1000 and Natomas Mutual will limit canal and ditch maintenance activities (excluding vegetation control, road maintenance, and rodent control) during any calendar year to not more than ten percent (10%), of the total miles of canals and ditches within each Water Agencies' respective service area. Vegetation control would be limited to one side of the ditch per year. Thus, vegetation that potentially provides habitat for white-faced ibis would be retained on one side of the ditch and the ditch could continue to provide habitat for white-faced ibis.

Natomas Basin Conservancy

Use of the Natomas Basin by white-faced ibis currently consists of wintering and migrating birds. At least over the short-term, white-faced ibis would be expected to use the habitat reserves only for foraging and potentially roosting during the winter or migration. Management actions could temporarily displace foraging birds, but this minor displacement would not have adverse effects on white-faced ibis as these birds are typically very mobile in their use of foraging habitat during winter and migration.

In the event that white-faced ibis nest on Conservancy lands in the future, management activities could disturb and displace nesting birds. If ibis are found to nest on the habitat reserves, the Conservancy would avoid disturbing nesting birds during O&M activities.

Overall Effects on White-faced Ibis

Breeding white-faced ibis populations declined in distribution and abundance during the 1960s and 1970s, especially in the western U.S. (Ryder and Manry, 1994; Shuford et al., 1996). The primary reason for the decline of the white-faced ibis as a nesting species in California was the loss of extensive marsh habitats (Remsen, 1978; Shuford et al., 1996). Pesticides also are believed to have contributed to population declines in the 1960s and 1970s. Since the 1980s, however, there has been an increase in western white-faced ibis populations as a result of improved nesting habitat management, increased planting of alfalfa, and a ban on DDT and other pesticide use in the early 1970s. In California, the winter

TABLE 5-4
Change in Potential Habitat for Tricolored Blackbird (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Total Nesting	**1,998**	**(148)**	**(76)**	**(225)**	**(449)**	**1,549**
Foraging Habitat Only						
Alfalfa	371	0	0	0	0	371
Non-rice Crops	16,686	(4,663)	(325)	(1,529)	(6,517)	10,169
Grassland	886	(427)	0	(134)	(560)	325
Pasture	674	(23)	(22)	(101)	(147)	527
Rice	22,693	(970)	(1,541)	(5,577)	(8,087)	14,606
Total Foraging	**41,310**	**(6,083)**	**(1,888)**	**(7,341)**	**(15,311)**	**25,998**

(#) decrease in acreage
Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

The projected loss of potential nesting habitat would be offset by creation of 2,187.5 acres of managed marsh in the habitat reserves. The habitat on the reserves would be designed and managed to promote marsh habitat values. The managed marsh would support emergent marsh vegetation including cattails and tules that provide optimal nesting habitat for tricolored blackbird. The habitat reserves also consist of large blocks that would allow development of large areas of marsh vegetation that are preferred by tricolored blackbirds. Tricolored blackbird would benefit from the substantial increase in high quality nesting habitat under the HCP.

In addition to reducing habitat availability, urban development in areas adjacent to areas inhabited by tricolored blackbirds can indirectly impact this species. Free-ranging domestic cats are often introduced to an area by the establishment of residential areas. Tricolored blackbirds are believed to be vulnerable to nest destruction by mammalian predators (Bent, 1958) and residential development close to areas inhabited by tricolored blackbirds could lead to increased predation by cats. Under the HCP, habitat reserves would be located at least 800 feet from urban areas and areas designated for urban development in applicable plan (unless a smaller distance is approved by CDFG and USFWS on a case-by-case basis) and a buffer at least 30 feet wide established within the reserve between marsh habitat and roadways. By locating habitat reserves away from urban areas, the potential for predation by cats could be reduced although not eliminated.

The total amount of potential foraging habitat would decline in the Natomas Basin by about 15,311 acres. This large reduction in potential foraging habitat reflects the catholic foraging habits of tricolored blackbirds. In the Natomas Basin and elsewhere the occurrence and distribution of tricolored blackbird is probably determined by the availability of suitable nesting habitat rather than foraging habitat. Given the current abundance of foraging habitat, but scarcity of nesting habitat in the Natomas Basin, the population size and distribution of tricolored blackbird likely are limited by the availability and distribution of nesting habitat rather than foraging habitat. With about 25,998 acres of foraging habitat remaining in the basin and their ability to use a wide diversity of foraging, the reduction in foraging habitat would not be expected to adversely impact tricolored blackbirds.

Effects of Construction Activities

Construction activities for urban development or associated with habitat creation on the habitat reserves has the potential to disturb nesting birds or directly destroy nests if birds were nesting in vegetation removed for construction. For construction associated with urban development, under the HCP, preconstruction surveys would be conducted. If tricolored blackbirds are found, disturbance to nesting colonies would be avoidance during the nesting season to the maximum extent possible. Similarly, the Conservancy would avoid disturbance to tricolored blackbirds nest sites during reserve management and enhancement activities to the maximum extent practicable.

Effects of O&M Activities

Water Agencies

The water agencies would implement measures to avoid and minimize the effects of their maintenance activities on giant garter snakes. These measures could have some minor benefits to tricolored blackbird. Specifically, the water agencies would limit some of their maintenance activities to 10 percent of the canal and ditch systems annually and where vegetation control is conducted only one side of the canal would be treated annually. These measures would contribute to maintaining vegetation along the canals and ditches that could provide some nesting opportunities for tricolored blackbirds.

O&M effects on tricolored blackbirds are expected to be rare. Canals and drains that would be affected by O&M activities support only limited habitat potentially suitable for tricolored blackbird and this species is rare in the Natomas Basin. As such, they are unlikely to occur in areas where O&M activities are conducted.

Natomas Basin Conservancy

A colony of tricolored blackbirds currently occurs on the Betts-Kismat-Silva property that is part of the Conservancy habitat reserve system. It is likely that tricolored blackbird colonies will become established on other the Conservancy lands as managed marshes develop. Management activities on the habitat reserves supporting tricolored blackbirds have the potential to disturb nesting birds or directly destroy nests if vegetation supporting nesting birds is removed during the nesting season. Under the HCP, the Conservancy would avoid conducting management activities that would disturb nesting tricolored blackbirds between April to July or while birds are present.

Overall Effects on Tricolored Blackbirds

The HCP is expected to benefit tricolored blackbirds. Loss of marsh habitat has been the primary factor in the decline in tricolored blackbird (Kaufman 1996; DeHaven et al., 1975). A major component of the HCP is the creation and protection of marsh habitat. With the limited amount of marsh habitat currently in the basin, the habitat reserves would substantially increase the amount of nesting habitat available to tricolored blackbirds. One colony of tricolored blackbirds is already protected on Conservancy lands. With the creation of marsh habitat, additional colonies likely would establish on the habitat reserves and contribute to increasing the size and distribution of tricolored blackbird in California.

5.5 Swainson's Hawk (*Buteo swainsoni*)

5.5.1 Species Description

The Swainson's hawk is listed as a Threatened species under the state Endangered Species Act. Historically, this species nested throughout lowland California. The current Swainson's hawk nesting distribution, however, is limited to extreme northeastern California, the Central Valley, and a few isolated locations in the Owens Valley (CDFG, 1992, 1994). The Swainson's hawk occurs in California only during the breeding season (March through September) and winters in Mexico and South America.

Swainson's hawks begin arriving in the Central Valley from wintering grounds in March to breed and raise their young. The earliest fledging of young occurs in July and the young remain with the parents until the southern migration in early fall. Swainson's hawk nesting preference is for large valley oaks (*Quercus lobata*), cottonwoods (*Populus fremontii*), or willow (*Salix goodingii*).

Swainson's hawks are opportunistic feeders, flushing prey (birds, rodents and some insects) from fields, pastures and grasslands adjacent to their nests. Swainson's hawks prefer large nesting trees with a panoramic view of their foraging grounds. Foraging habitats, open fields and grasslands, need to be within flying distance (maximum observed is 18 miles) and large enough to support the high densities of microtine rodent populations and birds upon which they feed.

Swainson's hawks have been observed foraging following farm machinery (moving harvester blade or disc) and capturing rodents exposed by ground disturbance (Estep, 1989). Suitable cover types for foraging habitats include, in order of suitability: (1) native grassland; (2) agricultural fields soon after discing; (3) alfalfa and other hay crops: (4) fallow fields; (5) lightly grazed pasture; (6) combinations of hay, grain, and row crops; (7) rice fields prior to flooding and after draining; and (8) heavily grazed pasture. Flooded rice fields were formerly thought to be unsuited for foraging, but recent observations indicate that its system of levees and checks is used by Swainson's hawks (Dave Zezulak, CDFG, pers. comm.) Unsuitable cover types for foraging habitat include vineyards, mature orchards, cotton, thistle in fallow fields and any crop where prey are unavailable due to high vegetation height and density.

Although nest sites are not found exclusively in riparian habitat, more than 87 percent of the known nest sites in the Central Valley are within riparian systems (Estep, 1984; Schlorff and Bloom, 1984). This is primarily a function of tree availability and not a preference for large riparian stands or the presence of other components of a riparian forest. Swainson's hawks also nest in mature roadside trees, isolated individual trees in agricultural fields, small groves of oaks, and trees around farm houses (CDFG, 1992, 1994).

Swainson's hawk nesting in the Natomas Basin occurs primarily in the western portion of the basin (Figure 5-1). Most nest sites are located along the Sacramento River where large trees are available. The most recent survey of the Natomas Basin (SHTAC 2001) shows 35 nest sites along the Sacramento River (22 on the east side and 13 on the west side). Twenty-seven nest sites are located elsewhere in the basin, for a total of 62 nest sites in or

immediately adjacent to the Natomas Basin. Two of these sites are considered abandoned because the nest trees have been removed.

In 2000, the Swainson's Hawk Technical Advisory Committee monitored 24 known nesting sites in the Basin, of which 17 were used in 2000. Of these, only 10 successfully nested in 2000 (i.e., reared young to fledging), producing a total of 20 fledglings (SHTAC, 2000). During 2001 surveys, two new territories were found in the interior of the Natomas Basin and a third new site was found adjacent to the East Main Drainage Canal (SHTAC, 2001). Of the 27 territories in the Basin, 19 were used in 2001.

5.5.2 Environmental Effects

Effects of Changes in Habitat

The Natomas Basin supports both nesting and foraging habitat for Swainson's hawks. For nesting, Swainson's hawks typically use riparian forest habitats where large trees are available, but can use isolated trees or groves of trees outside of riparian zones (SHTAC, 2000). Of the existing land use types in the Natomas Basin (see Section 4.0) Riparian, Oak Groves, and Tree Groves are considered potential nesting habitat for Swainson's hawk. Based on these land use types, the area covered by the HCP supports about 328 acres of nesting habitat for Swainson's hawk. This acreage does not include riparian habitat along the Sacramento River on the westside of the levees, which is outside of the HCP area.

Foraging habitat for Swainson's hawk consists of alfalfa, grasslands, pasture and certain row crops such as tomatoes and sugar beets. Lands designated as "idle" and "ruderal" also provide foraging opportunities for Swainson's hawk. Although Swainson's hawks have been observed to forage along the margins of rice fields when the fields are flooded, rice provides relatively little habitat for Swainson's hawk; therefore, this habitat type is not considered as foraging habitat in this analysis. Based on this characterization, the Natomas Basin supports about 22,051 acres of foraging habitat for Swainson's hawk. The habitat classes (from Tables 4-3 and 4-4) that provide potential nesting and foraging habitat for Swainson's hawk and the changes in acreage from implementing the HCP are presented in Table 5-5.

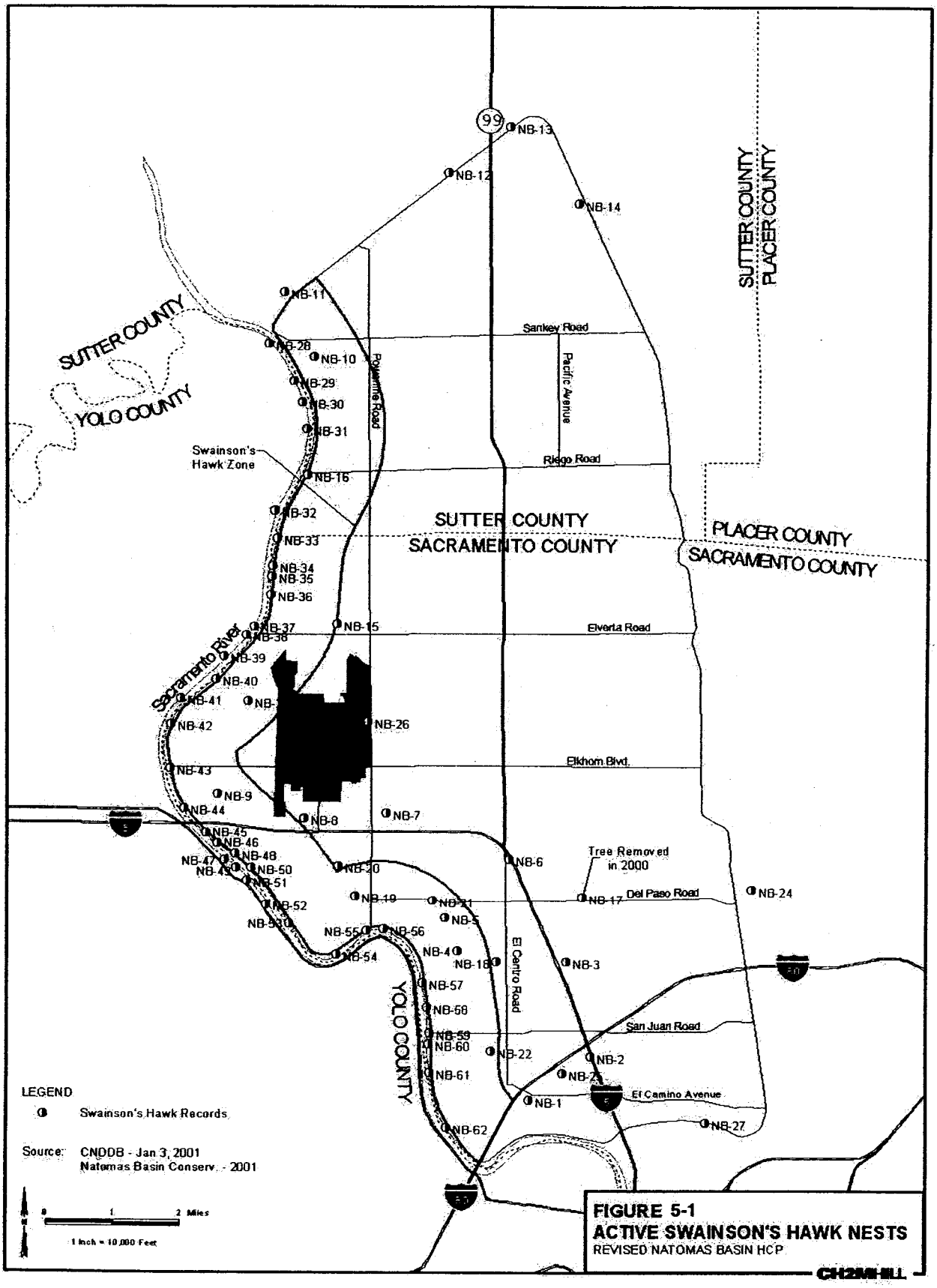


FIGURE 5-1
ACTIVE SWAINSON'S HAWK NESTS
REVISED NATOMAS BASIN HCP

CH2MHILL

TABLE 5-5
Change in Potential Habitat for Swainson's Hawk (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Nesting Habitat						
Riparian	124	(24)	0	0	(24)	100
Oak Groves	98	(6)	(2)	0	(8)	89
Tree Groves	106	(10)	(23)	0	(33)	73
Total Nesting	**328**	**(40)**	**(25)**	**0**	**(65)**	**263**
Foraging Habitat						
Alfalfa	371	0	0	0	0	371
Idle	1,464	(675)	(50)	(8)	(733)	731
Non-rice Crops	16,686	(4,663)	(325)	(1,529)	(6,517)	10,169
Grassland	886	(427)	0	(134)	(560)	325
Pasture	674	(23)	(22)	(101)	(147)	527
Ruderal	1,970	(1,137)	(6)	(88)	(1,231)	739
Total Foraging	**22,051**	**(6,925)**	**(403)**	**(1,860)**	**(9,188)**	**12,862**

(#) decrease in acreage

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

The land use analysis indicates that urban development could reduce potential nesting habitat by 65 acres. The change in the amount of nesting habitat, however, would be substantially less than this amount, and occupied nesting habitat could increase under the HCP. Loss of 8 acres of oak groves is attributable to three isolated groves in the Willow Creek area of the City of Sacramento and one 2-acre oak grove on the Metro Air Park property. The 24 acres of riparian lands are primarily located along the east side of Fisherman's Lake. This area is not designated as exempt from paying HCP fees, and therefore is included in the calculation of areas to be developed. This riparian habitat, however, would not be developed because of the open space buffer to be created in this area under the HCP. A small area of riparian habitat is also located near the northbound I-5 offramp to Del Paso Road. Loss of 33 acres of tree groves is primarily associated with a 21-acre grove in the Metro Air Park property. A 6-acre tree grove has been incorporated into the landscape features of the River View Oaks office complex, and a 1.5-acre tree grove will be preserved as part of the Whitter Ranch historic farm. Three remaining groves totaling approximately 4.5 acres are located as follows: one near the recently annexed City area near where I-80 crosses the Sacramento River, one west of I-5 near the proposed South Loop Road overpass, one in the City's proposed annexation area immediately south of Elkhorn Boulevard, and one in the Sutter County Industrial-Commercial Reserve north of Sankey Road. These four parcels were assumed to be lost to urban development.

None of the Riparian habitat, Oak Groves or Tree Groves that could be lost because of urban development contain Swainson's hawk nest sites. Thus, the projected habitat change would

not directly affect the existing Swainson's hawk population in the Natomas Basin. The HCP also includes measures to protect these and other existing habitat areas that could be used by Swainson's hawks for nesting in the future. The HCP requires:

- Avoiding removal of known nest trees if practicable
- Preserving valley oaks wherever possible
- Preserving and restoring riparian habitat, particularly at Fisherman's Lake (See Section V.5.b of the HCP)

These measures would contribute to maintaining existing nesting opportunities for Swainson's hawks.

The HCP also includes measures to increase nesting opportunities for Swainson's hawks over the 50 year project life. Specifically,

- Riparian trees would be planted on the Conservancy lands.
- Fifteen saplings would be planted for every Swainson's hawk nest tree impacted by development.
- The City would plant 60 sapling trees within 14 months of approval of the HCP.
- A tree planting program would be implemented to plant trees throughout the Basin (See Section V.5.b of the HCP).

It is estimated that four territories could be impacted by development in the City. To reduce the temporal effects associated with the potential loss of these territories, the City would advance funding to plant 60 sapling trees within 14 months of approval of the HCP; thus accelerating development of alternate nest sites to those expected to be impacted by development. The tree planting program and incorporation of riparian trees into the Conservancy's habitat reserves would be particularly beneficial because they could facilitate an increase in the number of territories. Portions of the Natomas Basin, particularly the east, support foraging habitat but provide few nesting opportunities. As a result, the available foraging habitat could be underused. The tree planting program and incorporation of riparian trees on the habitat reserves could create nesting opportunities in areas with limited nesting habitat but that have adequate foraging habitat and overall increase the nesting population of hawks in the basin.

In addition to these measures, the HCP recognizes the importance of nesting habitat along the Sacramento River and at Fisherman's Lake. Under the HCP, a goal of "no net loss" of nesting habitat would be established for the Swainson's hawk zone and no development in the Swainson's hawk zone would be permitted by under the HCP.[5] Lands would be protected around Fisherman's Lake and RD 1000 would prepare a management plan for Fisherman's Lake to maintain and/or improve its habitat value for species covered by the HCP. This area supports four Swainson's hawks' nest sites (SHTAC, 2000). With these

[5] The "Swanson's hawk zone" is defined as a corridor beginning at the Sacramento River levee, extending eastward for 1 mile, and running from the intersection of the Sacramento River and Natomas Cross Canal in the north of the Natomas Basin to the intersection of the Sacramento River and the American River in the south. For purposes of this assessment, the Swainson's hawk zone is considered to include those Swainson's hawk nest trees that are outside of but immediately adjacent to the Natomas Basin, along the Sacramento River.

measures, the known nesting sites territories associated with Fisherman's Lake would be protected and additional ones could be created with restoration of riparian habitat in this area. In combination, all of measures would act to avoid or minimize the loss of occupied and potential nesting habitat while providing additional nesting opportunities over the 50 year project life.

Potential foraging habitat for Swainson's hawk could be reduced by about 9,188 acres (a 42 percent reduction) in the Natomas Basin as a result of urban development. About 12,862 acres of potential foraging habitat would remain in the Natomas Basin. Loss of foraging habitat has the potential to indirectly impact Swainson's hawks. Under the HCP, 2,187.5 acres would be dedicated to upland habitat in permanent habitat reserves. This upland habitat could consist of existing foraging habitat for Swainson's hawk or could be created from lands that do not currently provide foraging opportunities for Swainson's hawks. If all of the upland habitat component of the habitat reserves consisted of protection of existing habitat, the net reduction in foraging habitat would be the 9,188 acres attributable to urban development. If all of the upland habitat component of the habitat reserves was created from non-habitat, then the net reduction in foraging habitat for Swainson's hawk would be about 7000.5 acres (a 32 percent reduction).

The importance of suitable foraging habitat to Swainson's hawk is influenced by its proximity to nest sites. Swainson's hawks have been found to forage up to 18 miles from nest sites, but most foraging occurs much closer to nest sites. Foraging habitat located closer to nest sites is considered to be more important than foraging habitat at greater distances. The CDFG considers habitat within 1.0 mile of the nest site as more valuable foraging habitat than habitat at greater distances. The acreage of foraging habitat for Swainson's hawk within 1 mile of nest sites is presented in Table 5-6. Of the 22,051 acres that provide potential foraging habitat for Swainson's hawk in the Natomas Basin, about 12,446 acres are within 1 mile of a known nest site.

TABLE 5-6
Change in Foraging Habitat Within 1 Mile of Swainson's Hawk Nest Sites (acres)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	280	0	0	0	0	280
Grassland	51	(21)	0	0	(21)	30
Idle	619	(264)	(47)	0	(311)	308
Non-rice Crops	9,698	(2,523)	(232)	(159)	(2,915)	6,784
Pasture	353	(3)	(20)	0	(23)	330
Ruderal	1,444	(868)	(6)	(5)	(879)	565
Total	**12,446**	**(3,679)**	**(305)**	**(165)**	**(4,149)**	**8,297**

(#) decrease in acreage

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

Most of the nest sites in and immediately adjacent to the Natomas Basin are within the Swainson's Hawk Zone along the Sacramento River. In addition to these nest sites, the Natomas Cross Canal supports several nest sites. Based on the location of planned urban

development, conversion of potential foraging habitat to urban uses would generally occur at distances of greater than 1.0 mile from nest sites. Of the 12,446 acres of foraging habitat within 1 mile of a nest site, urban development is predicted to convert 4,149 acres of foraging habitat. More than half this acreage would consist of non-rice crops. With implementation of the HCP, 2,187.5 acres would be acquired and protected and upland habitat created or enhanced as foraging habitat for Swainson's hawk. If upland habitat for the reserves is created from areas that currently do not provide foraging habitat, up to 2,187.5 acres of additional foraging habitat could be created in the basin under the HCP. The Conservancy would set as a top priority the acquisition of upland reserve sites in the Swainson's hawk zone. Following approval of the HCP, Sutter County would initiate a general plan amendment process to redesignate the portion of the IRC in the Swainson's hawk zone as agriculture. This redesignation would provide additional assurance that foraging habitat would be maintained for Swainson's hawks.

The net reduction would be at least partially, if not entirely, offset by the greater quality of upland habitat in the habitat reserves. The predominant habitat that would be lost would be non-rice crops. Non-rice crops (e.g., row crops) are used less (Estep, 1989; Babcock, 1995) and considered poorer quality foraging habitat for Swainson's hawk than native grasslands, alfalfa, and pasture. Upland habitat in the reserves would be alfalfa or native grassland and would be managed specifically to provide foraging habitat for Swainson's hawk. Further, the upland habitat in the reserves would be available throughout the entire period of time that the hawks are in the basin and would be stable in amount and location over the long term. In agricultural fields, Swainson's hawks often concentrate foraging in agricultural fields during or immediately following harvest (Estep, 1989). When the fields are not being harvested, prey in agricultural habitats might not be accessible to Swainson's hawks such that the effective amount of habitat is less than indicated by the total acreage. Crop types also fluctuate in the Natomas Basin and could shift over time to crops that are less favorable to Swainson's hawks for foraging. The habitat reserves would provide certainty of the amount, quality and location of foraging habitat.

Within the habitat reserves, upland habitat would be managed specifically to produce prey for Swainson's hawks. In addition to the upland habitat in the reserves, Swainson's hawks could use portions of the managed marsh and at times rice fields. To provide overwintering habitat for giant garter snakes, managed marshes would include upland areas. These areas also would provide foraging opportunities for Swainson's hawks. Some of the managed marshes would be seasonal and would not be inundated during the late spring and summer. When not flooded, seasonal marshes could be used by Swainson's hawks if the marshes are colonized by small mammals. Similarly, rice fields could provide foraging opportunities for hawks for a couple months each year when they are dry. Under the HCP, 10 percent of the rice on the habitat reserves would be fallowed each year which would further provide potential foraging opportunities. Collectively, the habitat reserves effectively would provide greater of foraging opportunities than suggested by the upland component alone, although a the specific amount of foraging habitat available in any given year cannot be quantified.

Importantly, the Conservancy would monitor future proposed development in the Swainson's hawk zone, where the majority of known Swainson's hawk nest sites are located. Based on existing general plans, development in this zone is expected to be limited

over the term of the HCP. If urban development does occur, however, reserve lands established as mitigation for that development would, likewise, be located within the Swainson's hawk zone. In addition, the Conservancy would set as a top priority the acquisition of upland reserve sites in the Swainson's hawk zone (via easement or land purchase), irrespective of any specific development proposals in this area. These actions would help maintain foraging habitat in proximity to a majority of the nesting sites and mitigate losses in the amount of potential foraging habitat in the basin.

Effects of Construction Activities

Urban development and the construction of habitat reserves have the potential to displace and or disturb nesting Swainson's hawks. Nest disturbance from the operation of heavy construction equipment and continued presence of activity near nest sites could cause Swainson's hawks to abandon a nesting attempt or interfere with incubation and feeding of young in a way that reduces nesting success.

The HCP includes measures to avoid and minimize the potential for impacts to Swainson's hawks from construction associated with urban development and for the habitat reserves (Section V). These measures include:

- Pre-construction surveys to determine whether any Swainson's hawk nest sites occur on or within 1/2 mile of the lands designated for development.
- Timing restrictions for construction activity if an occupied Swainson's hawk nest is identified (i.e., defer construction activities until after the nesting season) and then, if unavoidable, the nest tree may be destroyed during the non-nesting season.
- An onsite biological monitor (CDFG-approved raptor biologist) would be assigned to the project if construction or other project-related activities that could cause nest abandonment or forced fledging are proposed within the 1/4 mile buffer zone.

In combination, these measures would help ensure that nest sites are identified prior to the start of construction and that actions are taken to minimize or avoid adverse effects to the birds during the nesting season.

Effects of O&M Activities

Water Agencies

O&M activities by RD 1000 and Natomas Mutual could affect Swainson's hawks during their breeding season. Isolated trees along the canal and ditch system support nesting by Swainson's hawks. Nesting birds could be affected by noise from maintenance equipment such as mowers and construction equipment used for sediment removal as well as human activity in the vicinity of an occupied nest. Swainson's hawks that nest in trees along irrigation canals and ditches have selected and used these trees coincident with the on-going activities. Swainson's hawks that nest in trees on irrigation canals and ditches have successfully fledge young (SFTAC, 2001). Thus, no adverse effects to Swainson's haws are anticipated as a result of on-going O&M activities.

O&M activities by RD 1000 and Natomas Mutual also have the potential to indirectly affect Swainson's hawks through vegetation control and rodent control practices along the ditches and canals. Canal banks can provide foraging opportunities for Swainson's hawk. O&M

practices can influence the quality of canal banks as foraging opportunities for Swainson's hawk through effects on vegetation and directly through rodent control. Under the HCP, the water agencies would implement best management practices on maintain vegetative cover on the ditches and canals to provide food and protection for prey species (Section V). The water agencies also would limit rodent control measures to those necessary to maintain structurally sound flood control levees.

Natomas Basin Conservancy

The Conservancy would manage the habitat reserves to provide nesting and foraging habitat for Swainson's hawk. Thus, the Conservancy's operations and maintenance activities overall would have beneficial effects on Swainson's hawk. For example, under the HCP, the Conservancy would manage upland habitats on the reserves to support mice and insects to support a prey base for the hawks. If Swainson's hawks nest on the habitat reserves, O&M activities would have the potential to disturb nesting birds. Under the HCP the Conservancy would implement take avoidance measures to minimize potential take that could occur during habitat enhancement and management activities on reserve lands. the Conservancy would ensure that all such take avoidance measures as are necessary and appropriate are included in reserve management plans, as well as additional measures determined to be necessary during the development of management plans.

Overall Effects on Swainson's Hawk

Swainson's hawks once were one of the most common raptors in California. The breeding population in California has been estimated at about 10 percent of its historic level (Bloom, 1980). The substantial reduction in riparian forest and oak woodland habitat that Swainson's hawks use for nesting has been considered the primary cause of this species decline in California. Conversion of grassland to agricultural and urban also could have contributed to declines although, the hawks have adapted to using some types of agricultural fields for foraging. It is uncertain if the availability and quality of foraging habitat is currently a limiting factor for Swainson's hawk in the Natomas Basin.

Currently, there are 892 known Swainson's hawk nesting site occurrences in California. Three of these occurrences have been extirpated, and seven reported nest sites have not been relocated. Of the remaining 882 known occurrences presumed extant, 141 are reported in Sacramento County, and 53 are reported from Sutter County (CDFG, 2001). The most recent survey of the Natomas Basin (SHTAC, 2001) shows 35 nest sites along the Sacramento River (22 on the east side and 13 on the west side) and 27 nest sites located elsewhere in the basin, for a total of 62 nest sites in or immediately adjacent to the Natomas Basin. Two of the sites in the basin are considered abandoned.

Not including the two abandoned territories, seven of the known nest sites are within the approved development areas of the HCP. Five of these sites are located within the City and two are within Metro Air Park. Except for one of the sites, all were used in 2001. These seven nest sites have the greatest potential to be affected by covered activities, which could result in the direct loss of nesting habitat at these sites if removal of nest trees is not be avoided or the territories could be abandoned because of the indirect effects of reduced foraging habitat around the nest site. If the nest trees are retained, three of the territories in the City (NB-1, NB-2, and NB-25) would probably remain viable because of the large amount of foraging habitat available within about 0.25 mile between the City's western edge and the

Sacramento River. The remaining two territories in the City (NB-3 and NB-25) would be surrounded by urban development and would be 0.5 to 1.0 mile from alternative foraging habitat. These territories could be abandoned. There are territories in the Natomas Basin, however, that are surrounded by urban development and are more than one mile from suitable foraging habitat but that have successfully fledged young. Thus, these territories could remain occupied if the nest tree is retained. One of the territories in the Metro Air Park area is within about 0.25 mile of foraging habitat that would not be developed and therefore would not be expected to be lost because of reduced foraging habitat at Metro Air Park. The second nest site at Metro Air Park (NB-26) was a new site in 2001. Fallowing of rice fields in the Metro Air Park property in the last few years could have facilitated establishment of this territory. Little alternative foraging habitat is available near this nest site and it could be abandoned with development of Metro Air Park.

Overall, three territories are considered at risk to be abandoned. Although these sites have the greatest potential of those in the basin to be affected by urban development it is uncertain if they would be abandoned. Nevertheless, the HCP includes actions to offset a potential loss of territories, specifically the creation of additional nest sites at the habitat reserves, implementation of the tree planting program, and restoration of riparian habitat. A short-term reduction in the number of territories could occur prior to the development of alternate nest sites but over the long term the HCP would encourage the establishment of new territories as long as nesting habitat and not foraging habitat is the primary limiting factor.

Urban development could reduce the amount of foraging habitat available within the Natomas Basin as a whole. However, few territories likely would be abandoned a result of the projected reduction in foraging habitat acreage for the following reasons:

- Loss of potential foraging habitat would primarily occur away from nest sites where it is less valuable to nesting Swainson's hawks
- Maintenance of foraging habitat with the Swainson's hawk zone would be a focus of the HCP and most of the nest sites are located in this zone
- Upland reserves would be managed to provide better quality foraging habitat for Swainson's hawk than is provided in agricultural fields
- Foraging habitat is probably not currently limiting because of the large amount of agricultural fields available in and around the Natomas Basin and the ability for Swainson's hawks to forage over large distances

Lastly, upland reserve sites in the Swainson's hawk zone would be acquired with habitat contiguity as a primary consideration. The acquisitions by the Conservancy would ensure that substantial amounts of Swainson's hawk habitat would be maintained in close proximity to occupied nesting habitat. In addition acquisition would ensure that upland habitats would be selected using a strategy that maximizes the Conservancy's ability to maintain Swainson's hawks in the basin (i.e., upland habitats would not be randomly selected for the reserve system, either inside the zone or outside). For these reasons, the reduction in foraging habitat is not expected to result in the loss of territories associated with nest trees located outside of the areas proposed for development.

5.6 Aleutian Canada Goose (*Branta canadensis leucopareia*)

5.6.1 Species Description

The Aleutian Canada goose was delisted by the USFWS on March 20, 2001 (FR 66:15643), and is considered a federal Species of Concern because of ongoing monitoring activities pursuant to the delisting. The Aleutian Canada goose is a subspecies of the Canada goose, characterized by its smaller size and a distinctive white ring at the base of its black neck. The primary winter habitat for the goose's largest population segment is the Central Valley, and most of this population can be found by mid-December in the Modesto area (FR 66:15643). Foraging habitat consists of pasture, flooded rice fields, and harvested fields (USFWS, 1991). In addition, large ponds, flooded fields, and rice checks provide roosting habitat for the wintering geese (USFWS, 1991).

Currently, there are 13 known occurrences of wintering Aleutian Canada geese in California (CDFG, 2001). Of these 13 occurrences, 4 occur in Sutter County. These occurrences are all located in agricultural fields around the Sutter County/Colusa County line, north of the HCP area. There are no known occurrences in the HCP area. Aleutian Canada geese, however, likely stop in the Natomas Basin for brief periods during migration to and from their traditional wintering areas.

Additional information about the Aleutian Canada goose can be found in the HCP (Section II.C.4.a.), in the *Federal Register* notice that delists the species (FR 66:15643; March 20, 2001), and in the USFWS's Recovery Plan for the species (USFWS, 1991).

5.6.2 Environmental Effects

Effects of Changes in Habitat

Aleutian Canada geese do not breed or winter in the Natomas Basin, but could use habitats in the Natomas Basin as a migratory stopover while migrating between breeding grounds in Alaska and wintering grounds in the San Joaquin Valley. Pasture, rice fields, and other croplands is the Natomas Basin could be used by migrating geese for foraging or roosting. Currently, much of the Natomas Basin (40,053 acres) could be used by Aleutian Canada geese. The habitat classes (from Tables 4-3 and 4-4) that provide potential habitat for the Aleutian Canada goose and the changes in acreage from implementing the HCP are presented in Table 5-7. It is important to note that only a portion of the areas designated as "non-rice crops" constitute potential habitat for the Aleutian Canada goose. Only grain crops such as corn and wheat would likely be used by Aleutian Canada geese; non-grain crops such as tomatoes do not provide habitat. As such, the amount of habitat for Aleutian Canada geese is overestimated in Table 5-7.

TABLE 5-7
Change in Potential Habitat for Aleutian Canada Goose (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Non-rice crops	16,686	(4,663)	(325)	(1,529)	(6,517)	10,169
Pasture	674	(23)	(22)	(101)	(147)	527

TABLE 5-7
Change in Potential Habitat for Aleutian Canada Goose (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Rice (roosting and foraging)	22,693	(970)	(1,541)	(5,577)	(8,087)	14,606
Total	**40,053**	**(5,656)**	**(1,888)**	**(7,207)**	**(14,751)**	**25,302**

(#) decrease in acreage

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

Under the HCP, the total amount of potential habitat for the Aleutian Canada goose would be reduced by about 14,750 acres because of urban development. With urban development of 17,5000 acres, an estimated 25,302 acres of potential habitat for Aleutian Canada geese would remain in the Basin. The basin would continue to provide for use by migrating geese given this abundance of potential habitat.

This net reduction in potential habitat for the Aleutian Canada goose is unlikely to result in take of individual geese or affect the viability of the species. Potential habitat would remain abundant in the basin and agricultural areas are present and abundant both north and south of the basin. State and federal refuges also are distributed along the Central Valley and are managed to provide wintering and stopover habitat for ducks and geese. Further, the Aleutian Canada goose was listed as threatened because of threats on the species' breeding grounds in Alaska; the availability of migratory habitat has not been identified as a limiting factor for this species. Thus, projected changes in the amount of habitat in the Natomas Basin potentially used by Aleutian Canada geese would not be expected to affect the species' population. In the event that use of the Natomas Basin by Aleutian Canada geese increases in the future, the Conservancy would to use applicable Service-approved recovery or management plans to implement any additional conservation measures deemed appropriate.

The net loss of potential habitat would be at least partially offset by creation and protection of the habitat reserves. All of the habitats on the 8,750 acres in the reserve system would provide potential habitat for Aleutian Canada geese in perpetuity. The system of reserves would provide a mosaic of wetland, upland and agricultural habitats, all of which could be used by Aleutian Canada goose. The reserves would be protected in perpetuity, thereby providing certainty of the availability of stopover habitat for Aleutian Canada geese over the long-term. The stability and quality of habitat provided by the proposed system of permanent reserves would help ensure that Aleutian Canada geese could continue to use the Natomas Basin as a stopover area on their migration.

Effects of Construction Activities

Construction activities associated with urban development or creation of habitat would not be expected to adversely affect Aleutian Canada geese. Potential effects would be limited to displacement of birds foraging or roosting on a field during the initial phases of construction when fields are graded. Aleutian Canada geese only occur in the basin for brief periods during migration and in small numbers during migration such that the potential for construction activities to coincide with the presence of Aleutian Canada geese is minimal.

Effects of O&M Activities

Water Agencies

O&M activities by RD 1000 and Natomas Mutual are unlikely to affect the Aleutian Canada goose. These activities would be focused on canals and drains, which do not provide suitable habitat for this species. Further, the Natomas Basin is of limited importance to the Aleutian Canada goose, and the species is highly mobile during potential stopover periods in the Natomas Basin.

Natomas Basin Conservancy

Ongoing maintenance of the habitat reserves would be unlikely to affect the Aleutian Canada goose. Potential effects would be limited to displacement of birds foraging or roosting on a field. Potential disturbance would be of limited scope and short duration. Also, Aleutian Canada geese only occur in the basin for brief periods during migration and in small numbers during migration such that the Conservancy could schedule O&M activities to avoid disturbance. If hunting is allowed on the reserves, CDFG requirements would be followed. Hunting would not be allowed if it conflicted with the species' ongoing recovery.

Overall Effects on Aleutian Canada Goose

Aleutian Canada geese use the Natomas Basin to a limited degree during their seasonal migrations. Potential habitat is expected to remain abundant under the HCP. This species is not believed to be limited by wintering habitat such that the reduction in the potential in the Natomas Basin would not be expected to have any effects on the population. The habitat reserves under the HCP would provide high-quality habitat that is stable in amount and location in perpetuity. The long-term availability of this habitat could be beneficial to the Aleutian Canada goose if future development in the Central Valley substantially reduces other wintering and migratory habitat.

5.7 Burrowing Owl (*Athene cunicularia*)

5.7.1 Species Description

Burrowing owls are considered a Species of Concern by the USFWS, and a Species of Special Concern by CDFG. Burrowing owls are small, long-legged birds of open terrain that use vacated animal burrows (e.g. ground squirrel burrows) or artificial structures (e.g., culverts) for nesting and shelter. Generally, foraging habitat consists primarily of open grasslands and grass/shrub lands where prey species (e.g., insects and small mammals) are readily available. The species is often found in roadsides and other disturbed areas inhabited by ground squirrels and with few visual obstructions. Little scientific information is available for the local burrowing owl population (e.g. home range information and wintering versus resident status), but suitable habitat in the Natomas Basin likely consists of areas with small mammal burrows and nearby foraging areas.

Burrowing owls are neotropical migrants that occur throughout the western United States, including portions of northern Mexico and southern Canada. The species is also locally distributed throughout suitable habitat in the Caribbean, and in Central and South America (Haug, et al., 1993). California appears to have a non-migratory population (primarily in the

Imperial Valley), and is also a wintering ground for burrowing owls from other regions. Burrowing owls in Northern California are probably migratory, but little information is known about the migration habitats of the Northern California population (Haug, et al., 1993). The burrowing owl population is known to be in decline throughout its range because of various factors including habitat destruction (e.g., agricultural practices and land development), vehicle collisions, and predation. In California, and in the Natomas Basin specifically, urbanization is likely a key threat to this species.

There are 370 known burrowing owl occurrences in California (CDFG, 2001). Three hundred of these occurrences are considered extant. Eighteen occurrences are known in Sacramento County, of which 17 are considered extant. Three occurrences are recorded in the Natomas Basin, with another three known burrowing owl sites on the Conservancy's Betts-Kismat-Silva property. One occurrence is known in Sutter County. This occurrence is also considered extant (CDFG, 2001).

Burrowing owls are a permanent resident in California, but additional wintering owls also occur in the state. Burrowing owls occur in low numbers in the HCP area, but no systematic surveys have been conducted in the Plan area. One burrowing owl was observed near a burrow on the Metro Air Park project site in March 2000. The owl was observed along Powerline Road between Elverta Road and Elkhorn Boulevard on a canal bank (Thomas Reid Associates, 2000). Burrowing owls also occur at the Sacramento International Airport. During HCP habitat mapping surveys, three pairs of burrowing owls were observed along a water conveyance canal in the eastern portion of the Plan area. Burrowing owls also have been observed northeast of the intersection of San Juan and El Centro Roads and west of East Levee Road on the south side of Elkhorn Boulevard (CDFG, 2001).

5.7.2 Environmental Effects

Effects of Changes in Habitat

Burrowing owls are associated with open grassland habitats. They are dependent on burrowing mammals particularly ground squirrels to excavate burrows and thus, their occurrence and distribution is linked to these mammals. In the Natomas Basin, grasslands and pastures provide nesting and foraging habitat for burrowing owl. Burrowing owls also could forage in alfalfa but nesting would not be expected because of routine disturbance caused by harvesting. Burrowing mammals often create burrows in road and canal embankments and burrowing owls can be found nesting in these areas. For this analysis, grassland, pasture and alfalfa are considered habitat for burrowing owl. Based on this definition, the Natomas Basin supports about 1,931 acres of potential habitat for burrowing owl. The habitat classes (from Tables 4-3 and 4-4) that provide potential habitat for burrowing owl and the changes in acreage from implementing the HCP are presented in Table 5-8.

TABLE 5-8
Change in Potential Habitat for Burrowing Owl (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Grassland	886	(427)	0	(134)	(560)	325
Pasture	674	(23)	(22)	(101)	(147)	527
Total	**1,931**	**(450)**	**(22)**	**(235)**	**(707)**	**1,223**

(#) decrease in acreage

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

Under the HCP, urban development would impact about 700 acres of potential habitat for burrowing owl. Most of the habitat that would be lost would be grassland and pasture in the northern portion of the City's "panhandle" annexation area and the northeastern portion of Sutter County's Industrial-Commercial Reserve. This habitat loss would be offset by the upland mitigation strategy.

The upland mitigation strategy of the HCP is to create and maintain optimum nesting and foraging habitat for Swainson's hawk. Upland foraging habitat for Swainson's hawk includes open grassland and pasture areas and field crops (e.g., alfalfa) that are also suitable habitat for burrowing owl. Thus, the 2,187.5 acres of upland habitat in the reserves would be suitable for both burrowing owl and Swainson's hawk. Uplands associated with the wetland reserves could provide additional habitat.

In addition to increasing the total amount of habitat for burrowing owls, habitat in the reserve system would provide better habitat conditions for burrowing owl than the habitat that would be lost. The HCP requires specific management requirements for burrowing owls on the proposed system of upland reserves. Key requirements include creating mounded areas suitable for burrowing owl nesting, enhancing prey populations, and avoiding disturbance during management activities.

In addition to reducing habitat availability, urban development in areas adjacent to burrowing owl colonies can indirectly impact this species. Free-ranging domestic cats are often introduced to an area by the establishment of residential areas. Residential development close to burrowing owl colonies could increase predation by cats. Nearby residential areas could also lead to harassment of owls by human. In a Florida study area, harassment of owls by children was a leading cause of nest failures by burrowing owls (Millsap and Bear 2000). Under the HCP, habitat reserves would be located at least 800 feet from urban areas and areas designated for urban development in applicable plan (unless a smaller distance is approved by CDFG and USFWS on a case-by-case basis) and human access would be controlled. With these provisions, predation by cats and harassment by human would be reduced although not necessarily eliminated.

Effects of Construction Activities

Burrowing owls could be directly affected by construction activities associated with urban development and habitat creation on the habitat reserves. Earth-moving activities can trap

or injure owls in their burrows. The HCP requires the following measures to avoid impacts to burrowing owls:

- Pre-construction surveys would be conducted prior to the initiation of grading or earth disturbing activities site to determine if any burrowing owls are using the site for foraging or nesting. If nest sites are found, the CDFG shall be contacted regarding suitable mitigation measures, which may include a 300 foot buffer from the nest site during the breeding season (March 15 - August 31), or a relocation effort for the burrowing owls. Results of the pre-construction survey would be submitted to the land use agency with jurisdiction over the site prior to commencement of construction activities.
- If future surveys reveal the presence of burrowing owls on the project site, the applicant/developer would prepare a plan for relocating the owls to a suitable site.

By following these measures, the potential for injury of or trapping owls in their burrows would be reduced. These measures also require relocation of owls and habitat protection if a colony is displaced by construction. With this requirement, there would be no net change in the number of colonies as a result of urban development.

On the habitat reserves, habitat creation would be designed and conducted so as to avoid impacts to burrowing owl colonies. For example, the habitat creation plan for the Betts-Kismat-Silva property maintains the existing burrowing owl colonies intact. If future land acquisitions support burrowing owl colonies, they would be similarly protected.

Effects of O&M Activities

Water Agencies

O&M activities conducted by RD 1000 and Natomas Mutual have the potential to affect burrowing owls directly and indirectly. Activities such as sediment removal have the potential to trap owls in their burrows. Because burrowing owls do not inhabit canal and ditch embankments to a large degree, however, impacts to the burrowing owl population are expected to be infrequent and to affect a small number of owls. Rodent control activities have the potential to indirectly affect burrowing owls. Burrowing owls are dependent on burrowing rodents to create burrows. Under the HCP, the water agencies would only conduct rodent control activities as necessary to maintain structurally sound flood control levees. While not avoiding this potential impact entirely, this measure would reduce the potential impacts of these activities on populations of burrowing mammals on which the burrowing owl depends.

Natomas Basin Conservancy

The Conservancy would avoid impacts to burrowing owls during management activities of the habitat reserves by following CDFG's Staff Report on Burrowing Owl Mitigation.

Overall Effects on Burrowing Owl

With the increased amount and quality of habitat for burrowing owls and long-term protection of habitat in the reserve system, the HCP would improve habitat conditions for burrowing owl in the Natomas Basin. Reserve acquisitions to date have included known burrowing owl populations (i.e., Betts-Kismat-Silva), and it is likely that burrowing owls would occur on future reserve lands such that the number of colonies is areas permanently protected would increase. The overall combination of the measures (i.e., pre-construction

surveys for covered species and their habitat); species-specific measures (e.g., avoidance of burrow sites during the breeding season both within development lands and reserve lands, species relocation); additional mitigation according to CDFG guidelines; and long-term protection, creation, and enhancement of upland habitat in the reserve system would be expected to at least maintain the existing population level of burrowing owl in the Natomas Basin and potentially increase it over time.

5.8 Bank Swallow (*Riparia riparia*)

5.8.1 Species Description

The bank swallow is state listed as a Threatened species under the California Endangered Species Act. Historically, bank swallows nested on coastal bluffs in southern California and riverbanks throughout the Central Valley and northern California; however, the state's nesting population of bank swallow is currently concentrated on the banks of Central Valley streams. Approximately 75 percent of the current breeding population occurs along banks of the Sacramento and Feather Rivers. Other colonies persist along the central coast from Monterey to San Mateo counties, and northeastern California in Shasta, Siskiyou, Lassen, Plumas, and Modoc counties (Remson, 1978). There are no known breeding colonies remaining in southern California.

The bank swallow occurs in California during the breeding season (May through July) and winters in South America. Bank swallows begin arriving in the Central Valley from wintering grounds in South America in early March to breed and raise their young. Numbers decline in July and August as nesting colonies are abandoned and migration begins. Colonies are vacant by early August and some migrants could be observed through early- to mid-September. Bank swallows are rarely seen in California during the winter.

The bank swallow breeds from early May through July. Pairs usually nest colonially in groups of 10 to 1,500 although most colonies have 100-200 nesting pairs. Bank swallows require vertical banks or cliffs with fine-textured or sandy soils near streams, rivers, ponds, lakes, or the ocean for nesting. Bank swallows forage by hawking insects during long, gliding flights. Foraging occurs primarily over open riparian areas, but also over grassland, shrubland, and savannah habitats during the breeding season. Bank swallows feed on a wide variety of aerial and terrestrial soft-bodied insects including flies, bees, and beetles. The bank swallow uses holes dug in cliffs and river banks for cover; logs, shoreline vegetation, and telephone wires are also used for roosting.

There are 171 known bank swallow occurrences in California (CDFG, 2001). One of these occurrences is extirpated. There are 35 bank swallow occurrences (all presumed extant) in Sutter County and seven occurrences in Sacramento County (all presumed extant). Although there is no suitable nesting habitat in the Natomas Basin, bank swallows from nearby nesting colonies have the potential to forage in the Natomas Basin, and foraging could also occur during migration to nesting sites north of the Natomas Basin.

This species is a colonial nester and nests primarily in riparian and other lowland habitats west of the desert. This species requires vertical banks/cliffs with fine-textured/sandy soils to dig a nesting hole near streams, rivers, lakes, and oceans. Breeding occurs from about sea

level to as high as 6,900 feet (Small, 1994). Bank swallows tend to return to these colonial nests year after year.

5.8.2 Environmental Effects

Effects of Changes in Habitat

Bank swallows nest in vertical riverbanks with friable soils. Waterways within the Natomas Basin are largely channelized canals and ditches that are designed to resist erosion and therefore do not support suitable nesting substrates for bank swallows. Bank swallows do not nest in the Natomas Basin and the expected changes in land use do not include the removal or creation of bank swallow nesting habitat.

Bank swallows prey on insects and can forage in variety of open habitats. However, typically they concentrate foraging in riparian areas, wetlands and open water habitats (e.g., canals, ponds, and seasonally wet areas) where insects tend to be abundant. Grasslands and other croplands also could be used. There are no bank swallow nesting colonies in the Natomas Basin but bank swallows from colonies outside of the Natomas Basin or migrating birds could forage in the basin.

Bank swallows could forage in almost any open habitat in the Natomas Basin. The habitat classes (from Tables 4-3 and 4-4) that provide potential habitat for bank swallow and the changes in acreage from implementing the HCP are presented in Table 5-9. As summarized in Table 5-9, open habitats where bank swallows could forage would decline by about 15,760 acres under the HCP. This reduction in potential foraging habitat would not be expected to adversely affect bank swallows for several reasons. First, the abundance and distribution of bank swallows are determined by the availability and location of suitable nesting substrates rather than the availability of foraging habitat. Second, potential foraging habitat would remain abundant (about 27,547 acres) and, given the low level of use of the Natomas Basin by bank swallows, the habitat remaining in the basin with full implementation of the HCP would be sufficient to support the existing level of use. Also, bank swallows foraging in the Natomas Basin most likely come from nesting colonies on the Sacramento River and probably forage close to the river. The urban development contemplated under the HCP would occur away from Sacramento River and would not affect the areas likely receiving greatest use by bank swallows.

TABLE 5-9
Change in Potential Habitat for Bank Swallow (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Grassland	886	(427)	0	(134)	(560)	325
Non-rice crops	16,686	(4,663)	(325)	(1,529)	(6,517)	10,169
Pasture	674	(23)	(22)	(101)	(147)	527
Ponds and seasonally wet areas	96	(7)	(4)	(10)	(21)	75
Rice	22,693	(970)	(1,541)	(5,577)	(8,087)	14,606
Riparian	124	(24)	0	0	(24)	100

TABLE 5-9
Change in Potential Habitat for Bank Swallow (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Canals (all)	1,778	(117)	(72)	(215)	(404)	1,374
Total	**43,308**	**(6,231)**	**(1,964)**	**(7,566)**	**(15,760)**	**27,547**

(#) decrease in acreage
Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

To the extent that bank swallows use the Basin, the system of habitat reserves would be managed to provide a marsh ecosystem which would support a greater abundance and diversity of insects than agricultural fields. The creation of reserves could improve foraging opportunities for bank swallows. The habitat reserves also would be protected in perpetuity and provide habitat that is stable in quality and location. The Conservancy would manage the habitat reserves in accordance with applicable USFWS- or CDFG-approved bank swallow recovery or management plans. The HCP also contains management provisions to implement any additional conservation measures deemed appropriate if use of the Natomas Basin by this species increase in the future.

Effects of Construction Activities

No bank swallow nesting colonies are currently recorded in the Natomas Basin and such colonies are unlikely to occur because suitable nesting habitat (i.e., vertical banks with fine-textured soils) is absent. Accordingly, construction-related impacts are unlikely to occur. The HCP requires that surveys be conducted prior to the approval of urban development permit. In the event that a bank swallow nesting colony is found in a development area, impacts would be avoided during the nesting season. Similarly, in creating habitat on the habitat reserves, the Conservancy would avoid impacts during the nesting season if a nesting colony occurs on the habitat reserves.

Effects of O&M Activities

Water Agencies

O&M activities by RD 1000 and Natomas Mutual are unlikely to affect the bank swallow. These activities would be focused on canals and drains, which do not provide suitable nesting habitat for this species. O&M activities would not preclude or interfere with foraging by bank swallows.

Natomas Basin Conservancy

O&M activities by the Conservancy are unlikely to affect the bank swallows because suitable nesting habitat is not expected to occur on reserve lands. In the event that a bank swallow colony does occur on the habitat reserves, the Conservancy would avoid disturbance of colonies during the nesting season. Operation and maintenance activities would not preclude or interfere with foraging by bank swallows. If use of the Natomas Basin by bank swallows appreciably increased in the future, the Conservancy would implement additional conservation measures deemed appropriate based on applicable Service or CDFG approved bank swallow recovery or management plans, and/or the Adaptive Management provisions of the HCP.

Overall Effects on Bank Swallow

Bank swallows nest exclusively in high, steep, vertical banks typically formed on larger rivers through erosive processes. The primary contributor to this species' decline in California has probably been bank protection and flood control actions as well as flow diversions and regulations that have reduced erosive processes on Central Valley rivers. Because suitable nesting substrates do not occur in the Natomas Basin, the HCP would not affect (either positively or negatively) the species' primary limiting factor. As such, the HCP is not likely to affect this species.

5.9 Loggerhead Shrike (*Lanius ludovicianus*)

5.9.1 Species Description

The loggerhead shrike is a state Species of Special Concern. The loggerhead shrike occurs from the southern Canadian provinces south across most of the United States and into Mexico (American Ornithologists Union, 1957). The shrike is a resident species throughout the lowlands and foothills of California (Grinnell and Miller, 1944). The loggerhead shrike occurs in grasslands, agricultural lands, open shrublands, and woodlands (Bent, 1950). It prefers areas with perch sites (Zeiner et al., 1990). A study conducted in Illinois reported that shrikes were most abundant near pastures, hedgerows, cornfields, and rural residential areas (Smith and Kruse, 1992). Shrikes nest in low trees, dense shrubs, and vines. They feed on insects, small reptiles, and small mammals (e.g., mice). This species frequently skewers prey on thorns, sharp twigs, barbed wire, or forces it into a crotch to feed on or to cache for storage (Zeiner et al., 1990).

The loggerhead shrike is common throughout most of lowland California. This species is observed regularly throughout Natomas Basin (Thomas Reid Associates, 2000). Suitable nesting and foraging habitat is common throughout the Basin. Several shrikes were observed on or near the Metro Air Park project site during a site reconnaissance conducted on March 23, 2000 (Thomas Reid Associates, 2000), and three shrikes were observed along the eastern portion of the Natomas Basin during habitat mapping surveys of the Basin in 2001.

5.9.2 Environmental Effects

Effects of Changes in Habitat

In the Natomas Basin, potential foraging habitat for the loggerhead shrike primarily consists of pasture, grasslands, ponds and seasonally wet areas, croplands, orchards, and ruderal habitats. Shrikes also could nest in trees or shrubs occurring in or along the margins of these habitats. Canals, riparian areas and oak and tree groves also provide nesting opportunities for this species. The habitat classes (from Tables 4-3 and 4-4) that would provide potential habitat for loggerhead shrike and the changes in acreage from implementing the HCP are presented in Table 5-10. Based on the GIS, the Natomas Basin supports about 23,300 acres of potential habitat for loggerhead shrike (Table 5-10).

Only a portion of the potential habitat would be used by loggerhead shrikes. This species occurs in close association with small trees and shrubs which it uses as perch sites from which foraging bouts are launched and as nest sites. Small trees and shrubs are not found in

the middle of the field; rather they occur sporadically along the margins of the fields. Telephone lines along the roads also are used. Because loggerhead shrikes forage by making short forays from perch sites, they would not use the inner portions of fields that occur at some distance from perch sites. Thus, loggerhead shrikes predominantly use the margins of fields and only areas where there are perch sites. Considering the entire acreage of agricultural fields as potential habitat for loggerhead shrike overestimates the amount of habitat available to this species in the Natomas Basin.

TABLE 5-10
Change in Potential Habitat for Loggerhead Shrike (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Grassland	886	(427)	0	(134)	(560)	325
Non-rice crops	16,686	(4,663)	(325)	(1,529)	(6,517)	10,169
Oak Groves	98	(6)	(2)	0	(8)	89
Orchard	182	(13)	0	0	(13)	169
Pasture	674	(23)	(22)	(101)	(147)	527
Ponds and seasonally wet areas	96	(7)	(4)	(10)	(21)	75
Riparian	124	(24)	0	0	(24)	100
Ruderal	1,970	(1,137)	(6)	(88)	(1,231)	739
Rural Residential	377	(46)	(10)	0	(56)	321
Tree Groves	106	(10)	(23)	0	(33)	73
Canals (all)	1,778	(117)	(72)	(215)	(404)	1,374
Total	**23,348**	**(6,473)**	**(464)**	**(2,077)**	**(9,014)**	**14,332**

(#) decrease in acreage

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

Based on the GIS, potential habitat for loggerhead shrike would decline by about 9,000 acres under the HCP because of urban development (Table 5-10). Most of the potential habitat that would be lost would be non-rice crops. Non-rice crops probably provide relatively poor habitat for loggerhead shrike because this species feeds predominantly on insects and intensive management of agricultural lands strives to reduce insect pests. Further, insecticides are used to control insect pests and insecticide use is believed to be contributing to declines in loggerhead shrike populations (Kaufman, 1996).

The habitat reserves would provide 2,187.5 acres of high quality habitat for loggerhead shrike in perpetuity. This habitat would be stable in quality and location and encourage the establishment and long-term persistence of a breeding population in the Natomas Basin. Specifically to attract and maintain loggerhead shrikes, the Conservancy would encourage development and maintenance of perching and nesting sites on habitat reserves. Riparian habitat and some of the managed marsh on the reserves could provide additional nesting opportunities and foraging perch sites. The mosaic of upland, riparian and marsh habitats

on the reserves would provide nesting opportunities in close proximity to foraging habitat and provide all essential habitat features for loggerhead shrikes.

In addition to reducing habitat availability, urban development near areas inhabited by shrikes can have indirect effects. Free-ranging domestic cats are often introduced to an area by the establishment of residential areas. Residential development close to areas inhabited by shrikes could lead to increased predation by cats. Under the HCP, habitat reserves would be located at least 800 feet from urban areas and areas designated for urban development in applicable plan (unless a smaller distance is approved by CDFG and USFWS on a case-by-case basis). By locating habitat reserves away from urban areas, predation by cats could be reduced although not eliminated.

Effects of Construction Activities

Construction activities associated with development or for habitat creation on the habitat reserves could disturb or displace loggerhead shrikes. Under the HCP, preconstruction surveys for loggerhead shrikes would be conducted prior to urban development. If loggerhead shrikes are found, disturbance would be avoided during the nesting season to the maximum extent possible. Construction activities adjacent to the habitat reserves could disturb shrikes nesting on the reserves. The potential for this impact is low because the habitat reserves would be located 800 feet from urban development or lands designated for urban development (unless a smaller distance is approved by CDFG and USFWS on a case-by-case basis). On the habitat reserves, the Conservancy similarly would avoid disturbance to loggerhead shrike nest sites during construction activities for habitat creation.

Effects of O&M Activities

Water Agencies

O&M effects on loggerhead shrike are expected to be rare or infrequent. Canals and drains that would be affected by O&M activities generally do not support suitable habitat for loggerhead shrike such that they are unlikely to occur in areas where O&M activities are conducted.

Natomas Basin Conservancy

On the habitat reserves, management activities by the Conservancy could disturb or displace loggerhead shrikes nesting on the reserve. Under the HCP, the Conservancy would avoid disturbance of loggerhead shrikes during the nesting season while conducting management activities to the maximum extent practicable.

Overall Effects on Loggerhead Shrike

The net reduction in agricultural fields under the HCP likely would reduce the total population of loggerhead shrikes in the Natomas Basin. With creation and protection of high quality habitat on the habitat reserves, loggerhead shrikes probably would continue to be supported in the basin albeit probably at a reduced population level than currently exists. The current size and distribution of the loggerhead shrike population in the Natomas Basin is uncertain as are the factors determining these population characteristics. Specific habitat requirements also have not been identified for loggerhead shrikes in the Central Valley. In the absence of this information, the ability of the habitat reserves to adequately mitigate the impacts of urban development is uncertain.

5.10 Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

5.10.1 Species Description

The Valley elderberry longhorn beetle (VELB) is listed as Threatened under the federal Endangered Species Act. The valley elderberry longhorn beetle is a distinctive black and red-orange beetle with long antennae. The USFWS's Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS, 1999b) describes its habitat needs as follows:

> The valley elderberry longhorn beetle is completely dependent on its host plant, elderberry (*Sambucus* species), which is a common component of the remaining riparian forests and adjacent upland habitats in the Central Valley. Use of the elderberry by the beetle, a wood borer, is rarely apparent. Frequently, the only evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. The life cycle takes one or two years to complete. The animal spends most of its life in the larval stage, living within the stems of an elderberry plant. Adult emergence is from late March through June, about the same time as an elderberry produces flowers. The adult stage is short-lived.

The USFWS designated critical habitat for the VELB (50 CFR 17:95). Critical habitat is located along the American River Parkway in two places, upstream of the S.R. 160 overcrossing and in the Goethe Park area. In addition, the Recovery Plan designates the area along the American River east of Nimbus Dam as essential habitat, as well as an area along Putah Creek in Solano County (USFWS, 1984).

Information on the historical distribution and abundance of VELB is scarce. The substantial reduction in Central Valley riparian vegetation in the last 150 years suggests that the beetle's range has contracted and that remaining populations are discontinuous (USFWS, 1984). The USFWS's Programmatic Formal Consultation Permitting Projects with Relatively Small Effects on the Valley Elderberry Longhorn Beetle within the Jurisdiction of the Sacramento Field Office, California (USFWS, 1996) describes population densities of the beetle as follows:

> Population densities of the beetle are probably naturally low (USFWS, 1984); and it has been suggested, based on the spatial distribution of occupied shrubs (Barr, 1991), that the beetle is a poor disperser. Low density and limited dispersal capability may cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

The California Natural Diversity Database lists 168 occurrences of the valley elderberry longhorn beetle in California; none is located in the Natomas Basin (CDFG, 2001). Sutter County supports seven of these occurrences and Sacramento County supports 20 of these occurrences. There are several NDDB occurrences of VELB along the Sacramento River on the western and southern edge of the Natomas Basin. The occurrences nearest the Plan area are located southeast of Knights Landing, in Yolo County between Road 116 A and Road 16. Other Sutter County VELB occurrences are spread throughout the county often associated with major rivers and waterways. In Sacramento County, critical habitat is located along the

American River Parkway in two places, upstream of the S.R. 160 overcrossing and in the Goethe Park area.

There are no known occurrences of VELB in the Plan area (CDFG, 2001). There is suitable VELB habitat (i.e., elderberry shrubs) along the western and southern borders of the HCP area (i.e., in riparian areas associated with the Sacramento and American Rivers). Small patches of suitable habitat also exist along the East Drainage Canal, West Drainage Canal, and Main Drainage Canal (City of Sacramento Department of Utilities and Jones & Stokes Associates, 1996). Isolated elderberry shrubs or patches of shrubs also occur in several oak groves and old farm residences.

Although the historical abundance of VELB is unknown, extensive loss of riparian habitat, and to a lesser extent upland habitats, in the Central Valley during the past 150 years has reduced the amount of habitat available to the species and likely decreased and fragmented the species' range (USFWS, 1984). Loss of riparian habitat is attributable to flood control projects (e.g., levee construction, stream and river channelization, placement of rip-rap), land reclamation, and urban development. Additional factors affecting the VELB include grazing practices, herbicide spraying, and predation by non-native species.

Additional information about the VELB can be found in the HCP (Section II.C.4.a.), in the Federal Register notice (45:52803; August 8, 1980) that lists the species as Threatened under the ESA (USFWS, 1980), and in the USFWS's Recovery Plan for the species (USFWS, 1984).

5.10.2 Environmental Effects

Effects of Changes in Habitat

Riparian habitat is most likely to support elderberry shrubs on which the VELB depends, although elderberry shrubs could be found in almost all of the land use categories in the Natomas Basin. As explained previously, no loss of riparian habitat would occur as a result of the HCP. However, individual or small groups of shrubs could occur in areas subject to urban development and could be removed.

Although urban development could result in the removal of some elderberry shrubs, habitat availability for VELB would not be expected to decline in the Natomas Basin for several reasons. First, if elderberry shrubs occurred in a development area, the shrubs would transplanted and additional seedlings planted in accordance with the USFWS Conservation Guidelines for Valley Elderberry Longhorn Beetle. As the seedlings developed, habitat for VELB would increase. Second, the riparian corridor along Fisherman's Lake which supports elderberry shrubs is expected to remain intact because of the lands to be protected adjacent to the lake under the HCP. Third, the General Plan Amendment proposed for the 1 mile buffer area in Sutter County along the Sacramento River would protect some riparian habitat potentially containing elderberry shrubs. Last, elderberry shrubs would be planted in the habitat reserves. Accordingly, overall habitat availability in the Natomas Basin would increase for the VELB and much of the habitat would be in areas protected in perpetuity.

Effects of Construction Activities

Although overall habitat availability for the VELB would improve, removal of individual elderberry shrubs (resulting in potential elderberry beetle mortality) could still occur.

Shrubs could be removed during construction associated with urban development or with habitat creation on the reserves. The practice of avoiding and/or mitigating impacts to elderberry shrubs in accordance with the Conservation Guidelines is common in the Central Valley, and would continue to be the required practice with implementation of the HCP. Potential impacts to the valley elderberry longhorn beetle during land development (i.e., City, Sutter County, Metro Air Park) are addressed in the HCP by requiring compliance with the USFWS's Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS, 1999b). Key aspects of the Conservation Guidelines include:

- Surveys for the beetles and elderberry host plants by a qualified biologist prior to construction.
- Avoidance of elderberry bushes with a 100-foot construction buffer area (may be reduced with the approval of the USFWS).
- Mitigation of elderberry bushes where avoidance is not possible. The preferred mitigation is to transplant mature elderberry bushes during their dormant season (when the beetles are in their larval stage in the interior or the plant) to permanent mitigation lands and to plant a specified number of seedlings; planting additional elderberry seedlings may be allowed when transplanting is not feasible.

Construction impacts also could occur during development of the habitat reserve system. Specific locations of all of the reserves are not identified and, therefore, it is not possible to determine the number of shrubs that could be affected by development of the habitat reserves. Reserve acquisitions to date have not included lands with existing elderberry shrubs, but it is possible that elderberry shrubs would be present on lands acquired in the future. If elderberry shrubs occur on habitat reserves, the Conservancy would strive to preserve the shrubs. If shrubs must be removed to develop habitat on the reserves, the Conservancy would mitigate in accordance with the Conservation Guidelines.

Effects of O&M Activities

Water Agencies

The existing system of canals and drains in the Natomas Basin is highly maintained, and therefore, is unlikely to contain mature elderberry shrubs that are potential habitat for the valley elderberry longhorn beetle. However, some areas under management by RD 1000 and Natomas Mutual (e.g., Fisherman's Lake, RD 1000 Pumping Plant No. 2) contain mature riparian habitat that could contain elderberry shrubs. Areas under the management of the water agencies that support mature riparian habitat necessarily are those areas in which the water agencies do not routinely conduct vegetation control. As a result, the water agencies' continued O&M activities are not likely to remove elderberry shrubs supporting or potentially supporting VELB. The potential for removal of elderberry shrubs of sufficient size to support VELB is limited to construction activities associated with facility replacement or restructuring of canals. The number of shrubs potentially impacted over the project duration by these activities and their suitability for VELB is unknown. Because of this uncertainty in combination with uncertainty regarding the current status of VELB both in the Natomas Basin and rangewide precludes a prediction of the effect of the water agencies' O&M activities on VELB.

Natomas Basin Conservancy

Some of the Conservancy's management actions on the reserves have the potential to remove elderberry shrubs. the Conservancy would implement measures to avoid and minimize take of VELB as a result of habitat management actions. the Conservancy would ensure that necessary and appropriate take avoidance measures are included in reserve management plans, as well as additional measures determined to be necessary during the development of management plans.

Overall Effects on Valley Elderberry Longhorn Beetle

With implementation of the avoidance and mitigation measures for construction and O&M activities, long-term protection of existing riparian habitat, and planting and protection of additional elderberry shrubs on the habitat reserves, implementation of the HCP would mitigate impacts of the covered activities and contribute to maintaining VELB in the Natomas Basin.

5.11 Delta Tule Pea (*Lathyrus jepsonii* var. *jepsonii*)

5.11.1 Species Description

The Delta tule pea is considered a Species of Concern by the USFWS, and is on List 1B of the California Native Plant Society (rare or endangered in California and elsewhere). Delta tule pea is a perennial herb that, like other members of the pea family, has a large, brightly colored pink to lavender flower with a distinctive banner and keel. The species, like other peas, has grasping tendrils and a climbing habit. Delta tule pea is most commonly associated with both brackish and freshwater marsh vegetation, but can root near the water and extend into adjacent riparian and upland areas.

Delta tule pea is known primarily from the Sacramento-San Joaquin River Delta. Most known occurrences are recorded from Solano (39 records), Contra Costa (15), Sacramento (14), and San Joaquin (9) Counties (CalFlora Occurrence Database, 2001). All Sacramento County occurrence records are from the Delta region, with the nearest reported occurrences in the Walnut Grove area. (CDFG, 2001). Delta tule pea is not known to occur in Sutter County. Little information is known about the population status of the Delta tule pea, but the species is considered by the California Native Plant Society to be threatened by agricultural practices, water diversions, and erosion (Skinner and Pavlic, 1994 [Sixth Edition]).

5.11.2 Environmental Effects

Effects of Changes in Habitat

Potential habitat for the Delta tule pea is found in marsh areas. In the Natomas Basin, ponds and seasonally wet areas are the primary potential habitat although some ditches and canals could provide suitable conditions. Rice lands are not suitable for Delta tule pea because these lands are managed to discourage colonization by plants other than rice and are harvested annually. The habitat classes (from Tables 4-3 and 4-4) that provide potential habitat for the Delta tule pea and the changes in acreage from implementing the HCP are presented in Table 5-11.

"Ponds and Seasonally Wet Areas" occur throughout the Natomas Basin as isolated units; the loss of 21 acres could occur in approximately six areas subject to urban development. Assuming that smaller canals and drains do not remain after development has occurred, about 404 acres of Class II, III, and IV canals and ditches would be removed in the three development areas. Some of these canals and ditches could provide suitable conditions for delta tule pea.

TABLE 5-11
Change in Potential Habitat for Delta Tule Pea (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	(7)	(4)	(10)	(21)	75
Canals (all)	1,778	(117)	(72)	(215)	(404)	1,374
Total	**1,874**	**(124)**	**(76)**	**(225)**	**(425)**	**1,449**

(#) decrease in acreage

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

Under the HCP, a stable and natural marsh environment would be created on 2,187.5 acres, thereby replacing the loss of 425 acres of potential habitat from urban development. This restored marsh area would substantially increase potential habitat for the Delta tule pea. Because Delta tule pea is not known to occur in the Natomas Basin and the Natomas Basin is outside this species known range, the loss of potential habitat because of urban development and subsequent increase in potential habitat on the habitat reserves could have no effect on the species. The HCP, however, includes a measure for the Conservancy to consider introducing the Delta tule pea into suitable locations in the Natomas Basin. If pursued, these introductions would benefit the species by increasing the population size and distribution.

Effects of Construction Activities

Delta tule pea is not expected to be affected by construction because the Natomas Basin is outside of the primary range of the species, and the species is not known to occur in the Natomas Basin. It is possible that construction activities (e.g., urban development, habitat reserve development) could affect existing unknown occurrences of Delta tule pea or areas colonized by this species future. Under the HCP, surveys for covered species, including Delta tule pea would be conducted prior to construction activities. If Delta tule pea were identified in construction areas, they could be salvaged and transplanted per the requirements of the California Native Plant Protection Act if deemed necessary and appropriate by the USFWS and CDFG.

Effects of O&M Activities

Water Agencies

Maintenance of the canal and drain system in the Natomas Basin could affect potential habitat for the Delta tule pea and directly removed individuals. These potential effects are unlikely to occur because the Natomas Basin is outside of the primary range of the species,

and the species is not known to currently occur in the project area. If this species' range expanded and it colonized the canals and ditches in the Natomas Basin, O&M activities conducted by Natomas Mutual and RD 1000 could impact individual plants.

The HCP does not include specific requirements for O&M activities to address potential impacts to Delta tule pea. However, the likelihood that this species would occur in the canals or ditches during the project duration is low because of the routine sediment and vegetation control maintenance activities. Natomas Mutual and RD 1000 conduct regular operation and maintenance activities on the canals and ditches. These types of activities would continue under the HCP. If Delta tule pea occurs, it would have colonized and persisted in the drains or canals coincident with these on-going activities. Therefore, if Delta tule pea naturally colonizes the ditches and canals in the future, it would be expected to persist.

Natomas Basin Conservancy

Over the short-term, the Conservancy's management activities on the habitat reserves would not be expected to affect Delta tule pea because this species is not known to occur in the Natomas Basin. Delta tule pea could colonize portions of the habitat reserves in the future and/or the Conservancy could pursue introductions of this species under the HCP. If this species becomes established in the habitat reserves, the Conservancy would implement measures to avoid and minimize take of plants. To determine if this plant colonizes the habitat reserves, the Conservancy will monitor for this species on the habitat reserves.

Overall Effects on Delta Tule Pea

Because this species does not currently occur in the Natomas Basin, the HCP would not affect this species during the short-term. The species would benefit if it was successfully introduced into the Natomas Basin.

5.12 Sanford's Arrowhead (*Sagittaria sanfordii*)

5.12.1 Species Description

Sanford's arrowhead is considered a Species of Concern by the USFWS, and is on List 1B of the California Native Plant Society (rare or endangered in California and elsewhere). Sanford's arrowhead is an aquatic perennial that occurs under shallow-water conditions in freshwater marshes. Sanford's arrowhead is known primarily from the Central Valley, although the species has been found in other areas of California as well. Most known occurrences are recorded from Sacramento (30 records), Merced (11), Fresno (10), Butte (8), and Tehama (6) Counties (CalFlora Occurrence Database, 2001). In Sacramento County, several occurrences are reported along the American River Parkway along small oxbows and sloughs (CDFG, 2001). Sanford's arrowhead is not known to occur in Sutter County. No occurrences are reported in the Natomas Basin.

5.12.2 Environmental Effects

Effects of Changes in Habitat

Potential habitat for the Sanford's arrowhead is found in marsh areas. In the Natomas Basin, ponds and seasonally wet areas are the primary potential habitat although some ditches and

canals could provide suitable conditions. Rice lands are not suitable for Sanford's arrowhead because these lands are managed to discourage colonization by plants other than rice and are harvested annually. The habitat classes (from Tables 4-3 and 4-4) that provide potential habitat for Sanford's arrowhead and the changes in acreage from implementing the HCP are presented in Table 5-12.

TABLE 5-12
Change in Potential Habitat for Sanford's Arrowhead (acres)

Habitat Class[a]	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	(7)	(4)	(10)	(21)	75
Canals (all)	1,778	(117)	(72)	(215)	(404)	1,374
Total	**1,874**	**(124)**	**(76)**	**(225)**	**(425)**	**1,449**

(#) decrease in acreage

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

"Ponds and Seasonally Wet Areas" occur throughout the Natomas Basin as isolated units, and the loss of 21 acres would occur in approximately six areas subject to urban development as a covered activity under the HCP. Assuming that canals and drains do not remain after development has occurred, about 404 acres of Class II, III, and IV canals and drains would be removed in the development areas, some of which could contain emergent marsh values suitable for Sanford's arrowhead.

Under the HCP, a stable and natural marsh environment would be created on 2,187.5 acres, thereby replacing the loss of 425 acres of potential habitat from urban development. This restored marsh area would substantially increase potential habitat for the Sanford's arrowhead. Because Sanford's arrowhead is not known to occur in the Natomas Basin, the loss of potential habitat because of urban development and subsequent increase in potential habitat on the habitat reserves could have no effect on the species. The HCP, however, includes a measure for the Conservancy to consider introducing the Sanford's arrowhead into suitable locations in the Natomas Basin. If pursued, these introductions would benefit the species by increasing the population size and distribution.

A stable marsh environment would be created as part of the habitat reserve system. This restored marsh area would substantially increase potential habitat for Sanford's arrowhead. Because Sanford's arrowhead is not known to occur in the Natomas Basin, the loss of habitat from covered activities is not anticipated to have an effect on the species. The HCP includes a measure for the Conservancy to consider introducing Sanford's arrowhead into suitable locations in the Natomas Basin, which would benefit the species by increasing its increased population size and distribution.

Effects of Construction Activities

Sanford's arrowhead is not expected to be affected by construction because the species is not believed to currently occur in the Natomas Basin. It is possible that construction activities (e.g., urban development, habitat reserve development) could affect existing unknown

occurrences of Sanford's arrowhead or areas colonized by this species future. Under the HCP, surveys for covered species, including Sanford's arrowhead would be conducted prior to construction activities. If Sanford arrowhead were identified in construction areas, they could be salvaged and transplanted per the requirements of the California Native Plant Protection Act if deemed necessary and appropriate by the USFWS and CDFG.

Effects of O&M Activities

Water Agencies

Maintenance of the canal and drain system in the Natomas Basin could affect individual of Sanford's arrowhead. The Natomas Basin is within the known range of Sanford's arrowhead, and this species could inhabit smaller canals and drains. The HCP does not include specific requirements for O&M activities to address potential impacts to Sanford's arrowhead. However, the likelihood that Sanford's arrowhead occur in the canals or ditches is low because of the routine sediment and vegetation control maintenance activities. Natomas Mutual and RD 1000 conduct regular operation and maintenance activities on the canals and ditches. These types of activities would continue under the HCP. If Sanford arrowhead occurs, it would have colonized and persisted in the drains or canals coincident with these on-going activities. Therefore, if Sanford's arrowhead currently occurs in the canals or ditches, it would be expected to persist.

Natomas Basin Conservancy

Over the short-term, the Conservancy's management activities on the habitat reserves would not be expected to affect Sanford's arrowhead because this species is not known to occur in the Natomas Basin. It could colonize portions of the habitat reserves in the future and/or the Conservancy could pursue introductions of this species under the HCP. If Sanford's arrowhead becomes established in the habitat reserves, the Conservancy would implement measures to avoid and minimize take of plants. To determine if this plant colonizes the habitat reserves, the Conservancy will monitor for this species on the habitat reserves.

Overall Effects on Sanford's Arrowhead

Because this species does not currently occur in the Natomas Basin, the HCP probably would not affect this species. The species would benefit if it was successfully introduced to suitable habitat in the Natomas Basin.

5.13 Vernal Pool Species

5.13.1 Species Description

Vernal pools represent important remnants of the natural landscape of the foothills and valley floor of the Central Valley. Resulting from a combination of surface topography (shallow, closed depressions) and soil condition (low permeability), vernal pools support numerous special-status species. Twelve species inhabiting vernal pools are identified in the HCP as potentially occurring in the Natomas Basin. These species include 5 plant species, 5 vernal pool shrimp species, and 2 amphibian species. Vernal pool acreage in the Natomas Basin is not known, and therefore is not specified in this section.

Boggs Lake Hedge-Hyssop (*Gratiola heterosepala*)

The Boggs Lake hedge-hyssop is a state-listed Endangered species. Boggs Lake hedge-hyssop (*Gratiola heterosepala*) is a small, semi-aquatic, herbaceous annual plant found in five widely disjunct areas in California: Boggs Lake in Lake County, Rio Linda and Elk Grove in Sacramento County and near Roseville in Placer County, Big Table Mountain in Fresno County, Kennedy Table in Madera County, and near the Pit River in Shasta County (CDFG, 2001). It has also been reported at one site in Lake County, Oregon (Skinner and Pavlik, 1994).

Boggs Lake hedge-hyssop occurs in shallow waters or moist clay (adobe) soils, in vernal pools, and along lake margins. Populations are usually composed of scattered individuals and is often associated with bractless hedge-hyssop, coyote thistle, hairy clover-fern (*Marsilea vestita*) and slender orcutt grass (*Orcuttia tenuis*). At higher elevations, such as Boggs Lake in Lake County and near the Pit River in Shasta County, this species is found in close proximity to foothill woodland species, such as black oak (*Quercus kelloggii*) and foothill pine (*Pinus sambiana*), and northern juniper woodland species, respectively. There are no known occurrences of this species in the Natomas Basin although limited potential suitable vernal pool habitat occurs along the far eastern boundary of the Basin north of Del Paso Road. This species has been identified in Rio Linda, approximately 2 miles east of the Natomas Basin (CDFG, 2001).

Sacramento Orcutt Grass (*Orcuttia viscida*) and Slender Orcutt Grass (*Orcuttia tenuis*)

Sacramento orcutt grass is listed as Endangered by both the state and federal Endangered Species Acts and is considered rare, threatened, or endangered in California and elsewhere (List 1B) by the CNPS (Skinner and Pavlik, 1994). Slender orcutt grass is listed as Threatened under the federal Endangered Species Act, Endangered under the state Endangered Species Act, and is considered rare and endangered (List 1B) by the CNPS (Skinner and Pavlik, 1994). These grasses (*Orcuttia viscida, O. tenuis*) are gray-green annual grass species typically occurring in medium to large vernal pools with relatively long inundation periods. These species are associated with very old alluvial surfaces (also referred to as high terrace land forms), such as historic flood plains of pre-historic rivers and creeks. Associated species include vernal pool endemic plants, such as common spikerush (*Eleocharis macrostachya*), rayless lasthenia (*Lasthenia glaberrima*), and coyote thistle (*Eryngium vaseyi*).

Sacramento orcutt grass has been identified at nine sites in Sacramento County; no known occurrences of this species in the Natomas Basin (CDFG, 2001). The closest known occurrences are reported in the vicinity of Kiefer Road in eastern Sacramento County, approximately 8 miles southeast of the Natomas Basin. Limited potential habitat for this species in the vernal pools along the eastern edge of the HCP area.

Slender orcutt grass is currently reported from 74 occurrences in California, of which 4 occurrences are reported extirpated and 3 others occurrences have not been relocated at previously reported locations (CDFG, 2001). Of the 70 extant occurrences, two are reported from Sacramento County, and no occurrences are reported from Sutter County. There are no known occurrences of this species in the Natomas Basin (CDFG, 2001). The closest known occurrences are in eastern Sacramento County between Kiefer Road and Rancho Seco. In general, vernal pools in Natomas Basin lack the high terrace landforms with which this

species is associated. Therefore, the potential for this species to occur in the Natomas Basin is low.

Colusa Grass (*Neostapfia colusana*)

Colusa grass is both a federally and state-listed Endangered species. It is also considered rare and endangered (List 1B) by the CNPS (Skinner and Pavlik, 1994). Colusa grass is a low, tufted annual plant. Colusa grass is usually found in fairly monotypic stands in the drying beds of larger vernal pools, usually occurring in the deepest portions of the pools (Stone et al., 1988; May Consulting, unpubl. record). When Colusa grass is present, other vernal pool plants are often sparse or absent. When found with other species, Colusa grass is often associated with Hoover's spurge or orcutt grasses (*Orcuttia* sp.) (Stone et al., 1988).

There are currently 59 known occurrences of Colusa grass in California. Of these occurrences, 48 are presumed extant, 7 are considered extirpated, and an additional 4 occurrences have not been relocated at the previously reported location. Of the 48 extant occurrences, none are reported from Sacramento and Sutter Counties. There are no known occurrences of this species in the Natomas Basin (CDFG, 2001).

Legenere (*Legenere limosa*)

Legenere is considered a federal Species of Concern and rare and endangered (List 1B) by the CNPS (Skinner and Pavlik, 1994). Legenere is found below 500 feet elevation (Hickman, 1993) along lakeshores and in vernal pools, marshes, and other seasonally inundated habitats. Legenere is commonly associated with stipitate popcornflower, common spikerush (*Eleocharis macrostachya*), rayless goldfields (*Lasthenia glaberrima*), and coyote thistle (May Consulting unpubl. record).

Currently, there are 49 known occurrences of legenere in California. Of these, 18 are reported from Sacramento County, and none is reported from Sutter County. There are no reported occurrences in the Natomas Basin, although potentially suitable vernal pool habitat occurs along the far eastern boundary of the Natomas Basin north of Del Paso Road.

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

The vernal pool fairy shrimp is a federally listed Threatened species. The vernal pool fairy shrimp is a small (less than 1 inch) freshwater crustacean belonging to the order of fairy shrimp (*Anostraca*). Vernal pool fairy shrimp has one of the broadest distributions of the California endemic fairy shrimp species. This species is most often observed in vernal pools (79 percent of observations), although it is also observed in a variety of other natural and artificial habitats including seasonal wetlands, alkali pools, ephemeral drainages, stock ponds, roadside ditches, vernal swales, and rock outcrop vernal pools (Helm, 1998). The species occurs on many geologic formations and land forms. Regardless of the land form, this species is most often found in small and shallow habitats, although it also can occur in large and deep vernal pools (Helm, 1998). Vernal pool fairy shrimp often occurs with California linderiella, vernal pool tadpole shrimp, and occasionally with Conservancy fairy shrimp in the Vina Plains Preserve and is never the numerically dominant one (Eng et al., 1990).

There are 270 reported occurrences of vernal pool fairy shrimp in California, 50 of which are reported from Sacramento County and one of which is reported from Sutter County (CDFG, 2001). The reported occurrence in Sutter County is adjacent to the East Main Drain

in the Natomas Basin. There are also several occurrences east of the Natomas Basin in Elverta and Rio Linda (CDFG, 2001). California linderiella have been reported from two locations in the City of Sacramento's annexation area and in Sacramento County on the east side of the Natomas Basin. Because vernal pool fairy shrimp often are found in association with California linderiella, they could occur in these locations as well.

Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)

The vernal pool tadpole shrimp is a federally listed Endangered species. The vernal pool tadpole shrimp is a small (less than 3 inches in length) aquatic crustacea within the tadpole shrimp order (*Notostraca*). The common name "tadpole shrimp" presumably addresses the general shape of the creature when viewed from above. Vernal pool tadpole shrimp is one of the three most common large branchiopods occurring in the Central Valley (Helm, 1998). It generally occurs in very small to very large vernal pools with a variety of depths and volumes of water during the wet cycle (Helm, 1998). The species is associated with vernal pools on the following geomorphologic surfaces: alluvial fan, basin, basin rim, flood plain, marine terrace, high terrace, stream terrace, very high terrace, low terrace, and volcanic mudflow land forms (Helm, 1998). The vernal pool tadpole shrimp has been observed in stock ponds, vernal pools, pools in old alluvial soil in grass bottom swales or mud-bottomed pools, and other seasonal wetlands (Helm, 1998).This species occurs with California linderiella, vernal pool fairy shrimp, and Conservancy fairy shrimp (Helm, 1998). Unlike many of the fairy shrimp eggs, the vernal pool tadpole shrimp eggs do not need to go through a freezing or drying period to hatch (Ahl, 1991).

There are 154 reported occurrences of vernal pool tadpole shrimp in California, of which 54 occurrences are reported from Sacramento County, and 4 from Sutter County (CDFG, 2001). One of reported occurrences in Sutter County is adjacent to the East Main Drain in the Natomas Basin.

Midvalley Fairy Shrimp (*Branchinecta mesovallensis*)

The midvalley fairy shrimp has no official state or federal listing, although it appears to meet the status of rare, threatened, or endangered under CEQA. The midvalley fairy shrimp is similar in morphology to the vernal pool fairy shrimp (Helm, pers. comm.) and is also a freshwater crustacean belonging to the order of fairy shrimp (*Anostraca*). This species occurs in grassland pools and intermound pools within mound-inter-mound topography. This species has been found inhabiting the most ephemeral of seasonal wetland types, presumably due to its ability of rapid maturity (Helm, 1998). This species appears to be a vernal pool obligate species, as it was observed to occur in vernal pools 93 percent of the time, and in vernal swales only 7 percent of the time (Helm, 1998). This species is associated with the smallest and most ephemeral vernal pools (Helm, 1998).

There are 14 known occurrences of midvalley fairy shrimp reported in California, of which one is reported from Sacramento County. No occurrences of midvalley fairy shrimp are reported from Sutter County and the Natomas Basin; however, suitable seasonal wetland and vernal pool habitat occurs along the extreme eastern edge of the Natomas Basin.

5.13.2 Environmental Effects

Effects of Changes in Habitat

Only a few small areas of vernal pools are known to occur in the Natomas Basin on the eastern edge of the basin. Several locations supporting vernal pool species (some of which are covered by the HCP) occur in areas potentially subject to urban development under the HCP. In addition to these known locations, isolated seasonal wetlands could occur elsewhere in the Natomas Basin and could support vernal pool vegetation and special-status status vernal pool species.

Potential effects to vernal pool species consist of the direct loss of vernal pools because of construction as well as indirect effects. Urban development in areas surrounding vernal pools can change the hydrology of vernal pools which can change the suitability of the vernal pools for associated species. In addition, amphibians associated with vernal pools typically migrate between upland overwintering habitats and the breeding habitat of the vernal pool. Urban development around vernal pools can interfere with this movement and vehicular traffic can be a significant cause of mortality for some amphibians (e.g., tiger salamanders) during their movements between upland and aquatic habitats.

The HCP includes procedures to avoid, minimize and mitigate impacts to vernal pool species potentially resulting from development. Vernal pool resources within the City and the Sutter County Permit Areas would be identified prior to disturbance through pre-construction surveys and other biological investigations. Such resources would be discovered either through the early CEQA project review (required for general plan, specific plan, rezone, subdivision and other discretionary approvals of the Land Use Agencies) or during the pre-construction surveys required under the HCP. The following measures would be implemented by the Land Use Agencies prior to issuance of Urban Development Permits when public or private development projects are proposed for areas that may support wetlands and/or vernal pool species.

- If wetlands or potential wetlands are identified within the area of disturbance for a development project, then the project developer would obtain a verified delineation of jurisdictional waters of the U.S. from the U.S. Army Corps of Engineers (USCOE). If the USCOE determines the developer will conduct activities that would impact jurisdictional wetlands on the project site, the developer would obtain the necessary USCOE permits.
- If the USCOE determines there are jurisdictional wetlands on the project site and fill authorization is being requested pursuant to Section 404, prior to construction, the applicant shall obtain water quality certification/waiver of certification from the California Regional Water Quality Control Board under Section 401 of the Clean Water Act for the USCOE permit discussed above.
- If wetlands are determined to be jurisdictional and the Corps determines that listed species may be affected by the fill of wetlands, the Corps will consult with the Service under Section 7 of the ESA. Authorization for take and requirements for mitigation would be provided through a separate Section 7 consultation process and take authorization would not be granted to the Permittees under the HCP or the HCP Incidental Take Permits. However, the Land Use Agencies will require that a developer

subject to Section 404 and Section 7 adhere to the Section 7 consultation and the Corps permit as conditions of any Urban Development Permit.

If it is determined that wetland and/or vernal pool resources would be disturbed by a project, but that such resources do not involve jurisdictional wetlands, then take of vernal pool associated species would be covered under the HCP, subject to the following limitations and guidelines

- Where site investigations indicate vernal pool species may occur, and it has been determined that such resources do not involve jurisdictional wetlands, the developer would notify the Land Use Agency regarding the potential for impacts to vernal pool species. Such notification shall include biological data adequate to allow the Land Use Agency, and the USFWS and CDFG to determine the potential for impacts vernal pool species resulting from the proposed development.
- Following notification by the Land Use Agency, USWFS and CDFG would identify specific measures required to avoid, minimize and mitigate impacts to vernal pool species to be implemented prior to disturbance and in accordance with adopted standards or established guidelines.

With these measures, both direct (filling) and indirect (e.g., changes in hydrology) impacts to vernal pools and the associated species would be avoided or compensated.

As described previously, vernal pools would be protected under the HCP and therefore no adverse effects to vernal pool species would occur as a result of urban development or creation of habitat reserves. Depending on the specific characteristics of the upland and marsh habitat created in the habitat reserves, vernal pool species could be attracted to the habitat reserves. As part of the HCP, the Conservancy would periodically consult with experts to identify conservation opportunities for vernal pool species on the habitat reserves and thereby potentially establish additional populations of one or more of these species.

Effects of Construction Activities

Construction activities within the Natomas Basin are not likely to affect vernal pool species because no development is proposed in the few areas known to support vernal pool species. As an added assurance that impacts to vernal pool species would be avoided, prior to approval of Urban Development Permits, the involved Land Use Agency would require pre-construction surveys for vernal pool species. If the pre-construction surveys determine the presence of any of the covered species associated with vernal pools, the Land Use Agency would require the developer to consult with CDFG and/or USFWS to determine appropriate measures to avoid and minimize take of individuals.

Construction impacts also could occur during development of the habitat reserve system. Specific locations of the reserves are not identified and, therefore, it is not possible to determine if vernal pools or vernal pool species would be impacted. As part of the development of site-specific habitat creation and management plans, surveys to identify covered species currently or potentially supported by the specific parcel. If vernal pools or vernal pool species are found, impacts to these resource would be avoided during habitat creation and management activities and appropriate management activities pursued as necessary to retain resources values.

Effects of O&M Activities

Water Agencies

O&M activities are not likely to affect vernal pool species because suitable habitat for these species are restricted to vernal pools. These species are not expected to occur within water conveyance structures within RD1000's and Natomas Mutual's operations.

Natomas Basin Conservancy

As described above, habitat creation and management plans for the reserve system would be designed to protect vernal pool resources and associated covered species. If vernal pools species occur on the habitat reserves in the future, it is possible that some of the Conservancy's O&M activities could kill or injure individuals. The Conservancy will implement necessary and appropriate take avoidance measures included in reserve plans, as well as additional measures determined to be necessary during the development of management plans for the specific parcels.

Overall Effects on Vernal Pool Species

Currently, the Natomas Basin contains a minor amount of vernal pool habitat and use of the Natomas Basin by covered species appears to be very limited. The HCP includes measures to identify vernal pools or seasonal wetlands and avoid or mitigate impacts to vernal pools and associated species. One or more of the vernal pool species could benefit if the Conservancy was successful in attracting vernal pool species to the habitat reserves.

5.14 California Tiger Salamander (*Ambystoma californiense*)

5.14.1 Species Description

The California tiger salamander is a federal and state Candidate species. California tiger salamander is distinguished from other salamanders by its distinctive coloration consisting of spots or bars of white, cream or yellow on a black background. This species frequents slow-moving waters of swales, ponds and shallow lakes.

California tiger salamanders inhabit valley and foothill grasslands and open woodlands usually within 1 mile of water (Brode and McGinnis, pers. comm.). Adults spend much of their time underground. Adult California tiger salamanders are found under objects such as boards, rocks, brush or other wood debris or in rodent burrows near water. Tiger salamanders breed in reservoirs, ponds, vernal pools, small lakes, and slow-flowing streams that do not support predatory fish (Stebbins, 1972; Zeiner et al., 1988). Adult salamanders migrate from upland habitats to aquatic breeding sites during the first major rainfall events of the fall and early winter. Adults return to upland habitats after breeding. Juveniles disperse from aquatic breeding sites to habitats after metamorphosis. California tiger salamanders may not reproduce during years of low rainfall (Jennings et al., 1994).

There are 465 known tiger salamander occurrences in California (CDFG, 2001). Of these, four occurrences are in Sacramento County and one occurrence is in Sutter County; however, none of these occurrences is in the Natomas Basin. The nearest known tiger salamander occurrences are in northern Yolo County near Dunnigan and near Rancho Seco in southeastern Sacramento County. Vernal pools along the eastern edge of the Natomas Basin are considered potential, but marginal tiger salamander breeding habitat; no tiger

salamanders have been reported in these pools. Ponds and seasonally wet areas elsewhere in the Natomas Basin also could be used by tiger salamanders, but the species has not been reported in the basin.

5.14.2 Environmental Effects

Effects of Changes in Habitat

Potential habitat for California tiger salamander in the Natomas Basin consists of vernal pools and other ponds and seasonally wet areas and upland areas surrounding these features. Only a few small areas of vernal pools are known to occur in the Natomas Basin on the eastern edge of the basin. In addition, 96 acres of ponds and seasonally wet areas occur as isolated units throughout the Natomas Basin and are potential habitat for California tiger salamander.

Potential effects of the HCP on habitat for tiger salamander consist of the direct loss of vernal pools, ponds, or other seasonally wet areas and because of construction as well as indirect effects. Under the HCP, 21 acres of ponds and seasonally wet areas could be directly affected by development which could reduce the availability of breeding habitat for tiger salamander. Urban development in areas surrounding aquatic habitat also can directly affect habitat for tiger salamander by eliminating upland areas where tiger salamanders seek refuge during the much of the year. Tiger salamanders migrate between upland habitats and aquatic breeding habitat and urban development around aquatic habitats that tiger salamanders use for breeding can interfere with this movement. In some areas, vehicular traffic can be a significant cause of mortality for California tiger salamander during their movements between upland and aquatic habitats.

The HCP includes procedures to avoid, minimize and mitigate impacts to vernal pools as described under Section 5.15. *Vernal Pool Species*. The measures for vernal pool also would provide protection for many other aquatic habitats that California tiger salamanders could use. As a result of the requirements for vernal pools, generally, and tiger salamander specifically, impacts to habitat for this species would be avoided or mitigated.

Depending on the specific characteristics of the upland and managed marsh habitat provided on the reserves, tiger salamanders could be attracted to the habitat reserves. As part of the HCP, the Conservancy would periodically consult with experts to identify conservation opportunities for California tiger salamander on the habitat reserves. Such opportunities could include establishment or creation of wetland and upland habitats suitable for tiger salamanders within the reserve system (e.g., stock ponds or "artificial" vernal pools) and, if appropriate, re-introduction of tiger salamanders into the Basin.

Effects of Construction Activities

Construction activities within the Natomas Basin are not likely to affect California tiger salamander because this species is not currently known to inhabit the Natomas Basin. It is possible that construction activities could affect existing unknown occurrence of tiger salamanders or areas colonized by this species in the future. Under the HCP, prior to approval of Urban Development Permits, the involved Land Use Agency would require pre-construction surveys for tiger salamanders. If the pre-construction surveys determine the presence of California tiger salamander, the Land Use Agency would require the

developer to consult with CDFG to determine appropriate measures to avoid and minimize take of individuals.

Construction impacts also could occur during development of the habitat reserve system. As part of the development of site-specific habitat creation and management plans, surveys to identify covered species currently or potentially supported by the specific parcel would be conducted. If tiger salamanders are found, impacts to individuals would be avoided during habitat creation and management activities, and appropriate management activities pursued as necessary to retain habitat values for this species.

Effects of O&M Activities

Water Agencies

This species is not known to occur in the Natomas Basin, and RD 1000's and Natomas Mutual's water conveyance facilities do not provide suitable habitat for this species. O&M activities, therefore, are not likely to affect California tiger salamander.

Natomas Basin Conservancy

If tiger salamanders occur on the habitat reserves in the future, it is possible that some of the Conservancy's O&M activities could kill or injure individuals. the Conservancy will implement necessary and appropriate measures to avoid take included in reserve plans, as well as additional measures determined to be necessary during the development of management plans for the specific parcels. Further, the Conservancy will consult experts periodically during implementation of the HCP to identify additional conservation opportunities for this species in the habitat reserve system.

Overall Effects on the California Tiger Salamander

Currently, the Natomas Basin is not known to support California tiger salamander and contains a minor amount of potential habitat. The HCP includes measures to identify vernal pools and seasonal wetlands and avoid or mitigate impacts to these potential habitats for tiger salamander. California tiger salamander could benefit if the Conservancy was successful in attracting individuals to the habitat reserves or if it re-introduced the species to the habitat reserves.

5.15 Western Spadefoot Toad (*Scaphiopus intermontanus*)

5.15.1 Species Description

The western spadefoot toad is a California Species of Special Concern. This species occurs in shallow, seasonal wetlands (which are essential for breeding and egg-laying) in valley and foothill grasslands, open chaparral, and pine woodlands below 3,000 feet in elevation. This species is associated with seasonal wetlands and other temporarily ponded areas in low-lying grasslands, fields, washes, river flood plains, alluvial fans, alkali lakes and playas, but is also found in adjacent foothill and mountain habitats. Western spadefoot toads prefer slow-moving waters such as pools and plunge pools of small creeks, and short grasses with sandy or gravelly soils.

There are 173 known western spadefoot toad occurrences in California, of which five are in Sacramento County and none in Sutter County. There are no records of western spadefoot

toads in the Natomas Basin (CDFG, 2001). The nearest known occurrences are in Placer County at Fiddyment and Phillip Roads (about 6 miles east of the Natomas Basin) and at Mather Field in central Sacramento County. A few vernal pools that are suitable spadefoot toad breeding habitat occur along the far eastern edge of the Natomas Basin; however, there are no records for this species in this area to date. Ponds and seasonally wet areas elsewhere in the Natomas Basin also could be used by western spadefoot toad, but this species has not been reported in the basin.

5.15.2 Environmental Effects

Effects of Changes in Habitat

Potential habitat for western spadefoot toad in the Natomas Basin consists of vernal pools and other ponds and seasonally wet areas and upland areas surrounding these features. Only a few small areas of vernal pools are known to occur in the Natomas Basin on the eastern edge of the basin. In addition, 96 acres of ponds and seasonally wet areas occur as isolated units throughout the Natomas Basin and are potential habitat for western spadefoot toad.

Potential effects of the HCP on habitat for spadefoot toad consist of the direct loss of vernal pools, ponds, or other seasonally wet areas because of construction as well as indirect effects. Under the HCP, 21 acres of ponds and seasonally wet areas could be directly affected by development which could reduce the availability of breeding habitat for western spadefoot toad. Urban development in areas surrounding aquatic habitat also can directly affect habitat for spadefoot toad by eliminating upland areas where this species seeks refuge during the much of the year. Spadefoot toads move between upland habitats and aquatic breeding habitat and urban development around aquatic habitats that are used for breeding can interfere with this movement. Vehicular traffic can cause mortality of spadefoot toads during their movements between upland and aquatic habitats.

The HCP includes procedures to avoid, minimize and mitigate impacts to vernal pools as described under Section 5.15. *Vernal Pool Species*. The measures for vernal pool also would provide protection for other aquatic habitats that western spadefoot toad could use. As a result of the requirements for vernal pools, generally, and western spadefoot toad specifically, impacts to habitat for this species would be avoided or mitigated. Depending on the specific characteristics of the upland and managed marsh habitat provided in the reserves, spadefoot toads could be attracted to the habitat reserves. As part of the HCP, the Conservancy would periodically consult experts to identify conservation opportunities for western spadefoot toad on the habitat reserves.

Effects of Construction Activities

Construction activities within the Natomas Basin are not likely to affect western spadefoot toad because this species is not currently known to inhabit the Natomas Basin. It is possible that construction activities could affect existing unknown occurrence of spadefoot toads or areas colonized by this species in the future. Under the HCP, prior to approval of Urban Development Permits, the involved Land Use Agency would require pre-construction surveys for tiger salamanders. If the pre-construction surveys determine the presence of western spadefoot toad, the Land Use Agency would require the developer to consult with CDFG to determine appropriate measures to avoid and minimize take of individuals.

Construction impacts also could occur during development of the habitat reserve system. As part of the development of site-specific habitat creation and management plans, surveys to identify covered species currently or potentially supported by the specific parcel would be conducted. If western spadefoot toads were identified, impacts to individuals would be avoided during habitat creation and management activities, and appropriate management activities pursued as necessary to retain habitat values for this species.

Effects of O&M Activities

Water Agencies

This species is not known to occur in the Natomas Basin, and RD 1000's and Natomas Mutual's water conveyance facilities do not provide suitable habitat for this species. O&M activities, therefore, are not likely to affect western spadefoot toad.

Natomas Basin Conservancy

If western spadefoot toads occur on the habitat reserves in the future, it is possible that some of the Conservancy's O&M activities could kill or injure individuals. the Conservancy will implement necessary and appropriate measures to avoid take included in reserve plans, as well as additional measures determined to be necessary during the development of management plans for the specific parcels. Further, the Conservancy will consult experts periodically during implementation of the HCP to identify additional conservation opportunities for this species in the habitat reserve system.

Overall Effects on Western Spadefoot Toad

Currently, the Natomas Basin is not known to support western spadefoot toad and contains a minor amount of potential habitat. The HCP includes measures to identify vernal pools and seasonal wetlands and avoid or mitigate impacts to these potential habitats for spadefoot toad. The species could benefit if the Conservancy was successful in attracting individuals to the habitat reserves or if it introduced the species to the habitat reserves.

SECTION 6.0

References

Ahl, J.S.B. 1991. Factors affecting contributions of the tadpole shrimp, Lepiduris packardi to its over-summering egg reserves. Hydrobiologia 212:137-143.

American Ornithologist Union. 1957. Check-list of North American birds. 5th ed. Am. Ornithol. Union, Washington, D.C.

Babcock, K.W. 1995. Home range and habitat use of breeding Swainson's hawks in the Sacramento Valley of California. J. Raptor Res. 29(3):193-197.

Bent, A.C. 1950 Life histories of North American wagtails, shrikes, vireos and their allies. U.S. Natl. Mus. Bull. 197.

Barr, C.B. 1991. The distribution, habitat, and status of the valley elderberry longhorn beetle Desmocerus californicus dimorphus. U.S. Fish and Wildlife Service; Sacramento, California.

Beedy, E.C. and A. Hayworth. 1991. Breeding status, distribution, and habitat association of the tricolored blackbird (Agelaius tricolor), 1850-1989. (JSA 88-187). Prepared by Jones and Stokes Associates, Inc., Sacramento, California for the U.S. Fish and Wildlife Service, Sacramento, California.

Bent, A.C. 1958. Life histories of the North American blackbirds, orioles, tanagers, and allies. U.S. National Museum Bulletin 211: 1-549.

Bloom, Peter. 1980. The Status of the Swainson's Hawk in California, 1979.

Brode, John M. and George E. Hansen. January 1992. Status and Future Management of the Giant Garter Snake (Thamnophis gigas) Within the Southern American Basin, Sacramento and Sutter Counties, California. California Department of Fish and Game Inland Fisheries Division Endangered Species Project.

CalFlora Database. Online: Accessed August 10, 2001 and August 29, 2001.

California Department of Fish and Game (CDFG). 2001. California Natural Diversity Database.

CDFG. 1994. Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California. Sacramento, California.

CDFG. 1992. 1991 annual report on the status of California state-listed threatened and endangered animals and plants. Sacramento, California.

City of Sacramento and Jones & Stokes Associates. 1996.

DeHaven, Richard L. U. S. Fish and Wildlife Service. June 2000. Breeding Tricolored Blackbirds in the Central Valley, California: A Quarter-Century Perspective

Dehaven, R.W., F.T. Crase, and P.P. Woronecki. 1975. Breeding status of the tricolored blackbird. California Fish and Game 61: 166-180.

Eckert, A.W. 1981. The wading birds of North America (north of Mexico). Doubleday and Company, Inc. Garden City, New York.

Eng, L.L., D. Belk, and C.H. Eriksen. 1990. California Anostraca: distribution, habitat and status. Journal of Crustacean Biology 10(2):247-277.

Estep, James A. 1989. Biology, Movements, and Habitat Relationships of the Swainson's Hawk in the Central Valley of California, 1986-87. California Department of Fish and Game, Nongame Bird and Mammal Section Report.

Estep, J.A. 1984. Diurnal raptor eyrie monitoring program. (Project W-65-R-1, Job No. ll-2.0). California Department of Fish and Game, Nongame Wildlife Investigations. Sacramento, California.

Fitch, H.S. 1940. A biogeographical study of the ordinoides Artenkreis of garter snakes (genus *Thamnophis*. University of California Publications in Zoology. 44:1-150.

Grinnell, J., and A.H. Miller. 1944. The distribution of the birds of California. Pac. Coast Avifauna No. 27.

Hansen, George E. 1988. Review of the status of giant garter snake and its supporting habitat during 1986-1987.

Hansen, G.E. 1993. Survey and analysis of the giant garter snake (Thamnophis couchii gigas), the western pond turtle (Clemmys marmorata), the California red-legged frog (Rana aurora draytoni), and the foothill yellow-legged frog (Rana boylei) in the Bear Creek Unit of the Merced County Streams Project, California. (Contract Purchase Order No. DACW05-92-P1766). Prepared for the U.S. Army Corps of Engineers, Sacramento, California.

Hansen, George E. and J.M. Brode. 1992. An Evaluation of the Time and Conditions Required for Newly Constructed Waterways to Become Suitable Habitat for the Giant Garter Snake (*Thamnophis gigas*). Unpubl. Rep. dated May 1992.

Hansen, G.E. and J.M. Brode. 1980. The status of the giant garter snake (Thamnophis couchii gigas) (Fitch). Inland Fisheries Endangered Species Program Special Publication 80-5. California Department of Fish and Game, Sacramento, California.

Haug, E.A., B.A. Millsap, and M.S. Martell. 1993. Burrowing Owl (*Speotyto cunicularia*). *In* The Birds of North American, No. 61 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Helm, B.P. 1998. Biogeography of eight large brachiopods endemic to California. Pp. 124-139 In: Witham, C.W., E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (editors), Ecology, conservation, and management of vernal pool ecosystems - proceeding from a 1996 conference. California Native Plant Society, Sacramento, California.

Hickman, James. 1993. The Jepson Manual Higher Plants of California. University of California Press.

Holland, D.C. and R.B. Bury. 1992. Status of the western pond turtle (Clemmys marmorata) in 1991. Prepared for presentation at the Western Section, Wildlife Society 1992 annual meeting on February 5-8, 1992 in San Diego, California.

Kaufman, K. 1996. Live of North American birds. Houghton Mifflin Company, Boston, MA.

James, A.H. 1977. Sandhill cranes breeding in Sierra Valley, California. West. Birds 8:159-160.

Jennings, M. R., M. P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. California Department of Fish and Game, Inland Fisheries Division. Rancho Cordova, CA.

Leidy, G.R. 1992. Ecology, Status and Management of the Giant Garter Snake (Thamnophis gigas). Prepared for Sutter Bay Associates and the North Natomas Landowners Association, Inc.

Metro Air Park Property Owners Association. 2000. Draft Habitat Conservation Plan for the Metro Air Park project in the Natomas Basin, Sacramento County, California. Prepared by Thomas Reid Associates, Palo Alto, California. November 2000.

Millsap, B. A. and C. Bear. 2000. Density and reproduction of burrowing owls along an urban gradient. Journal or Wildlife Management 64: 33-41.

McCaskie, G., P. De Benedictis, R. Erickson, and J. Morlan. 1979. Birds of northern California, an annotated field list. 2nd ed. Golden Gate Audubon Society, Berkeley.

Monk, G. 1981 California peregrine falcon reproductive outcome and management efforts in 1981. U.S. department of Interior, Fish and Wildlife Service, Sacramento, California. Endangered Species Report.

Natomas Basin Conservancy. 2000. Site-specific Management Plans for the Natomas Basin Conservancy's Mitigation Lands, Sacramento and Sutter Counties, California. Prepared by Wildlands, Inc., Citrus Heights, California for The Natomas Basin Conservancy, Sacramento, California. July.

Nussbaum, R. A., E. D. Brodie, Jr., and R. M. Storm. 1983. Amphibians and Reptiles of the Pacific Northwest. University of Idaho Press, Moscow, ID.

Remson, J.V., Jr. 1978. Bird species of special concern in California. California Department of Fish and Game, Sacramento. Wild. Manage. Admin. Rep. No. 78-1.

Ryder, R.A. and D.E. Manry. 1994. White-faced ibis (*Plegadis chihi*) in The Birds of North America, no. 130, Poole, A and F. Gill, editors. Philadelphia, PA: The Academy of Natural Sciences.

Shuford, W.D., C.M. Hickey, R.J. Safran, and G.W. Page. 1996. A review of the status of the white-faced ibis in winter in California. Western Birds 27: 169-196.

Schlorff, R.W. and P.H. Bloom. 1984. Importance of riparian systems to nesting Swainson's hawks in the Central Valley of California. Pp. 612-618 In: R.E. Warner and K.M. Hendrix (editors), California riparian systems - ecology, conservation, and productive management. University of California Press, Berkeley, California.

Skinner, Mark W. and Bruce M. Pavlic. 1994. Inventory of Rare and Endangered Vascular Plants of California, Fifth Edition. California Native Plant Society. [Sixth Edition, electronic update.]

Small, Arnold. 1994. California Birds: Their Status and Distribution. Ibis Publishing Company. Vista, California.

Smith, E.L. and K.C. Kruse. 1992. The relationship between land-use and the distribution and abundance of loggerhead shrikes in south-central Illinois. J. Field Ornithol. 63:420-427.

Stebbins, R. C. 1972. California Amphibians and Reptiles. University of California Press. Berkeley, CA.

Stebbins, R. C. 1985. Western Reptiles and Amphibians, Second Edition. Peterson Field Guides No. 16. Houghton Mifflin Company, Boston, MA.

Stone, R.D., W.B. Davilla, D.W. Taylor, G.L. Clifton, and J.C. Stebbins. 1988. Status survey of the grass tribe Orcuttieae and *Chamaesyce hooverii* (Euphorbiacea) in the Central Valley of California. Biosystems Analysis, Inc. Tiburon, California. Prepared for the U.S. Fish and Wildlife Service, Endangered Species Office, Sacramento, California.

Swainson's Hawk Technical Advisory Committee (SHTAC). 2000. Nesting Swainson's hawks (Buteo swainsoni) in the Natomas basin Habitat Conservation Plan Area, 2000 annual survey results. Prepared for the Natomas Basin Conservancy. September, 2000.

Swainson's Hawk Technical Advisory Committee (SHTAC). 2001. Nesting Swainson's hawks (Buteo swainsoni) in the Natomas basin Habitat Conservation Plan Area, 2001 annual survey results. Prepared for the Natomas Basin Conservancy. September, 2001.

Thomas Reid Associates. 2000.

U.S. Fish and Wildlife Service (USFWS). 1999a. Draft Giant Garter Snake Recovery Plan. Portland, Oregon.

USFWS. 1999b. Conservation Guidelines for the Valley Elderberry Longhorn Beetle, Updated July 9, 1999.

USFWS. 1996. Valley elderberry longhorn beetle consultation with the U.S. Army Corps of Engineers. Sacramento, California.

USFWS. 1991. Aleutian Canada goose Recovery Plan. USFWS. Anchorage, Alaska.

USFWS. 1984. Recovery plan for the valley elderberry longhorn beetle. Endangered Species Program. Portland, Oregon.

USFWS. 1980. Listing the valley elderberry longhorn beetle as a threatened species with critical habitat. Federal Register 45: 52803-52807.

Wylie, G.D., and M.L. Casazza. 2000. Investigations of giant garter snakes in the Natomas Basin: 1998-1999. U.S. Geological Survey, Biological Resources Division.

Wylie, G. D., M. Cassaza, and J. K. Daugherty. 1997. 1996 Progress report for the giant garter snake study. Preliminary report, U.S. Geological Survey, Biological Resources Division.

Zeiner, D. C., W. F. Laudenslayer, and K. E. Mayer (compiling editors). 1988. California's wildlife. Volume I. Amphibians and Reptiles. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, CA.

Zeiner, D. C., W. F. Laudenslayer, K. E. Mayer, and M. White (compiling editors). 1990. California's wildlife. Volume II. Birds. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, CA.

Appendix I

NBHCP Fee Update - 2002, by Economic & Planning Systems, Inc., dated April 25, 2002.

Economic & Planning Systems

Public Finance
Real Estate Economics
Regional Economics
Land Use Policy

MEMORANDUM

To: John Roberts, *Natomas Basin Conservancy*

From: Georgette Lorenzen and Allison Shaffer

Subject: NBHCP Fee Update -- 2002; EPS #12461

Date: April 25, 2002

EPS has updated the cash flow model used to estimate the Natomas Basin Habitat Conservation Plan (NBHCP) mitigation fee (the "fee") based on a number of factors that are detailed in this correspondence. The fee is composed of two components—the Base Fee and the Settlement Land Acquisition Premium (the 'Settlement Premium"). The proposed 2002 fee maintains the Settlement Premium adopted in 2001, which is due to stay in effect until October of 2002. This memorandum details the updated assumptions used to derive Base Fee amount.

Figure 1 summarizes the cost per acre of habitat and the mitigation fee for both the Base Fee and the Settlement Premium. The proposed fee level continues to assume the current HCP mitigation requirement of one half acre of mitigation land for each gross acre of developed land. Therefore, the fee shown reflects 50 percent of the cost per acre of habitat mitigation as shown in Figure 1.

The Base Fee is comprised of fee components for five funds as follows:

- Land Acquisition (LA)
- Restoration & Enhancement (RE)
- Administration/Operation &Maintenance (Admin/O&M)
- O&M Endowment
- Supplemental Endowment (for Land Acquisition)

The updated Base Fee amount was estimated based on a revised cash flow analysis prepared by EPS for each of the funds listed below. The updated assumptions are as follows:

SACRAMENTO
1750 Creekside Oaks Drive, Suite 290
Sacramento, CA 95833-3647
www.epsys.com
phone: 916-649-8010
fax: 916-649-2070

BERKELEY
phone: 510-841-9190
fax: 510-841-9208

DENVER
phone: 303-623-3557
fax: 303-623-9049

1. ***Fund Balance Adjustments***: The cash flows for each fund were updated such that the beginning balances in 2002 match actual fund balances of the NBHCP as of December 31, 2001.

2. ***Land Acquisition Costs***: Land costs were increased from $4,750 per acre to $6,000 per acre (or $11,000 per acre to $12,250 per acre including the Settlement Premium). The increase in costs reflects increasing price pressure in the Natomas Basin for habitat preservation as witnessed by the Natomas Basin Conservancy (NBC).

3. ***Restoration & Enhancement Costs:*** In 2001 the NBC completed the first conversion of acquired acres into managed marsh (Betts/Kismat/Silva property totaling 192.5 acres). The cost to convert the acres was approximately $1,000,000, or $5,200 per acre. The estimated cost assumed in the 2001 update was $2,482 per acre. Therefore, actual costs were nearly double estimated costs.

   According to the NBC, estimated future costs of restoration and enhancement will be reduced somewhat from the Betts/Kismat/Silva property conversion costs. The 2002 cash flow analysis assumes a cost per acre of approximately $5,000 per acre. In addition a contingency amount of 12% or $164 per acre was added to the cost to cover the shortfall in revenues due to the difference in actual costs vs. budgeted costs and provide some cushion against future cost increases. As a result the total cost per acre for Restoration & Enhancement increased from $736 per acre to $1,565 per acre (actual cost weighted by 25% allocation of managed marsh to total acres).

   In addition, the cost estimate (on a per acre basis) for completing site specific management plans for acquired mitigation land was increased from $116 per acre to $127 per acre. The cost increase reflects the most current cost estimate for the next site specific management plan to be completed by the NBC.

4. ***Revised Administrative/O&M Cost Estimates***: Administrative costs were revised based on the current budget estimates of the NBC. Projected expenditures for property taxes were also increased. Assessed values of acquired mitigation land have increased resulting in an average value of $5,100 per acre as compared to $2,400 per acre assumed in 2001. Therefore the cost per acre for property taxes increased from $24 per acre to $51 per acre in Sutter County and $25.60 to $54.42 in Sacramento County.

5. ***Hunting Revenues***: Projected hunting revenues are based on two primary assumptions as follows:

   - Net income will be $12 per hunting acre
   - The percentage of mitigation land used for hunting increases from 30% in 2003 to 50% in 2009, and is maintained at 50% thereafter.

The second assumption reflects a change from the prior analysis. In 2001 it was assumed that the percentage of mitigation land used for hunting would increase from 30% in 2002 to 60% in 2010, and was maintained at 60% thereafter. The reduction in

acres hunted in the 2002 Update results in less hunting revenue generated. As a result, the Admin/O&M fee component was increased.

CASH FLOW ANALYSIS

The cash flows for each fund are summarized in **Figure 2**. The assumption tables for the cash flow analysis are presented in **Figure 3** through **Figure 5**

SUPPLEMENTAL ENDOWMENT FUND

The Supplemental Endowment fund was created in 2001 to provide additional revenue to allow the NBC to either purchase mitigation land in advance of requirements (such as establishing a 200 reserve land surplus) or to provide a cushion for land acquisition in the case that land prices spike in any given year before the fee can be adjusted accordingly. The fee revenues generated from the supplemental endowment fund are approximately $160,000 annually through 2015. To the extent the supplemental endowment is not drawn down, interest earnings will accrue. **Figure 2** shows what the ending balance would be in the case the Supplemental Endowment fund is never drawn down. Once all land acquisition is completed, if a positive fund balance remains in the Supplemental Endowment, these monies could be transferred to the Admin/O&M fund for operations or the O&M Endowment fund at the discretion of the NBC Board of Directors.

Figure 1
Natomas Basin HCP
Estimation of Mitigation Fee

Assumes:
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Estimation of Mitigation Fee					Notes:
Mitigation Requirement	**1/2 Acre of Mitigation Land for Each Gross Acre of Developed Land**				
Habitat Mitigation Fee	Cost per Acre of Habitat	Mitigation Fee per Acre of Development	Percent of Base Fee	Percent of Total Fee	
	a	*b=a x .5*		*(w/ Settlement Premium)*	
BASE FEE					
Land Acquisition Cost (LA)					
Land Cost	$6,000 [1]	$3,000			
Transaction Costs & Contingency	$1,500 [1]	$750			
Total Land Acquisition Cost (LA)	**$7,500**	**$3,750**	47%	31%	
Restoration/Enhancement (RE)					
RE Cost	$1,401	$700			
RE Contingency	$164	$82			
Total Restoration/Enhancement (RE)	**$1,565**	**$782**	10%	7%	
Administration/O & M	$3,110 [2]	$1,555	20%	13%	
O & M Endowment Fund	$3,000 [2]	$1,500	19%	13%	
Supplemental Endowment Fund	$375	$188	2%	2%	5% of land acquisition fee
Subtotal Mitigation Fee	**$15,550**	**$7,775**			
Fee Collection Administration		$159	2%	1%	2% of fee for collection
Total Base Fee		**$7,934**	**100%**	**66%**	
SETTLEMENT PREMIUM (based on 2001 assumptions)					
Land Acquisition Cost (LA)					
Land Cost	$6,250	$3,125			
Transaction Costs & Contingency	1,645	$822			
Total Land Acquisition Cost (LA)	**7,895**	**$3,947**		33%	
Fee Collection Administration		$81		1%	2% of fee for collection
Total Settlement Premium		**$4,028**		**34%**	
TOTAL FEE		**$11,962**		**100%**	

"assumptions3"

[1] Based on information provided by the Natomas Basin Conservancy
[2] Administration/O&M and Endowment Fund costs set based on cash flow analysis, ensuring that fund balances are positive in year 50 and that annual interest earnings in endowment fund exceed drawdown by Admin/O&M fund.

Figure 2
Natomas Basin HCP
Cash Flow Summary- 2002$

Assumes:	0.0% Inflation
	3.0% Interest Rate

	Total 1996-2045	1 1996	2 1997	3 1998	4 1999	5 2000	6 2001	7 2002	8 2003
		[1]	[1]	[1]	[2]				
LAND ACQUISITION									
Beginning Balance		$0	$55,641	$248,442	$2,777,379	$587,176	$563,113	$2,225,278	$3,998,244
Total Revenues	$64,875,701	$55,641	$192,801	$2,528,936	$2,734,795	$1,287,471	$3,198,070	$3,928,346	$6,602,502
Total Expenditures	($54,888,436)	$0	$0	$0	($4,924,998)	($1,642,100)	($1,535,905)	($3,491,041)	($6,596,587)
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$1,335,661	($1,335,661)
Balance Adjustments	$330,566	$0	$0	$0	$0	$330,566	$0	$0	$0
Ending Balance	**$10,317,832**	**$55,641**	**$248,442**	**$2,777,379**	**$587,176**	**$563,113**	**$2,225,278**	**$3,998,244**	**$2,668,497**
RESTORATION & ENHANCEMENTS									
Beginning Balance		$0	$4,257	$19,032	$292,743	$589,200	$582,058	$268,280	$330,451
Total Revenues	$12,308,413	$4,257	$14,775	$273,711	$296,457	$145,324	$746,644	$396,759	$1,365,844
Total Expenditures	($12,144,663)	$0	$0	$0	$0	$0	($1,060,422)	($334,587)	($517,586)
Balance Adjustments	($152,466)	$0	$0	$0	$0	($152,466)	$0	$0	$0
Ending Balance	**$11,284**	**$4,257**	**$19,032**	**$292,743**	**$589,200**	**$582,058**	**$268,280**	**$330,451**	**$1,178,709**
ADMINISTRATION/O&M									
Beginning Balance		$0	$4,561	$70,261	$621,109	$1,167,750	$1,549,539	$1,154,659	($111,024)
Total Revenues	$57,086,691	$4,561	$65,700	$657,778	$878,604	$686,626	$816,275	$956,100	$2,951,730
Drawdown on Endowment Fund	$16,318,765	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	($73,048,066)	$0	$0	($106,930)	($331,964)	($547,446)	($611,155)	($886,122)	($1,001,443)
Balance Adjustments (Inc. Transfers)	($357,391)	$0	$0	$0	$0	$242,609	($600,000)	($1,335,661)	$1,335,661
Ending Balance	**$0**	**$4,561**	**$70,261**	**$621,109**	**$1,167,750**	**$1,549,539**	**$1,154,659**	**($111,024)**	**$3,174,923**
O&M ENDOWMENT									
Beginning Balance		$0	$3,041	$13,622	$152,066	$323,846	$463,981	$1,003,066	$1,788,158
Total Revenues	$61,554,999	$3,041	$10,581	$138,445	$157,704	$140,135	$539,085	$785,092	$2,664,606
Drawdown on Endowment Fund	($16,318,765)	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$14,076	$0	$0	$0	$14,076	$0	$0	$0	$0
Ending Balance	**$45,250,310**	**$3,041**	**$13,622**	**$152,066**	**$323,846**	**$463,981**	**$1,003,066**	**$1,788,158**	**$4,452,764**
SUPPLEMENTAL ENDOWMENT									
Beginning Balance		$0	$0	$0	$0	$0	$0	$73,498	$169,453
Total Revenues	$7,888,598	$0	$0	$0	$0	$0	$73,498	$95,955	$330,804
Drawdown	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$7,888,598**	**$0**	**$0**	**$0**	**$0**	**$0**	**$73,498**	**$169,453**	**$500,257**

Figure 2
Natomas Basin HCP
Cash Flow Summary- 2002$

	9 2004	10 2005	11 2006	12 2007	13 2008	14 2009	15 2010	16 2011	17 2012
LAND ACQUISITION									
Beginning Balance	$2,668,497	$3,674,828	$4,261,960	$4,809,041	$5,364,328	$5,927,945	$6,500,015	$7,080,667	$7,670,029
Total Revenues	$6,652,147	$3,410,040	$3,369,989	$3,378,195	$3,386,525	$3,394,979	$3,403,560	$3,412,270	$3,421,110
Total Expenditures	($5,645,816)	($2,822,908)	($2,822,908)	($2,822,908)	($2,822,908)	($2,822,908)	($2,822,908)	($2,822,908)	($2,822,908)
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$3,674,828**	**$4,261,960**	**$4,809,041**	**$5,364,328**	**$5,927,945**	**$6,500,015**	**$7,080,667**	**$7,670,029**	**$8,268,231**
RESTORATION & ENHANCEMENTS									
Beginning Balance	$1,178,709	$1,838,887	$1,000,201	$330,218	$408,268	$487,957	$569,320	$652,391	$737,207
Total Revenues	$1,383,657	$718,069	$700,456	$686,387	$688,026	$689,699	$691,408	$693,152	$694,934
Total Expenditures	($723,479)	($1,556,755)	($1,370,440)	($608,337)	($608,337)	($608,337)	($608,337)	($608,337)	($608,337)
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$1,838,887**	**$1,000,201**	**$330,218**	**$408,268**	**$487,957**	**$569,320**	**$652,391**	**$737,207**	**$823,804**
ADMINISTRATION/O&M									
Beginning Balance	$3,174,923	$5,258,877	$5,971,849	$6,622,939	$7,272,693	$7,924,093	$8,578,761	$9,234,419	$9,883,703
Total Revenues	$3,131,104	$1,867,931	$1,902,327	$1,956,666	$2,012,938	$2,069,781	$2,123,296	$2,176,840	$2,230,194
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	($1,047,150)	($1,154,959)	($1,251,236)	($1,306,912)	($1,361,538)	($1,415,113)	($1,467,638)	($1,527,556)	($1,587,475)
Balance Adjustments (Inc. Transfers)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$5,258,877**	**$5,971,849**	**$6,622,939**	**$7,272,693**	**$7,924,093**	**$8,578,761**	**$9,234,419**	**$9,883,703**	**$10,526,422**
O&M ENDOWMENT									
Beginning Balance	$4,452,764	$7,197,516	$8,721,947	$10,292,335	$11,910,069	$13,576,578	$15,293,336	$17,061,859	$18,883,712
Total Revenues	$2,744,752	$1,524,430	$1,570,388	$1,617,734	$1,666,509	$1,716,758	$1,768,524	$1,821,853	$1,876,793
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$7,197,516**	**$8,721,947**	**$10,292,335**	**$11,910,069**	**$13,576,578**	**$15,293,336**	**$17,061,859**	**$18,883,712**	**$20,760,506**
SUPPLEMENTAL ENDOWMENT									
Beginning Balance	$500,257	$840,985	$1,029,074	$1,222,807	$1,422,351	$1,627,881	$1,839,578	$2,057,625	$2,282,214
Total Revenues	$340,728	$188,090	$193,732	$199,544	$205,531	$211,697	$218,047	$224,589	$231,327
Drawdown	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$840,985**	**$1,029,074**	**$1,222,807**	**$1,422,351**	**$1,627,881**	**$1,839,578**	**$2,057,625**	**$2,282,214**	**$2,513,541**

Figure 2
Natomas Basin HCP
Cash Flow Summary- 2002$

	18 2013	19 2014	20 2015	21 2016	22 2017	23 2018	24 2019	25 2020
LAND ACQUISITION								
Beginning Balance	$8,268,231	$8,875,406	$9,491,688	$10,117,215	$10,317,832	$10,317,832	$10,317,832	$10,317,832
Total Revenues	$3,430,083	$3,439,191	$3,448,435	$200,616	$0	$0	$0	$0
Total Expenditures	($2,822,908)	($2,822,908)	($2,822,908)	$0	$0	$0	$0	$0
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$8,875,406**	**$9,491,688**	**$10,117,215**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**
RESTORATION & ENHANCEMENTS								
Beginning Balance	$823,804	$912,219	$1,002,491	$1,094,659	$564,466	$11,284	$11,284	$11,284
Total Revenues	$696,752	$698,609	$700,505	$22,988	$0	$0	$0	$0
Total Expenditures	($608,337)	($608,337)	($608,337)	($553,181)	($553,181)	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$912,219**	**$1,002,491**	**$1,094,659**	**$564,466**	**$11,284**	**$11,284**	**$11,284**	**$11,284**
ADMINISTRATION/O&M								
Beginning Balance	$10,526,422	$11,162,378	$11,791,369	$12,411,461	$11,751,733	$11,041,704	$10,310,374	$9,557,105
Total Revenues	$2,283,350	$2,336,304	$2,386,894	$1,054,844	$1,035,052	$1,013,751	$991,811	$969,213
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	($1,647,394)	($1,707,313)	($1,766,802)	($1,714,572)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)
Balance Adjustments (Inc. Transfers)	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$11,162,378**	**$11,791,369**	**$12,411,461**	**$11,751,733**	**$11,041,704**	**$10,310,374**	**$9,557,105**	**$8,781,237**
O&M ENDOWMENT								
Beginning Balance	$20,760,506	$22,693,899	$24,685,601	$26,737,375	$27,548,155	$28,383,604	$29,244,477	$30,131,551
Total Revenues	$1,933,393	$1,991,703	$2,051,774	$810,780	$835,449	$860,873	$887,074	$914,076
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$22,693,899**	**$24,685,601**	**$26,737,375**	**$27,548,155**	**$28,383,604**	**$29,244,477**	**$30,131,551**	**$31,045,627**
SUPPLEMENTAL ENDOWMENT								
Beginning Balance	$2,513,541	$2,751,807	$2,997,221	$3,249,998	$3,347,498	$3,447,923	$3,551,361	$3,657,901
Total Revenues	$238,266	$245,414	$252,777	$97,500	$100,425	$103,438	$106,541	$109,737
Drawdown	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$2,751,807**	**$2,997,221**	**$3,249,998**	**$3,347,498**	**$3,447,923**	**$3,551,361**	**$3,657,901**	**$3,767,639**

Figure 2
Natomas Basin HCP
Cash Flow Summary- 2002$

	26 2021	27 2022	28 2023	29 2024	30 2025	31 2026	32 2027	33 2028	34 2029
LAND ACQUISITION									
Beginning Balance	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832
Total Revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**
RESTORATION & ENHANCEMENTS									
Beginning Balance	$11,284	$11,284	$11,284	$11,284	$11,284	$11,284	$11,284	$11,284	$11,284
Total Revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**
ADMINISTRATION/O&M									
Beginning Balance	$8,781,237	$7,982,093	$7,158,975	$6,311,163	$5,437,917	$4,538,474	$3,612,047	$2,657,828	$1,674,982
Total Revenues	$945,937	$921,963	$897,269	$871,835	$845,638	$818,654	$790,861	$762,235	$732,749
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)
Balance Adjustments (Inc. Transfers)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$7,982,093**	**$7,158,975**	**$6,311,163**	**$5,437,917**	**$4,538,474**	**$3,612,047**	**$2,657,828**	**$1,674,982**	**$662,650**
O&M ENDOWMENT									
Beginning Balance	$31,045,627	$31,987,530	$32,958,111	$33,958,249	$34,988,846	$36,050,835	$37,145,176	$38,272,861	$39,434,909
Total Revenues	$941,903	$970,582	$1,000,137	$1,030,597	$1,061,989	$1,094,342	$1,127,684	$1,162,048	$1,197,464
Drawdown on Endowment Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$31,987,530**	**$32,958,111**	**$33,958,249**	**$34,988,846**	**$36,050,835**	**$37,145,176**	**$38,272,861**	**$39,434,909**	**$40,632,373**
SUPPLEMENTAL ENDOWMENT									
Beginning Balance	$3,767,639	$3,880,668	$3,997,088	$4,117,000	$4,240,510	$4,367,726	$4,498,757	$4,633,720	$4,772,732
Total Revenues	$113,029	$116,420	$119,913	$123,510	$127,215	$131,032	$134,963	$139,012	$143,182
Drawdown	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$3,880,668**	**$3,997,088**	**$4,117,000**	**$4,240,510**	**$4,367,726**	**$4,498,757**	**$4,633,720**	**$4,772,732**	**$4,915,914**

Figure 2
Natomas Basin HCP
Cash Flow Summary- 2002$

	35 2030	36 2031	37 2032	38 2033	39 2034	40 2035	41 2036	42 2037	43 2038
LAND ACQUISITION									
Beginning Balance	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832
Total Revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**
RESTORATION & ENHANCEMENTS									
Beginning Balance	$11,284	$11,284	$11,284	$11,284	$11,284	$11,284	$11,284	$11,284	$11,284
Total Revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**
ADMINISTRATION/O&M									
Beginning Balance	$662,650	$0	$0	$0	$0	$0	$0	$0	$0
Total Revenues	$702,380	$682,500	$682,500	$682,500	$682,500	$682,500	$682,500	$682,500	$682,500
Drawdown on Endowment Fund	$380,051	$1,062,581	$1,062,581	$1,062,581	$1,062,581	$1,062,581	$1,062,581	$1,062,581	$1,062,581
Total Expenditures	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)
Balance Adjustments (Inc. Transfers)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
O&M ENDOWMENT									
Beginning Balance	$40,632,373	$41,486,286	$41,683,887	$41,888,040	$42,098,966	$42,316,894	$42,542,062	$42,774,715	$43,015,105
Total Revenues	$1,233,965	$1,260,182	$1,266,734	$1,273,507	$1,280,509	$1,287,749	$1,295,233	$1,302,972	$1,310,973
Drawdown on Endowment Fund	($380,051)	($1,062,581)	($1,062,581)	($1,062,581)	($1,062,581)	($1,062,581)	($1,062,581)	($1,062,581)	($1,062,581)
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$41,486,286**	**$41,683,887**	**$41,888,040**	**$42,098,966**	**$42,316,894**	**$42,542,062**	**$42,774,715**	**$43,015,105**	**$43,263,497**
SUPPLEMENTAL ENDOWMENT									
Beginning Balance	$4,915,914	$5,063,391	$5,215,293	$5,371,752	$5,532,904	$5,698,891	$5,869,858	$6,045,954	$6,227,332
Total Revenues	$147,477	$151,902	$156,459	$161,153	$165,987	$170,967	$176,096	$181,379	$186,820
Drawdown	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$5,063,391**	**$5,215,293**	**$5,371,752**	**$5,532,904**	**$5,698,891**	**$5,869,858**	**$6,045,954**	**$6,227,332**	**$6,414,152**

Figure 2
Natomas Basin HCP
Cash Flow Summary- 2002$

	44 2039	45 2040	46 2041	47 2042	48 2043	49 2044	50 2045
LAND ACQUISITION							
Beginning Balance	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832	$10,317,832
Total Revenues	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0
Transfers from Admin/O&M Fund	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**	**$10,317,832**
RESTORATION & ENHANCEMENTS							
Beginning Balance	$11,284	$11,284	$11,284	$11,284	$11,284	$11,284	$11,284
Total Revenues	$0	$0	$0	$0	$0	$0	$0
Total Expenditures	$0	$0	$0	$0	$0	$0	$0
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**	**$11,284**
ADMINISTRATION/O&M							
Beginning Balance	$0	$0	$0	$0	$0	$0	$0
Total Revenues	$682,500	$682,500	$682,500	$682,500	$682,500	$682,500	$682,500
Drawdown on Endowment Fund	$1,062,581	$1,062,581	$1,062,581	$1,062,581	$1,062,581	$1,062,581	$1,062,581
Total Expenditures	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)	($1,745,081)
Balance Adjustments (Inc. Transfers)	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
O&M ENDOWMENT							
Beginning Balance	$43,263,497	$43,520,162	$43,785,380	$44,059,442	$44,342,650	$44,635,313	$44,937,756
Total Revenues	$1,319,245	$1,327,799	$1,336,643	$1,345,788	$1,355,245	$1,365,023	$1,375,135
Drawdown on Endowment Fund	($1,062,581)	($1,062,581)	($1,062,581)	($1,062,581)	($1,062,581)	($1,062,581)	($1,062,581)
Balance Adjustments	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$43,520,162**	**$43,785,380**	**$44,059,442**	**$44,342,650**	**$44,635,313**	**$44,937,756**	**$45,250,310**
SUPPLEMENTAL ENDOWMENT							
Beginning Balance	$6,414,152	$6,606,577	$6,804,774	$7,008,918	$7,219,185	$7,435,761	$7,658,833
Total Revenues	$192,425	$198,197	$204,143	$210,268	$216,576	$223,073	$229,765
Drawdown	$0	$0	$0	$0	$0	$0	$0
Ending Balance	**$6,606,577**	**$6,804,774**	**$7,008,918**	**$7,219,185**	**$7,435,761**	**$7,658,833**	**$7,888,598**

cash flow

Prepared by EPS.

12461 model update 4/26/2002

Figure 3
Natomas Basin HCP
Land Acquisition and Restoration/Enhancements Cost and Acquired Habitat Land Utilization Assumptions

Assumes:
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Part A - Assumptions				Notes:
Inflation	**0.0%**			
Interest Rate	**3.0%**			
Land Acquisition Values per Acre	Land Value	Permitted by Plan	Assumed in Financial Analysis	
In-Basin Lands	$6,000	80%	100%	Estimated $4,000-$9,000 per acre range
Out-of-Basin Lands	$3,250	20%	0%	Estimated $3,100-$3,500 per acre range per Recent Experience of NBHCP
Average Land Value (1)	**$6,000**	Use In-Basin Land Value		
Plus Transaction Costs & Contingency	$1,500	per Acre		
Average Land Acquisition Cost	**$7,500**	**per acquired acre**		Beginning 1/1/01
2002 Habitat Acres				
Average Land Value	$9,500	per acquired acre		
Plus Transaction Costs & Contingency	$1,500	per acquired acre		
Average Land Acquisition Cost	**$11,000**	**per acquired acre**		
Estimated Use of In-Basin Lands				
Marsh	25%			
Existing Rice	50%			
Other/Upland	25%			
Total Initial Use	**100%**			
Rice Converted to Marsh	After year 5, 324 acres in marsh 25% thereafter			
Rice Lands (excluding land converted to marsh) (7)				
Uplands/Fallow	10%			
Leased for Other Crops	0%			
Leased Rice Base Land	90%			
Total Rice Lands	**100%**			
Initial Restoration/Enhancement	Use of Land	Initial Costs	Weighted Cost (6)	
Expended At Time Land Is Acquired				
Marsh (2)	0%	$0	$0	Note (3)
Existing Rice	75%	$0	$0	Note (3)
Dry Converted to Rice	0%	$0	$0	Note (3)
Other Upland	25%	$0	$0	Note (3)
Subtotal	**100%**		**$0**	
Expended At Time Land Is Converted				
Rice/Other Converted to Marsh	25%	$5,095	$1,274	Note (4)
Site Specific Plan Costs			$127 per acre	Note (5)
Average Cost per Habitat Acre			**$1,401**	Weighted average cost per acre

"assumptions1"

Source: Natomas Basin Conservancy

(1) Assumes all acquisition occurs at the average in-basin land value.
(2) Initial use of marsh land estimated at 0% because NBHCP estimates that little to no marshland is available for acquisition. However, rice land will be converted to marsh land.
(3) The initial costs of marsh, existing rice, dry land converted to rice and other upland have been set to zero as no initial restoration or enhancement costs are anticipated.
(4) The current estimate of $5,095 per acre is based on the estimate of $1,235,000 spent to convert 242.4 acres to marsh through 2002.
(5) The site specific plan cost per acre is estimated as the cost of the site specific plans prepared through 2001 divided by the total acres of all properties except Ayala, which is not yet in the plan ($224,571 / 1,772 acres).
(6) The cost of restoration and enhancement is weighted by the percent of acres assumed to be converted or used for that particular land use.
(7) Rice Lands percents included for cost and revenue calculation purposes only.

Figure 4
Natomas Basin HCP
Operations & Maintenance Assumptions

Assumes:
17,500 acres of development
1/2 acre of mitigation land per gross acre of developed land
25% marsh

Part A - Assumptions Con't				Notes:
Operations & Maintenance Costs				
Marsh	$281.00	per acre		Updated Cost -- May 2001
Upland/Fallow	$18.25	per acre		Based on Wildlands, Inc. Estimates
Land Leased for Planted Rice Base	$2.96	per acre		Based on Wildlands, Inc. Estimates
Land Leased for Other Crops	$2.96	per acre		alfalfa, safflower, etc.
Other	$0.00	per acre		
Hunting	$0.00	per acre		Updated Cost -- May 2001
Misc./Monitoring/Adaptive Mgmt.	$27.35	per acre		Based on Wildlands, Inc. Estimates
Special Assessment & Property Tax Costs				
Sacramento County				
Reclamation District #1000	$13.08	per acre		Based on published tariffs and rates
NCMWA	$0.42	per acre		Based on published tariffs and rates
SAFCA O&M Assessment #1	$5.69	per acre		Based on published tariffs and rates
CSAI Safety Lights	$0.08	per acre		Based on published tariffs and rates
Property Tax [1]	$54.42	per acre		Based on average assessed value of all properties acquired through Feb. 2002 -- $5,100 per acre
Subtotal Sacramento County	**$73.68**	per acre		
Sutter County				
Reclamation District #1000	$13.08	per acre		Based on published tariffs and rates
NCMWC	$0.42	per acre		Based on published tariffs and rates
Property Tax	$51.00	per acre		Based on average assessed value of all properties acquired through Feb. 2002 -- $5,100 per acre
Subtotal Sutter County	**$64.50**	per acre		
Administrative Costs				
During Development	$551,598	per year		Figure 5 for detail phased in over 3- 5 years
After All Land Acquired	$468,858	per year		
Operations & Maintenance Revenues				
Crop Land Leases				
Through 2002				
Planted Rice Base Acreage	$160	per acre/year	normal ag. practices	
Other Crops (Flex. acreage)	$80	per acre/year	normal ag. practices	
2003 +				
Planted Rice Base Acreage	$160	per acre/year	normal ag. practices	
Other Crops (Flex. acreage)	$80	per acre/year	normal ag. practices	
Hunting				
Hunting Revenue per Acre	$12	per acre		Based on Wildlands Estimate for initial Site Plan

"assumptions2"

Source: Natomas Basin Conservancy

[1] Includes G.O. bond assessment.

Figure 5
Natomas Basin HCP
Estimated Annual Natomas Basin Conservancy (NBC) Administrative Cost

	Annual Cost	Notes
Administrative Expenses		
Staff	$195,000	
Benefits	$64,350	
Board Expense	$6,000	
Subtotal	**$265,350**	
Office Expense		
Rent	$20,000	
Telephone	$1,700	
Copying & Printing	$16,000	
Office Supplies	$5,000	
Postage	$600	
Equipment	$2,500	
Auto Expense	$6,500	
Subtotal	**$52,300**	
Miscellaneous Expense		
Insurance	$25,000	Liability and E&O
Accounting	$20,000	
Legal	$80,000	
Corporate Taxes	$1,000	
Subtotal	**$126,000**	
Contract Work/ Public Education/ Publications/Monitoring/Reports, etc.	**$36,000**	
Subtotal Costs	**$479,650**	
Contingency	$71,948	15% Contingency
Total Administration During Habitat Acquisition Phas	**$551,598**	
Total Administration After Habitat Acquisitio	**$468,858**	[1]

"admin"

Source: NBC FY 2001 budget estimate

[1] Administrative costs are reduced by 15% after all habitat lands have been acquired per John Roberts.

Appendix J

Documents Regarding Sacramento Area Flood Control Agency Army Corps of Engineers Permit Compliance.

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY PERMIT

Permittee: Sacramento Area Flood Control Agency
F.I. Hodgkins, Executive Director
926 J Street, Suite 424
Sacramento, California 95814

Permit Number: 199200719

Issuing Office: U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 "J" Street
Sacramento, California 95814-2922

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

The discharges of dredged or fill material into waters of the United States associated with the following activities are authorized by this permit:

a. Raising the levees along the Natomas East Main Drain (NEMDC) using top only and sliver fill techniques.

b. Construction of a new 1000 cfs pump station on the NEMDC approximately 2600 north of Dry Creek.

c. Replacing the existing Main Avenue Bridge with a new four-lane structure.

d. Raising the levee, rebuilding the levee access road, and modifying the stoplog structures on Arcade Creek between the NEMDC and Marysville Boulevard.

e. Enlarging existing levees, construction of a new levee segment and construction of a floodwall along Dry Creek between the NEMDC and Marysville/Rio Linda Boulevard.

f. Extending the NEMDC north to Sankey Road.

g. Constructing a stoplog structure, a retaining wall, and raising the existing levee along the Pleasant Grove Creek Canal.

h. Raising the Natomas Cross Canal south levee between the Sacramento River and State Highway 99 along its existing alignment.

All work is to be completed in accordance with the attached plan(s).

Project Location:

The project is located in the City of Sacramento and Sacramento and Sutter Counties as shown on the attached location maps.

Permit Conditions

General Conditions:

1. The time limit for completing the work authorized ends on 31 March 1999. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

a. The Permittee shall fully implement all measures described in the Wetland Mitigation Plan for the Revised Natomas Area Flood Control Improvement Project, March 1994. The contents of this document are expressly incorporated into the terms of this permit except as otherwise modified by these Special Conditions. Permit Special Conditions shall supersede similar or conflicting conditions within this and other documents named within these special conditions.

Wetland mitigation acreage shall be 28.62 as described in the Wetland Mitigation Plan for the Revised Natomas Area Flood Control Improvement Project.

b. Construction of the compensatory mitigation areas shall commence concurrently with or in advance of the start of construction of the authorized activity and be complete within two years. The permittee shall notify the District Engineer of the start date and the completion date of mitigation construction in writing and no later than ten (10) calendar days after each date.

c. The following actions shall be taken prior to the start of construction of the authorized project.

1. Establishment of a long term funding mechanism intended to provide for maintenance and monitoring of mitigation areas.

2. Recordation of deed restrictions maintaining all preservation and mitigation areas as wetland preserve and wildlife habitat in perpetuity. Copies of the proposed deed restriction language shall be provided to the Corps of Engineers for approval prior to recordation.

3. Copies of the recorded documents shall be provided to the Corps of Engineers no later than 30 days prior to the start of construction of any of the activities authorized by this permit.

d. The permittee shall provide two complete sets of as-builts of the completed work within the mitigation areas to the Corps of Engineers. The as-builts shall indicate any changes made from the original plans in red ink. These as-builts shall be provided no later than 60 days after the completion of mitigation area wetland construction.

e. Monitoring of the vernal pool and freshwater marsh mitigation areas shall occur for five years or until the success criteria described in the Wetland Mitigation Plan for the Revised Natomas Area Flood Control Improvement Project are met, whichever is longer. This period shall commence upon completion of the construction of the mitigation wetlands. Additionally, continued success of the mitigation wetlands, without human intervention, must be demonstrated for three consecutive years, once the success criteria have been met. The mitigation will not be deemed successful until this criteria has been met. Monitoring reports shall be submitted annually to the Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and the CA Department of Fish and Game for the five year monitoring period, and for each additional year, if needed due to remediation to the mitigation program.

f. Monitoring of riparian mitigation areas shall occur for ten years or until the success criteria described in the incorporated documents describing the mitigation plan are met, whichever is greater. This period shall commence upon completion of the construction of the mitigation wetlands. Additionally continued success of the mitigation wetlands, without human intervention, must be demonstrated for three consecutive years once the success criteria have been met. The mitigation plan will not be deemed successful until this criteria has been met.

Monitoring reports shall be submitted annually for years one through six and for years eight, and ten of the monitoring period, and for each additional year if needed due to remediation to the mitigation areas.

An additional monitoring report shall be provided at the end of the three year period demonstrating continued success of the mitigation program without human intervention. The only exception to this last requirement shall be if the three year period occurs wholly within the ten year monitoring period, in which case the ten year report may be used to meet this requirement.

g. All pumps shall be screened in accordance with the requirements of the California Department of Fish and Game Code.

h. Documentation of all sites potentially eligible for listing in the National Register of Historic Places that would be affected by construction activities shall be accomplished in accordance with standards developed in consultation with the California State Historic Preservation Officer.

i. Prior to initiating any construction on the pump station north of Dry Creek, a Historic Property Treatment Plan (HPTP) shall be developed and approved in accordance with the Programmatic Agreement Among the Corps of Engineers, Bureau of Reclamation, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding implementation of the American River Watershed Project.

j. Prior to initiating any construction on the pump station north of Dry Creek, the permittee shall develop a Natomas Basin Habitat Management Plan (Plan). This Plan shall provide the framework within which a mitigation program for the effects of development within the Natomas floodplain will proceed. The framework shall be incorporated into future planning processes by State, local, and Federal authorities as development reaches the appropriate planning stages. The plan shall: ensure that the development within the Natomas floodplain complies with applicable Federal, State and local laws and regulations, including the Endangered Species Act and the Clean Water Act; identify at a conceptual level, appropriate and practicable mitigation measures that may be contemplated under Federal, State, and local laws pertaining to future development; and describe the mechanism to be used for the long-term management and protection of any mitigation lands. The Plan shall be developed by the permittee in coordination with the on-going Corps of Engineers activities for the American River Watershed Investigation. The Plan, including its development, shall be coordinated with the Corps, the U.S. Fish and Wildlife Service, the Environmental Protection Agency, and other Federal, State, and local agencies having interest, expertise and jurisdiction over the Natomas floodplain.

The District Engineer will verify that the Final Plan is in compliance with this condition before work commences on the pump station. The final Plan shall be incorporated by reference as a condition of this permit. Enforcement of mitigation requirements of State and local land use agencies shall be the responsibility of the applicable State or local agency.

k. The applicant shall prepare and implement a plan for avoiding and minimizing construction related impacts to the giant garter snake. The plan shall be submitted to the Corps and Service for review and approval prior to the start of project construction.

l. The permit applicant shall not begin construction on the pumping station along the East Main Drain or otherwise complete the proposed project by providing 100-year flood protection for the lower American Basin until the Service first issues an incidental take permit and associated implementing agreement pursuant to Section 10(a)(1)(b) of the Act to the City and County of Sacramento, Sutter County and any other parties necessary to guarantee the successful implementation of a habitat conservation plan for the giant garter snake resident in the American Basin. This plan shall be compatible with and a component of the multispecies habitat management plan otherwise required by the Department of the Army as a condition of permit authorization.

m. The Biological Opinion from the U.S. Fish and Wildlife Service to the U.S. Army Corps of Engineers dated March 11, 1994 is expressly incorporated as a condition of this permit.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant.

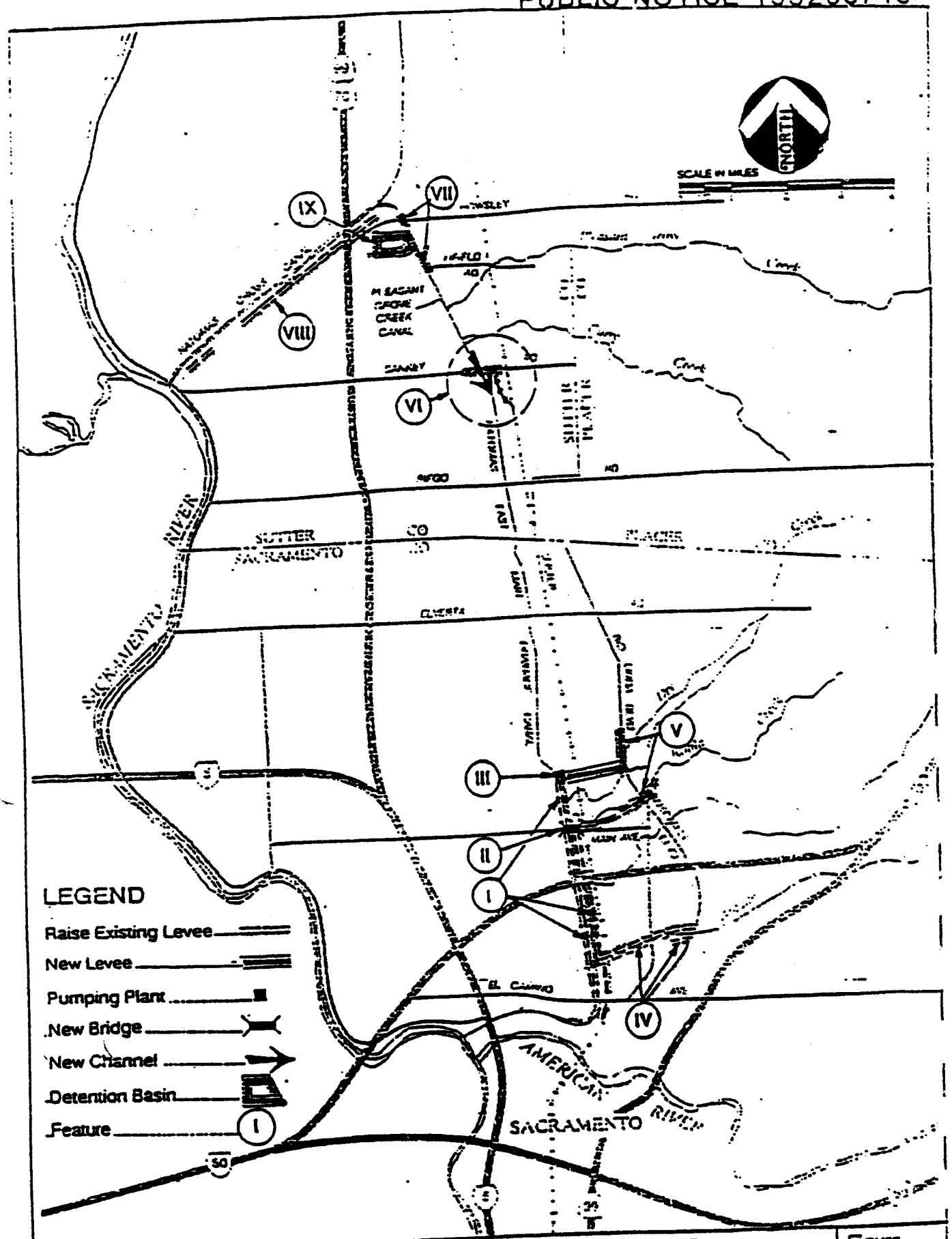
Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative

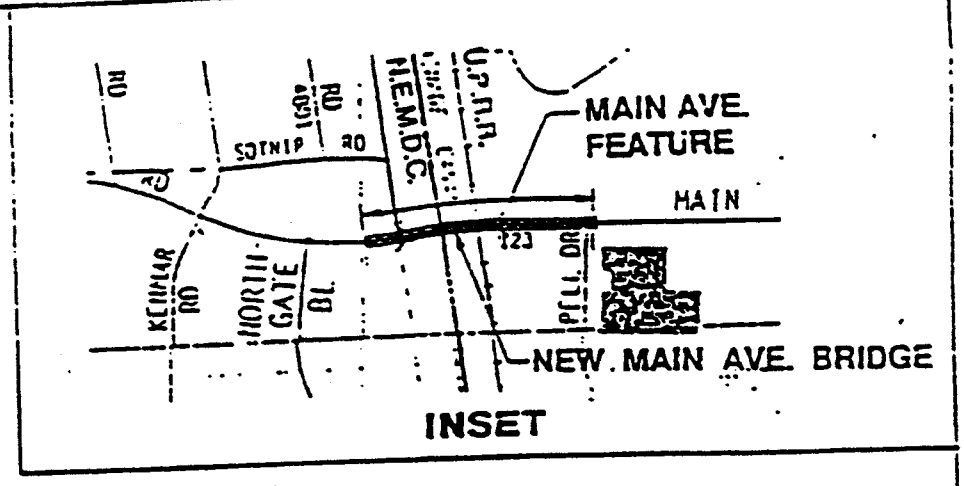


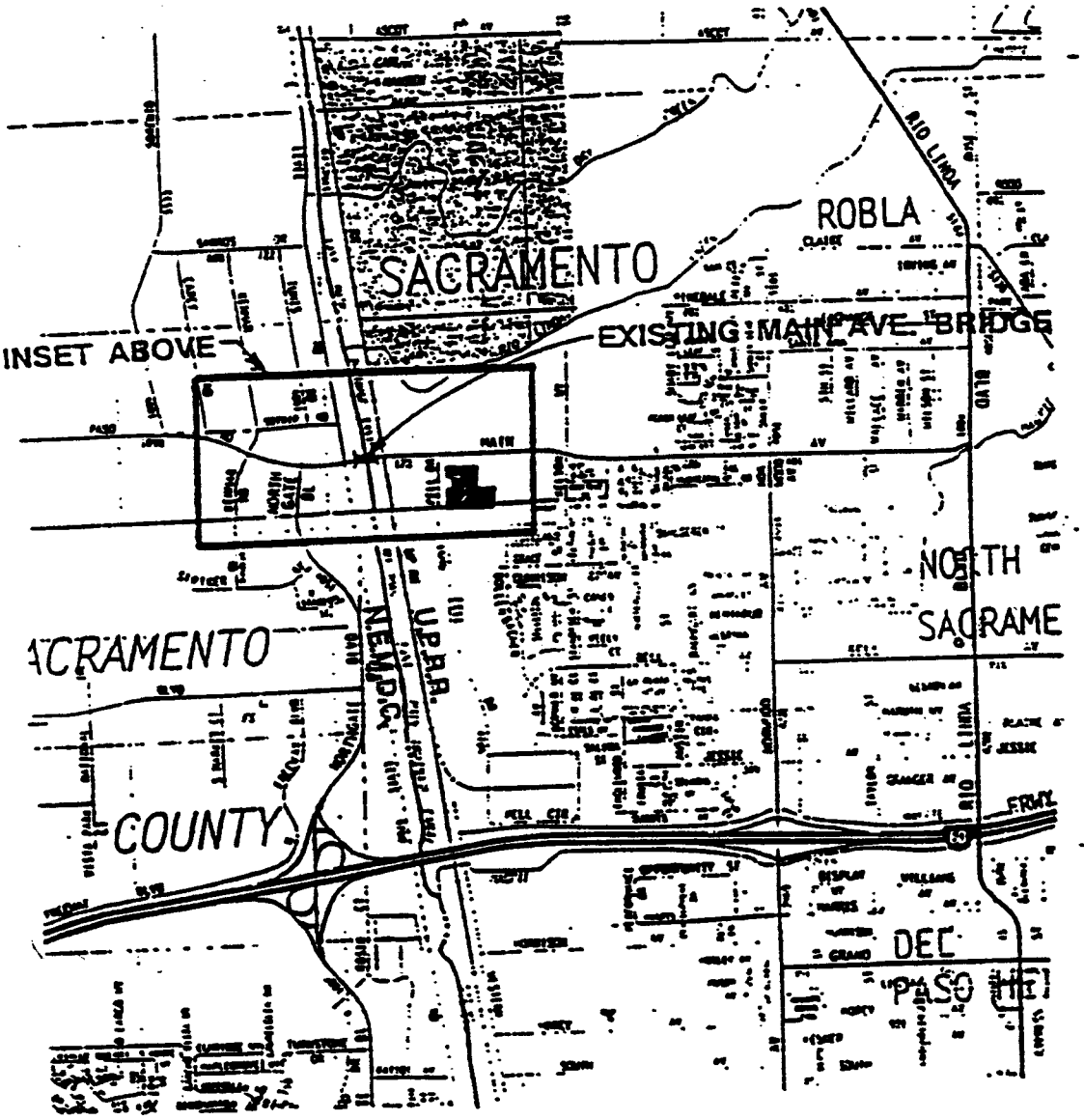
Parsons

SAFCA LOCAL PROJECT

NATOMAS AREA FLOOD CONTROL

Figure 2





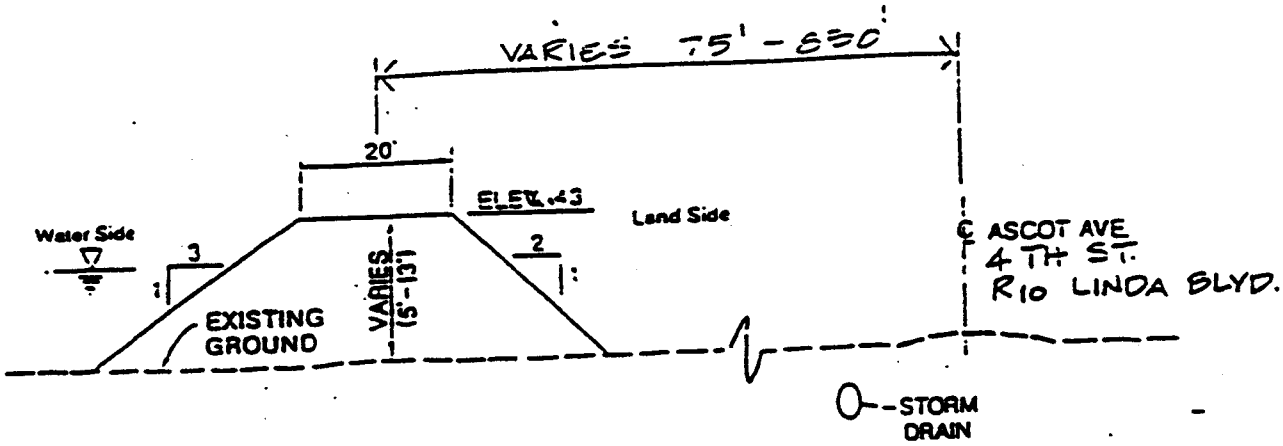
Parsons Brinckerhoff 100 YEARS

SAFCA LOCAL PROJECT

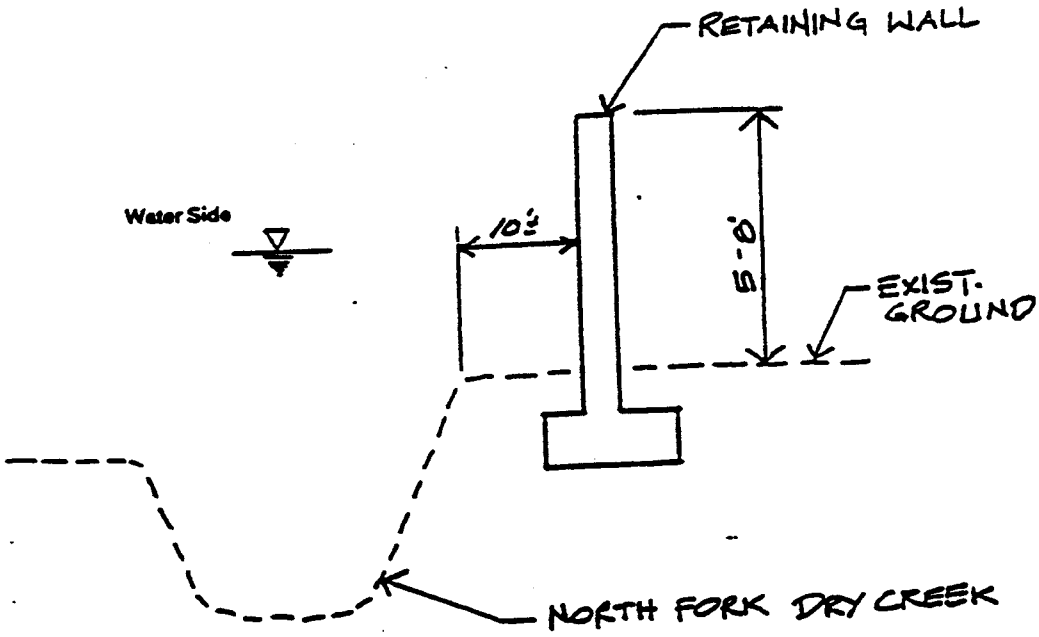
MAIN AVE. BRIDGE

VICINITY / LOCATION MAP

Figure 5

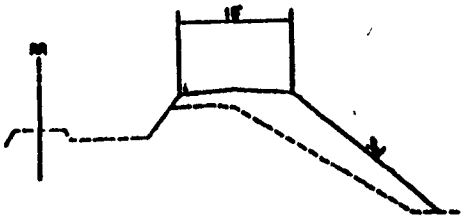


U.P.R.R. TO W. 2nd ST.

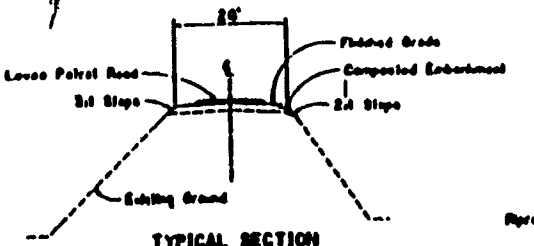


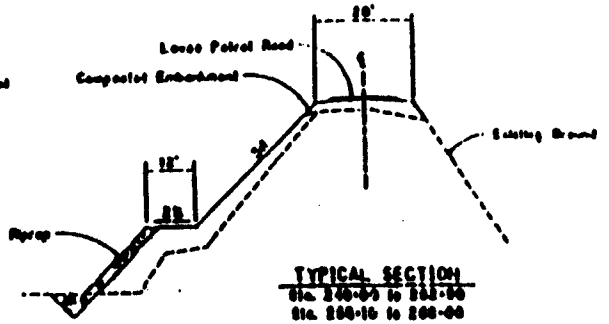
TYPICAL SECTION - DRY CREEK FLOOD WALL
STA. 73+20 TO 79+65
STA. 85+00 TO 89+25

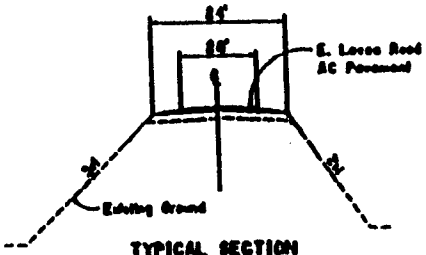
Parsons Brinckerhoff 100 YEARS	SAFCA LOCAL PROJECT NORTH DRY CREEK LEVEE TYPICAL SECTIONS	Figure 12

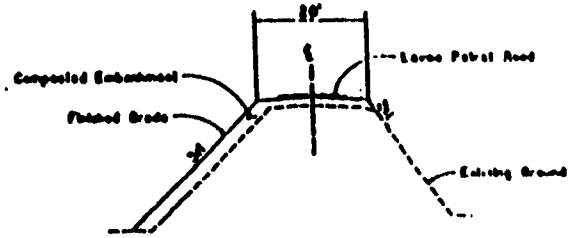


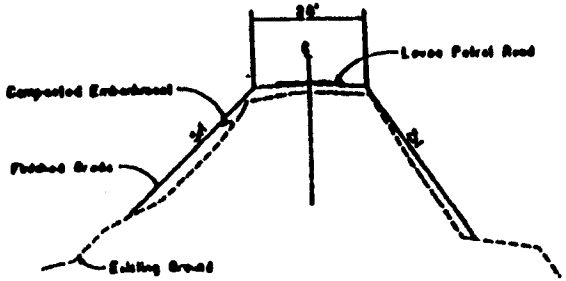
EAST LEVEE

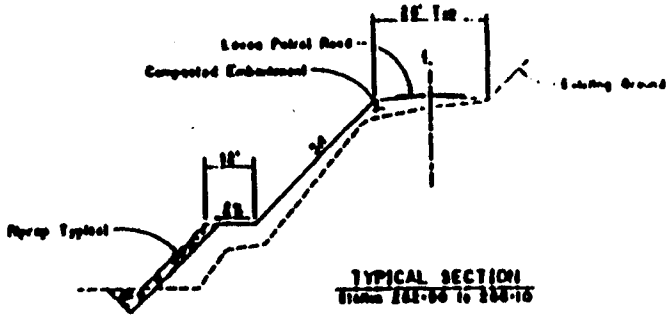












WEST LEVEE

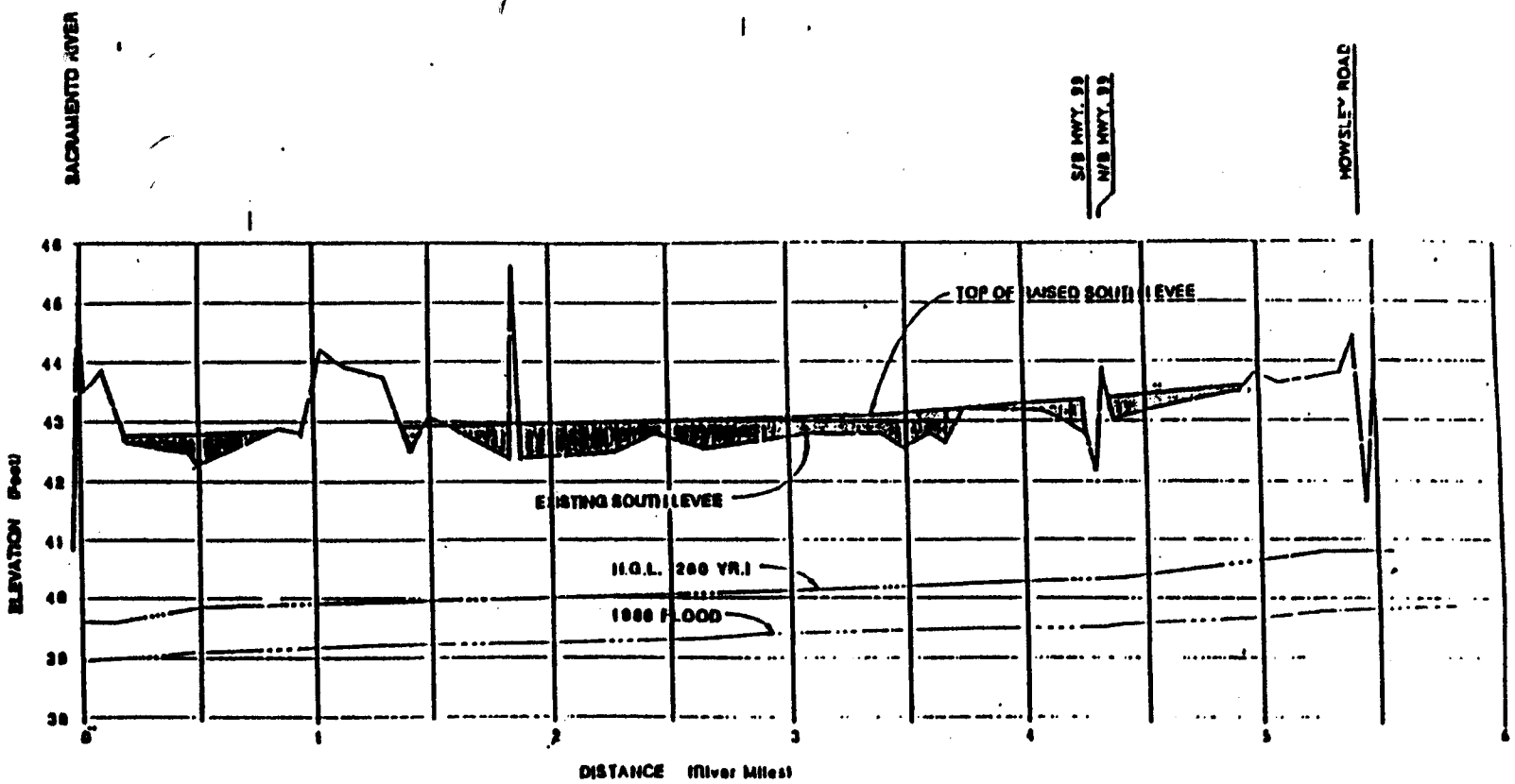
SACRAMENTO AREA FLOOD CONTROL AGENCY

NEMDC LEVEE PROJECT

TYPICAL LEVEE CROSS SECTIONS

4

PUBLIC NOTICE 1982001/19



SOURCE:

Topography is based on Corps of Engineers information contained in the American River Watershed Investigation, Interim Report, December 1991 and augmented by Field Surveys, conducted by Parsons Brinckerhoff December 1992.

H.G.L. (200 YR) is based on Parsons Brinckerhoff hydraulic analysis using COJ adopted flows

PUBLIC NOTICE 19920719

Parsons Brinckerhoff 100 Years

SACRAMENTO LOCAL PROJECT

NATOMAS CROSS CANAL

SOUTH LEVEE MODIFICATIONS

SHEET 21

STATE OF CALIFORNIA—THE RESOURCES AGENCY

PETE WILSON, Governor

DEPARTMENT OF FISH AND GAME
REGION 2
1701 NIMBUS ROAD, SUITE A
RANCHO CORDOVA, CA 95670

(916) 355-7020

May 3, 1995

Colonel John N. Reese
District Engineer
US Army Corps of Engineers
1325 J Street
Sacramento, California 95814

Dear Colonel Reese:

The Department of Fish and Game recently received a copy of a letter from Mr. Butch Hodgkins of the Sacramento Area Flood Control Agency (SAFCA) regarding Permit No. 199200719 with a request for changes to two of the conditions.

These changes would require that the Habitat Conservation Plan (HCP) be completed and approved prior to the completion of the construction of the pump station rather than prior to commencement of construction. The original requirement was designed to facilitate the expeditious preparation of the HCP so that the indirect effects of the flood control project would be mitigated.

At this point in time, we would ask that you postpone your decision on this request. Currently, SAFCA, the City of Sacramento, and Sacramento and Sutter counties are expected to approve submittal of the HCP on July 18, 1995, prior to August when SAFCA needs to award the contract for the pump station. While we fully expect the HCP to be submitted on July 18, there has been some opposition to the overall concept of an HCP by some members of the public.

Our recommendation regarding the request for changes in the permit condition will depend, in part, on the actions by the various boards and councils on July 18. This delay in a decision should not prejudice SAFCA's proposed project because the contract wouldn't be awarded until August and it will allow us to better gauge the likelihood of success in the efforts to prepare an HCP.

If you have any questions, please contact myself at (916) 355-0922, or Ms. Cindy Chadwick, Environmental Services Supervisor, at (916) 355-0267.

Sincerely,

Brian Hunter
for L. Ryan Broddrick
Regional Manager

cc: Ms. Cindy Chadwick
Department of Fish and Game
Rancho Cordova, California

Mr. Wayne White
U.S. Fish and Wildlife Service
2800 Cottage Way, Room E-1803
Sacramento, California 95825

Mr. Butch Hodgkins
Sacramento Area Flood
Control Agency
926 J Street, Suite 424
Sacramento, California 95816

Copy Furnished:

U.S. Fish and Wildlife Service, Attn: Joel Medlin,
2800 Cottage Way, Room E-1803, Sacramento, California 95825
The Honorable Vic Fazio, Representative in Congress,
3rd District, California, 2113 Rayburn, Post Office Building,
Washington, D.C. 20515
The Honorable Robert T. Matsui, Representative in Congress,
5th District, California, 2311 Rayburn, Post Office Building,
Washington, D.C. 20515
The Honorable John T. Doolittle, Representative in Congress,
4th District, California, 2130 Professional Drive, Suite 190,
Roseville, California 95661
The Honorable Richard W. Pombo, Representative in Congress,
11th District, California, 1519 Longworth, House Office
Building, Washington, D.C. 20515
The Bohl Corporation, Attn: John A. Bohl, 1330 "Q" Street,
Sacramento, California 95814
Law Offices Of Gregory D. Thatch, Attn: Gregory D. Thatch,
1730 I Street, Suite 220, Sacramento, California 95814

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

May 5, 1995

Regulatory Branch (199200719)

F.I. Hodgkins, Executive Director
Sacramento Area Flood Control Agency
926 J Street, Suite 424
Sacramento, California 95814

Dear Mr. Hodgkins:

In response to your letter of April 19, 1995, we have modified Special Conditions i, j, and l of Department of the Army Permit number 199200719. These conditions have been modified as follows:

For purposes of these three conditions "complete construction" shall mean the placement of the embankment from the pump station east to the Union Pacific railroad tracks.

i. Prior to completing construction on the pump station north of Dry Creek, a Historic Property Treatment Plan (HPTP) shall be developed and approved in accordance with the Programmatic Agreement Among the Corps of Engineers, Bureau of Reclamation, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding implementation of the American River Watershed Project.

j. Prior to completing construction on the pump station north of Dry Creek, the permittee shall develop a Natomas Basin Habitat Management Plan (Plan). This Plan shall provide the framework within which a mitigation program for the effects of development within the Natomas floodplain will proceed. The framework shall be incorporated into future planning processes by State, local, and Federal authorities as development reaches the appropriate planning stages. The plan shall: ensure that the development within the Natomas floodplain complies with applicable Federal, State and local laws and regulations, including the Endangered Species Act and the Clean Water Act; identify at a conceptual level, appropriate and practicable mitigation measures that may be contemplated under Federal, State, and local laws pertaining to future development; and describe the mechanism to be used for the long-term management and protection of any mitigation lands.

The Plan shall be developed by the permittee in coordination with the on-going Corps of Engineers activities for the American River Watershed Investigation. The Plan, including its development, shall be coordinated with the Corps, the U.S. Fish and Wildlife Service, the Environmental Protection Agency, and other Federal, State, and local agencies having interest, expertise and jurisdiction over the Natomas floodplain.

The District Engineer will verify that the Final Plan is in compliance with this condition before completing construction on the pump station. The final Plan shall be incorporated by reference as a condition of this permit. Enforcement of mitigation requirements of State and local land use agencies shall be the responsibility of the applicable State or local agency.

1. The permit applicant shall not complete construction on the pumping station along the East Main Drain or otherwise complete the proposed project by providing 100-year flood protection for the lower American Basin until the Service first issues an incidental take permit and associated implementing agreement pursuant to Section 10(a)(1)(b) of the Act to the City and County of Sacramento, Sutter County and any other parties necessary to guarantee the successful implementation of a habitat conservation plan for the giant garter snake resident in the American Basin. This plan shall be compatible with and a component of the multispecies habitat management plan otherwise required by the Department of the Army as a condition of permit authorization.

All other conditions of the permit remain in full force and effect.

If you have any questions, please write to Tom Cavanaugh, Room 1444, or telephone (916) 557-5261.

Sincerely,

John N. Reese
Colonel, Corps of Engineers
District Engineer

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

IN REPLY REFER TO:

In Reply Refer To:
1-1-95-I-900

May 19, 1995

Colonel John Reese
District Engineer
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Subject: Endangered Species Act Consultation on the Revised Natomas Area Flood Control Improvement Project (PN 199200719, 1-1-94-F-13) in Sacramento and Sutter Counties, California

Dear Colonel Reese:

This letter is in response to the April 19, 1995, letter from the Sacramento Area Flood Control Agency to your office regarding modifications to the above mentioned Army Corps of Engineers (Corps) permit, and your May 5, 1995, response. At issue are similar provisions of the Corps permit and the March 11, 1994, biological opinion prepared pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act), requiring that construction of the pumping station along the East Main Drain not be initiated until the applicants obtain a permit pursuant to section 10(a)(1)(B) of the Act. Since issuance of the biological opinion, the applicants have made substantial progress toward completing the section 10(a)(1)(B) process. To date, the applicants have submitted a draft Habitat Conservation Plan (HCP) that my staff has reviewed. We have determined that, with minor additions to provide clarification, this draft will be acceptable in principle. At this time my staff is working with the applicants to complete the HCP process.

It has come to our attention, however, that to meet timing needs, the applicants must initiate construction on the pumping station prior to completion of the section 10(a)(1)(B) process. To aid the local community in this matter, we are modifying term and condition 2) of the biological opinion to read as follows:

> The Sacramento Area Flood Control Agency shall not commence construction of the pumping station along the East Main Drain until it and any other necessary parties have submitted to the Service an application for an incidental take permit pursuant to section 10(a)(1)(B) of the Act accompanied by an Habitat Conservation Plan and Implementing Agreement for the giant garter snake that have been conceptually agreed to by the Service. This plan will be compatible with and a component of the multi-species habitat management plan otherwise required by the Corps as a condition of permit authorization. The permit applicants shall not complete construction of the pumping station or otherwise complete the proposed project until the Service issues the subject section 10(a)(1)(B) permit. For purposes of this condition, "complete construction" shall mean the placement of the embankment from the pump station east to the Union Pacific railroad tracks.

This modification will allow the applicants to initiate construction activities, thus alleviating their concerns.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

In Reply Refer To:
1-1-94-F-13

March 11, 1994

District Engineer
U.S. Army Corps of Engineers
Regulatory Branch (Attention: Tom Kavanaugh)
1325 J Street
Sacramento, California 95814-2922

Subject: Endangered Species Act Consultation on the Revised Natomas Area Flood Control Improvement Project (PN 199200719) in Sacramento and Sutter Counties, California

Dear Sir:

This responds to your request of January 21, 1994, for initiation of formal consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act), on the proposed provision of 200-year flood protection for the lower American Basin. Your request was received by the U.S. Fish and Wildlife Service (Service) on January 25, 1994. At issue are the effects of the proposed project on the giant garter snake (*Thamnophis gigas*), listed as a threatened species by the State and Federal governments.

This biological opinion is based on the public notice for this project, numerous environmental documents prepared under the National Environmental Policy Act and California Envnironmental Quality Act, and other scientific and commercial information in Service files.

Biological Opinion

It is our biological opinion that the proposed Revised Natomas Area Flood Control Improvement Project, together with the five proposed permit conditions described in the Corps' letter dated January 21, 1994, is not likely to jeopardize the continued existence of the giant garter snake. Critical habitat has not been designated for this species; therefore, none will be adversely modified or destroyed.

Description of the Proposed Action

Please refer to the public notice (PN 199200719) for a description of the construction related details of the proposed project. In brief, the Sacramento Area Flood Control Agency (SAFCA) proposes to improve levee systems needed to provide 200-year flood protection to the 55,000-acre lower American

(Natomas) Basin. Your January 21, 1994, request for consultation included a list of five special conditions proposed for inclusion as part of any permit issued for the proposed project--three conditions designed to avoid, minimize, and offset the direct effects of project construction on the garter snake, and two conditions that would offset the indirect effects of the proposed flood control project. By mutual agreement, the Corps and Service consider these permit conditions to be part of the project proposal. Please refer to the Incidental Take section below for more details on conditional language to be included in any Department of the Army authorization of the proposed project.

To avoid, minimize, and offset the direct effects of the proposed project on the giant garter snake, the Corps proposed three permit conditions to supplement the applicant's proposed Wetland Mitigation Plan, dated June 1993. These three permit conditions, as described by letter dated January 21, 1994, would (1) require preconstruction surveys for the giant garter snake, (2) include measures to minimize the extent of incidental take, and (3) compensate for any direct losses of giant garter snake habitat. To address indirect effects of the proposed project, the Corps also proposed (in the same letter) to require (4) completion of a habitat management plan prior to start of construction of the proposed pumping station, per direction of the Assistant Secretary of the Army (Civil Works), that addresses mitigation requirements for the giant garter snake, and (5) inclusion of a habitat management plan and signed agreement among the City of Sacramento, Sacramento and Sutter counties, and the Service, to guarantee implementation of the plan. Relative to items #1 and 2 above, the permit applicant, by letter dated February 3, 1994, submitted a proposed plan to avoid direct effects of project construction on the giant garter snake. This plan will be modified and approved by the Service per requirements described in the Incidental Take section below.

Species Account/Environmental Baseline

Please refer to the October 20, 1993, Federal Register notice (58 FR 54053-54066) listing the giant garter snake as a threatened species, for detailed information on the biology/ecology of the species. One of the largest garter snakes, reaching a total length of at least 64 inches, this highly aquatic species feeds exclusively on small fishes, tadpoles, and frogs. The giant garter snake inhabits small mammal burrows and other soil orifices above prevailing flood elevations throughout its winter dormancy period (November to mid-March). The breeding season commences immediately upon emergence in the spring, extending through March and April; females give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young, with a mean of 23.1 (n=19) (*ibid.*). Although growth rates are variable, young typically more than double in size by one year of age (*ibid.*). Sexual maturity averages 3 years of age in males and 5 years for females (*ibid.*).

The giant garter snake is endemic to valley floor emergent marshes in the Central Valley, historically distributed throughout the large flood basins from the former Buena Vista lakebed in Kern County northward to the Butte Basin. Reclamation of wetlands for agriculture and flood control have resulted in severe habitat fragmentation, to the extent that wetland habitats with natural hydrologic and vegetative characteristics effectively have been eliminated throughout the entire range of the species. The remaining giant garter snake populations identified since the mid-1970s are clustered in 13

distinct areas that largely coincide with historical riverine flood basins and tributary streams (Hinds 1952, Brode and Hansen 1992). In agricultural areas (predominantly rice), giant garter snakes primarily occur along water delivery and drainage canals. Nine of the remaining 13 regional populations occur discontinuously in typically small, isolated patches of valley floor habitat that support few individuals due to limited extent and quality of suitable habitat (Hansen 1988). These nine populations, encompassing about 75 percent of the species' current geographic range, are vulnerable to extinction at any time from anthropogenic causes, as well as stochastic (random) environmental, demographic, and genetic processes. Despite repeated censusing, giant garter snakes have not been observed throughout the San Joaquin Valley since the mid-1970's. Considering the urbanization threats to the American Basin population portended by the proposed project, 10 of the 13 (77 percent) extant populations are imminently imperiled.

The American Basin supports the largest extant giant garter snake population (Brode and Hansen 1992). Throughout this area, reconnaissance level surveys (USFWS 1991) indicate that about 1,400 acres of giant garter snake habitat exist in the form of man-made irrigation and drainage canals, as well as an undetermined acreage of suitable habitat within nearly 13,000 acres of adjoining rice fields. The giant garter snake also uses an undetermined amount of habitat at higher elevations to escape from winter flooding during the inactive winter phase of the snake's life cycle.

Effects of the Proposed Action

Direct Effects

The proposed levee improvement work could directly affect giant garter snakes if they occur along the reaches specified for upgrading. The applicant proposes to conduct field surveys to determine if suitable habitat and the species occur in any of the proposed work areas. If giant garter snakes are found, construction will be scheduled to avoid the period between October 1 to May 1, thereby precluding the likelihood of impacting snakes while dormant underground. Levee construction will predominantly occur along levee tops and banks, areas seldom used by this highly aquatic species during its active season. Therefore, death or injury from construction activities during the summer along levee banks and slopes is unlikely because snakes center their activities in aquatic habitats at this time.

Nonetheless, as currently formulated, the proposed levee improvements do not address the possibility of eliminating terrestrial retreat habitat during the summer while garter snakes are restricted largely to aquatic habitats. Under this scenario, terrestrial retreat habitat may become a limiting factor to any garter snakes inhabiting project reaches scheduled for levee improvement. However, it is likely that small mammals and other processes that create soil holes and fissures will relatively quickly reestablish any terrestrial retreat habitat lost due to project construction.

Indirect Effects

The proposed flood control project would provide 200-year flood protection for the 55,000-acre lower American Basin. This area currently consists 7,140 of acres of urban land uses and 47,742 acres of agricultural lands. The draft

and final Environmental Impact Statement (EIS) for the American River Watershed Investigation (U.S. Army Corps of Engineers 1991) and Environmental Impact Report (EIR) for the Revised Natomas Area Flood Control Improvement Project (SAFCA 1993) defined this 55,000-acre basin as the project area. Both documents acknowledged that flood control would result in intensive urbanization of the Basin throughout the foreseeable future. In addition, various City and County plans identify proposed development for the region, to wit: draft EIR for the Sutter Bay Village Specific Plan and Golf Course Residential (Sutter County 1992); draft EIR for the Metropolitan Airport/Vicinity Special Planning Area General Plan Amendment and Rezone No. 89-GPB-ZOB-0781 (Sacramento County 1992); North Natomas Community Plan (City of Sacramento 1993); draft and final EIR's for the South Sutter County General Plan Amendment (Sutter County 1991, 1992). These documents establish a clear link between the proposed flood protection and resulting flood plain development. For example, the North Natomas Community Plan acknowledges that further development is precluded until the proposed flood control project is constructed. The Sutter Bay Village Specific Plan states that "[u]ltimate approval of the proposed project (Sutter Bay) is dependent on the eventual approval of a regional flood control project, which is being proposed by the Sacramento Area Flood Control Agency, the Army Corps of Engineers, and the State Reclamation Board." Moreover, Joe Serna, Mayor of the City of Sacramento, stated at a September 16, 1993, meeting of the Floodplain Management Association, that "the decision already has been made in Natomas, we're going to develop it" (Sacramento Bee, 9/17/93).

Absent measures to address the prospect of future basin-wide losses of existing giant garter snake habitat, this flood control project and consequent urban development could extirpate the giant garter snake from the American Basin [California Department of Fish and Game (CDFG) 1992, Brode and Hansen 1992)]. The North Natomas Community Drainage System and associated urban development, proposed by the City of Sacramento, would affect about 26 miles of giant garter snake habitat along existing canals and ditches, and additional rice field habitat (*ibid.*). Potential effectiveness of a proposed mitigation plan remains undetermined. The proposed Sutter Bay project, at the north end of the American Basin, could eliminate and/or degrade about 42 miles of suitable canals (*ibid.*) and thousands of acres of associated rice fields and giant garter snake habitat. The proposed South Sutter Industrial Center, located near the Sutter Bay project, could eliminate another 9.0 miles of aquatic habitat and associated rice fields. The Metro Air Park is proposing about 1,890 acres of development on agricultural and vacant lands that potentially could result in major adverse impacts to the species, including the loss of about 9.0 miles of canal habitat and 1,500 acres of rice fields, as well as the disruption of movement corridors (*ibid.*). Roadway improvement and construction projects, or the planned extension of the Sacramento Regional Transit system in this area, also increases the likelihood for major impacts to the species, including elevated mortality from increased traffic on local roads and highways (*ibid.*). Numerous species of aquatic snakes are vulnerable to roadway mortality (Bernardino *et al.* 1992). Giant garter snakes also are killed and injured by vehicular traffic, as evinced by numerous observations (Sacramento County 1992; G. Hansen, pers. comm., 1992; J. Brode, pers. comm., 1992); of the cumulative total of 1,056 giant garter snake records compiled by G. Hansen over his many years of study, 76 (7.2 percent) were road kills (G. Hansen, pers. comm., 1992).

With nine of the twelve other extant populations on the verge of extinction throughout 75 percent of the current range of the species, including the entire San Joaquin Valley (see Species Account/Environmental Baseline), survival of the species cannot be assured by the additional loss or degradation of the largest remaining population. Because of the severe, declining trends in habitat suitability/availability and population levels throughout 75 percent of the range of the species, the Service concludes that the maintenance of a viable giant garter snake population in the American Basin is vital to the survival of the species.

To address the prospective habitat losses of the proposed project to the American Basin population, the Corps has proposed, by letter dated January 21, 1994, a special permit condition that would establish a multispecies habitat management plan for the 55,000-acre lower American Basin, scheduled for completion prior to the start of construction of the proposed pumping station. An element of this habitat management plan would include an agreement among local governments and the Service that guarantees the conservation needs of the giant garter snake. Based on ongoing habitat conservation planning discussions with representatives of the applicant, Corps, CDFG, and landowners, this agreement, at the Federal level, will take the form of an incidental take permit and implementing agreement issued by the Service under section 10(a)(1)(B) of the Act, and at the State level, a permit issued by the CDFG under section 2081 of the State Fish and Game Code.

This habitat management plan would provide certainty for the maintenance of a viable population in the American Basin if the proposed project is authorized. The Service, therefore, concludes that the proposed project is not expected to reduce appreciably the likelihood of the survival and recovery of the giant garter snake by adversely affecting reproduction, numbers, and distribution of the species.

Cumulative Effects

Cumulative effects are those effects of future non-Federal (State and local governments, or private) activities on endangered and threatened species or critical habitat that are reasonably certain to occur during the course of the Federal activity subject to consultation. Future Federal actions are subject to the consultation requirements established in section 7 and, therefore, are not considered cumulative to the proposed action.

Various farming and canal maintenance practices adversely affect most remaining giant garter snake populations (58 FR 54063). For example, sodium sulfate and selenium contamination throughout most of the Grasslands region of the San Joaquin Valley has been documented to adversely affect giant garter snake prey species and overall habitat quality (USFWS file information). In addition, acrolein (Magnacide H) is commonly used as a herbicide in irrigation and drainage canals throughout much of the range of the giant garter snake. This compound, when used at levels needed to control target plant species, is toxic to virtually all aquatic vertebrates (CDFG and USFWS file information). Livestock grazing is known to be contributing to the elimination and degradation of available habitat at four populations (58 FR 54061).

Cumulative effects together with the impacts of the proposed project are not likely to reduce appreciably the likelihood of the survival and recovery of the giant garter snake.

Incidental Take

Sections 4(d) and 9 of the Act, as amended, prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to such an extent as to significantly disrupt normal behavioral patterns that include but are not limited to breeding, feeding, or sheltering.

Under the terms of §7(b)(4) and §7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such take is in compliance with this incidental take statement. The measures described below are nondiscretionary and must be undertaken by the agency so that they become binding conditions of any permit issued to the applicant for the exemption in §7(o)(2) to apply. The Federal agency has a continuing duty to regulate the activity that is covered by this incidental take statement. If the agency fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, the protective coverage of §7(o)(2) may lapse.

The Service anticipates that an unquatified amount of potential giant garter snake habitat could be lost during construction of the proposed levee improvements. Surveys have not been conducted to determine the extent, if any, of giant garter snake habitat within the project reaches proposed for improvement. The Corps and applicant propose preconstruction surveys to obtain the information needed to design and schedule the project so that impacts can be avoided and minimized to the extent possible. The Service also anticipates that an unquantifiable amount of giant garter snake habitat would be eliminated by future commercial development over the next ±50 years throughout much of the lower American Basin consequent to the provision of the proposed flood protection.

The Service establishes the following reasonable and prudent measures to minimize the impact of take. The measures below are nondiscretionary and must be undertaken by the Corps:

1) Construction related disturbance to the giant garter snake shall be minimized.

2) A conservation plan to address indirect effects of the proposed project shall be approved by the Service prior to the start of construction on the pumping station.

To be exempt from the prohibitions of section 9 of the Act, the following terms and conditions, which implement the reasonable and prudent measures described above, must be complied with in their entirety and included as

special conditions in any Department of the Army permit issued for the proposed project:

1) The applicant shall prepare and implement a plan for avoiding and minimizing construction related impacts to the giant garter snake. The plan shall be submitted to the Corps and Service for review and approval prior to the start of project construction.

2) The permit applicant shall not begin construction on the pumping station along the East Main Drain or otherwise complete the proposed project by providing 100-year flood protection for the lower American Basin until the Service first issues an incidental take permit and associated implementing agreement pursuant to §10(a)(1)(B) of the Act to the City and County of Sacramento, Sutter County, and any other parties necessary to guarantee the successful implementation of a habitat conservation plan for the giant garter snake population resident within the American Basin. This plan shall be compatible with and a component of the multispecies habitat management plan otherwise required by the Department of the Army as a condition of permit authorization.

Pursuant to 50 CFR §402.14(i)(4), if during the course of the action the amount or extent of incidental taking is exceeded, the causative action must cease and the Corps must reinitiate consultation immediately with the Service to avoid violation of section 9 of the Act.

Reporting Requirements: The Service shall be notified immediately of any information about take or suspected take of giant garter snakes associated with project construction and implementation of the habitat conservation plan for the giant garter snake. Upon locating a dead, injured, or sick giant garter snake specimen, the Corps, permittee, and/or contractors must immediately notify the Service within 3 working days of any such information. Notification must include the date, time, and precise location of the incident/specimen, and any other pertinent information. The Service contact for this information is the Field Supervisor at 916/978-4866. Care shall be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state for later analysis of cause of death. The finder and handler of any such animals has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed. Injured animals or specimens shall be delivered to the Service's Division of Law Enforcement at 2800 Cottage Way, Sacramento, California 95825-1846 (916/978-4861).

This concludes formal consultation on the project as described above. Reinitiation of formal consultation is required if (1) the amount or extent of incidental take is exceeded, as previously described, or the requirements under the Incidental Take section are not implemented, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent that was not considered in this opinion, (3) the proposed action is subsequently modified in a manner that causes an effect to the giant garter snake that was not considered in this opinion, and/or (4) a new species is listed or critical habitat is designated that may be affected by the action.

The 404 permit expressly incorporates the decision by the Assistant Secretary of the Army (Civil Works), and the biological opinion including accompanying terms and conditions of the incidental take statement provided by the Service. Your May 5, 1995, letter purports to modify the 404 permit in a manner inconsistent with the decision rendered by the Assistant Secretary and the terms and conditions of the biological opinion or the modified language set out above. Consequently, the Service recommends that the Corps either modify the Corps permit conditions to be consistent with the above modified term and condition of biological opinion 1-1-94-F-13, or that we meet at your earliest convenience to resolve this issue.

The Corps also should be aware that the Service is currently working with local entities to develop a procedure that will allow the completion of the proposed flood control project prior to the issuance of a section 10(a)(1)(B) permit. We welcome your participation in these discussions. If you have any questions, please contact Mr Joel Medlin, Field Supervisor, Sacramento Field Office at (916) 979-2710.

Sincerely,

Wayne S. White
State Supervisor

Literature Cited

Bernardino, F., Jr. and G. Dalrymple. 1992. Seasonal activity and road mortality of the snakes of the Pa-hay-okee wetlands of Everglades National Park, USA. Biol. Cons. 62:71-75.

Brode, J. and G. Hansen. 1992. Status and future management of the giant garter snake (*Thamnophis gigas*) within the southern American Basin, Sacramento and Sutter counties, California. CDFG, Inland Fish. Div., Jan. 1992.

California Department of Fish and Game. 1992. 1991 Annual report on the status of California State listed threatened and endangered animals and plants. The Resources Agency. 193 pp.

Hansen, G. 1988. Review of the status of the giant garter snake (*Thamnophis couchi gigas*) and its supporting habitat during 1986-1987. Final report for Calif. Depart. Fish and Game Contract C-2060. Unpubl. 31 pp.

Hansen, G.E. and R.W. Hansen. 1990. Thamnophis gigas. Reproduction. Herp Review 21(4):93-94.

Hinds, N.E.A. 1952. Evolution of the California landscape. Calif. Div, of Mines Bull. No. 158. 240 pp.

Sacramento County. 1992. Draft environmental impact report for the Matropolitan Airport/vicinity special planning area General Plan Amendment and Rezone No. 89-CPB-ZOB-0781. State Clearinghouse No. 92032074. County of Sacramento Depart. of Envir. Rev. and Ass. July 31, 1992.

U.S. Fish and Wildlife Service. 1991. American River watershed investigation, Natomas area: Draft substantiating seport, vol. IV. Sacramento, CA. 150 pp. plus appendices.

Appendix K

Addendum to the Biological Technical Memorandum, prepared by CH2MHill, April 2003.

Technical Memorandum

Addendum

Natomas Basin Habitat Conservation Plan EIR/EIS

April 2003

CH2MHILL
2485 Natomas Park Drive, Suite 600
Sacramento, California

SECTION 1

Introduction

A Biological Resources Technical Memorandum (CH2M HILL, 2002) was prepared to determine the adequacy of the conservation strategy of the Natomas Basin Habitat Conservation Plan (NBHCP), and to provide a basis for the analysis of impacts in the NBHCP and its Environmental Impact Report/Environmental Impact Statement (EIR/EIS). This Addendum to the Technical Memorandum has been prepared to clarify the original analysis and to support responses to public comments on the Draft NBHCP and Draft EIR/EIS.

This Addendum provides additional information to clarify the baseline habitat conditions for the Swainson's hawk, specifically the quality and availability of foraging opportunities. It also presents clarifying information to refine further the analysis of the effects of the NBHCP on foraging opportunities and the consequent potential effects to the Swainson's hawk population in the Natomas Basin. In addition, it updates the analysis of potential effects of removal of nest trees on the Swainson's hawk population in the Natomas Basin in consideration of implementation of conservation measures to date (CH2M HILL, 2002). The additional information in this Addendum comprises minor revisions to the original analysis conducted for the Draft EIR/EIS and it does not alter the original findings that a less-than-significant impact to Swainson's hawk is anticipated to result from implementing the conservation strategy of the NBHCP. No new or substantially more severe environmental impacts have been identified in the analysis.

The Addendum is organized in the following way:

- Section 1, Introduction
- Section 2, Assumptions and Approach
- Section 3, Additional Information Clarifying Baseline Conditions
- Section 4, Additional Information Clarifying the Effects of Implementing the NBHCP
- Section 5, Conclusions
- Section 6, References

SECTION 2

Assumptions and Approach

This section presents the approach and the assumptions used to develop additional information on baseline conditions and the effects of implementing the NBHCP on foraging habitat. Additional baseline information was developed by: (1) quantifying foraging habitat by habitat value and (2) quantifying the temporal availability of foraging opportunities during the months when Swainson's hawks are in the Natomas Basin (April through September). Information that further refines the 2002 Biological Resources Technical Memorandum's determination of the impacts of changes in foraging habitat on Swainson's hawk was developed by evaluating changes in the value and temporal availability of foraging habitat under a range of possible implementation scenarios on the Mitigation Lands (i.e., lands managed by The Natomas Basin Conservancy [TNBC] pursuant to the NBHCP).

2.1 Value of Foraging Habitat

The 2002 Biological Resources Technical Memorandum and Draft EIR/EIS rely on a habitat database to present quantitative information on the acreage of potential Swainson's hawk foraging habitat available in the Natomas Basin (see Tables 4-12 and 4-13 of the Draft EIR/EIS). The habitat database is based on the California Department of Water Resources (DWR) land cover database, which includes information on specific cover types (including crop types) during 1993 for Sacramento County and 1998 for Sutter County. Cover types considered to provide potential foraging habitat for Swainson's hawk are: non-rice crops, pasture, idle, ruderal, grassland, and alfalfa. While the Draft EIR/EIS acknowledges that different cover types offer different value as foraging habitat for Swainson's hawk, differences in estimated habitat values are not quantitatively described. In this manner, the Draft EIR/EIS assumes that all potential foraging habitat provides the same value—a conservative approach because foraging habitat value would not be underestimated.

This Addendum clarifies the prior analysis by classifying foraging habitat from the database (CH2M HILL 2002) as Low, Moderate, or High value using a class system developed by Estep and Teresa (1992). The habitat value classes of Estep and Teresa (1992) reflect differences in prey abundance and accessibility and are derived from a study (Estep 1989) of Swainson's hawk in the Central Valley. Based on the habitat preferences of 12 Swainson's hawks in the Central Valley, agricultural land uses are ranked according to their relative value as foraging habitat from most valuable to least valuable as follows:

1. Alfalfa
2. Disced field
3. Fallow
4. Dry-land pasture
5. Beets
6. Tomatoes
7. Irrigated pasture
8. Grains
9. Other row crops
10. Other

This ranking reflects differences in prey abundance and accessibility among the cover types. The habitat value rating collapses this ranking into three categories: Low, Moderate, and High.

Table 1 shows the specific crop and pasture types mapped in the Natomas Basin and the corresponding habitat value designation.

TABLE 1
Foraging Habitat Value of Crops, Pasture and Other Cover Types for Swainson's Hawk in the Natomas Basin
Habitat value is based on Estep and Teresa (1992)

Cover Type	Habitat Value	Comment
Non-rice crops		
Sugar beet	Moderate	None
Tomato	Moderate	None
Corn	Low	None
Safflower	Low	None
Onions and garlic	Low	Assigned Low value because a majority of the row and field crops (6 out of 11) listed by Estep and Teresa (1992) are considered Low foraging habitat value. Tall plant structure would impede access to prey.
Melons, squash and cucumber	Moderate	Assigned Moderate value based on similar structure to tomatoes
Beans	Moderate	None
Unspecified row and field crops	Low	Assigned Low value because a majority of the row and field crops (6 out of 11) listed by Estep and Teresa (1992) are assigned Low value.
Wheat	Moderate	None
Pasture		
Alfalfa	High	None
Clover	Moderate	Irrigated pasture in Estep and Teresa (1992)
Unspecified or mixed	Moderate	Irrigated pasture In Estep and Teresa (1992)
Grassland	Moderate	Grassland is assumed to provide Moderate habitat value (Rineck, pers. comm)
Idle	High	Idle fields are considered to be fallow fields under Estep and Teresa's (1992) habitat valuation approach. The Idle classification includes lands not cropped in the current or previous season but cropped in past 3 years. These fields are considered to be "High" value because stubble left after harvest provides forage for rodents and access for hawks. They would not have been idled long enough to allow development of vegetation sufficient to block access to prey by hawks.
Ruderal	Moderate	Ruderal lands are considered similar to fallow fields. Estep and Teresa (1992) show fallow fields as "High" or "Moderate" and note that the value of fallow fields as foraging habitat for Swainson's hawks depends on the height and density of vegetation. Ruderal was used for areas designated as "barren" in the DWR habitat classification. These areas, while not likely to have much vegetation cover, also would not be expected to support abundant prey because of limited vegetation. Therefore, the ruderal designation is considered to be "Moderate" rather than "High."

2.2 Temporal Availability of Foraging Opportunities

Bechard (1982) and Estep (1989) suggest that while some crop types support high prey abundance, the dense cover of vegetation in cultivated fields makes prey inaccessible to Swainson's hawk during much of the spring and summer. Prey are accessible during harvest and Swainson's hawks often are observed foraging in close association with harvesting equipment. Some crops (e.g. alfalfa) provide accessible prey throughout the hawk's residency period because frequent harvest and irrigation expose or concentrate prey, making them vulnerable to predation by hawks.

The temporal availability of foraging opportunities is discussed in the Draft EIR/EIS. In this Addendum, additional information is presented on the temporal availability of foraging opportunities based on time of harvest in the Natomas Basin. For example, alfalfa is harvested and irrigated monthly beginning in April and continuing through September, thus providing foraging opportunities in every month during which hawks are in the Basin. In contrast, corn is harvested only in September. This Addendum assumes that prey are accessible in corn only during September, and the 924 acres of corn in the Basin are considered to provide potential foraging habitat only during that month. The months in which each cover type is considered to provide foraging opportunities for Swainson's hawks are shown in Table 2. For crops harvested during a 2-month period (e.g. sugar beets), half of the acreage is assumed to be harvested in each month.

TABLE 2
Months in which Each Cover Type Provides Foraging Opportunities for Swainson's Hawk

Cover Type	Months	Comment
Non-rice crop		
Sugar beet	September – October[a]	None
Tomato	July – August	None
Corn	September	None
Safflower	August	None
Onions and garlic	August	None
Melons, squash and cucumber	October[a]	Pumpkins
Beans	October[a]	None
Unspecified row and field crops	July – August	Conservatively assumed to be the same as tomatoes
Wheat	June	None
Pasture		
Alfalfa	April – September	None
Clover	April – September	None
Unspecified or mixed	April – September	None
Grassland	April – September	Grassland were assumed to be consistently usable as foraging habitat.

TABLE 2
Months in which Each Cover Type Provides Foraging Opportunities for Swainson's Hawk

Cover Type	Months	Comment
Idle	April – September	Idle fields were assumed to be consistently usable as foraging habitat.
Ruderal	April – September	Ruderal lands were assumed to be consistently usable as foraging habitat.

[a] Swainson's hawks have migrated out of the Natomas Basin by October and if these crops were harvested in October they would not provide any foraging habitat for Swainson's hawks.

Sources: J. Williams, University of California, Davis Agricultural Extension Program, pers. comm.
J. Dickey, CH2M HILL, pers. comm.
Smallwood (1995)

2.3 Assumptions for Mitigation Lands Implementation Scenarios

The additional information on habitat value and the temporal availability of foraging habitat allows further refinement on the potential effects of the NBHCP on Swainson's hawk. One component of the NBHCP is the acquisition and management of lands by TNBC to provide habitat for Covered Species. The NBHCP specifies the total acreage of land to be acquired and the habitat composition to be provided in the reserves. To meet the reserve requirements, the NBHCP allows TNBC to acquire lands that currently provide habitat for Covered Species and manage and protect those lands in perpetuity. Alternatively, TNBC can acquire lands that do not provide habitat for Covered Species and implement actions to create habitat. As a result of this flexibility, there is a range of possible future habitat conditions in the Natomas Basin depending on how much of the reserve acreage consists of existing habitat. To clarify further the potential effects of the NBHCP on Swainson's hawks, three implementation scenarios are considered in this Addendum to capture the range of possible habitat conditions that could occur under the NBHCP. The following text describes the acreage and habitat composition requirements specified in the NBHCP, the assumptions on the value and temporal availability of foraging opportunities of habitats on the reserve, and the assumptions for the range of implementation scenarios used to refine the effects on the NBHCP on Swainson's hawk in this document.

2.3.1 Summary of NBHCP Requirements and Assumptions for Mitigation Lands

The NBHCP requires that 8,750 acres be acquired and maintained in a habitat reserve system (i.e., the Mitigation Lands) as mitigation for Authorized Development (i.e., the 17,500 acres of development authorized under the NBHCP). Of this 8,750 acres, 4,375 acres would be in rice, 2,187.5 acres would be managed marsh, and 2,187.5 acres would be upland habitat[1]. Foraging opportunities for Swainson's hawk occur in the upland habitat, as well as portions of the rice and managed marsh, as discussed below. The assumptions used in this Addendum for this habitat are presented below:

- The 2,187.5 acres of upland habitat would be primarily managed to provide foraging habitat for Swainson's hawk. This habitat is assumed to be of High value and to provide consistently accessible prey through the hawk's residency period in the Natomas Basin.

[1] The NBHCP stipulates that the acreage of managed marsh can be increased up to 6,562.5 acres under certain conditions.

- The NBHCP requires fallowing of 10 percent of the rice each year and implementation of management practices to increase foraging habitat value for Swainson's hawk (Section V.4.b). The 437.5 acres of fallowed rice under the NBHCP is assumed to provide consistently accessible prey throughout the hawk's residency period, but is classified as Moderate-value habitat because prey likely would not be able to achieve high abundance in the short period during which the rice is fallowed.
- The managed marsh includes an upland component comprising 20 to 30 percent of the acreage. This upland habitat would consist mainly of annual and perennial grassland similar to native foraging habitat for Swainson's hawk. This habitat is assumed to provide consistently accessible prey for Swainson's hawk but to be of Moderate habitat value because of low to moderate prey abundance (Rinek, Personal Communication). Managed marsh is assumed to provide 546.9 acres (25 percent of 2,187.5 acres) of potential foraging habitat for Swainson's hawk.

2.3.2 Implementation Scenarios

The NBHCP does not identify specific lands to be acquired as Mitigation Lands to meet these requirements, and allows acquisition of lands that currently provide habitat to meet the acreage requirements. With this implementation flexibility, a range of possible outcomes exists for future habitat conditions in the Natomas Basin for Swainson's hawk. This Addendum considers three possible scenarios to encompass the possible range of future habitat conditions in the Natomas Basin depending on habitat value and temporal availability of foraging opportunities provided by lands incorporated into the reserve system. The three possible scenarios are summarized in Table 3 at the end of this section.

Under Scenario 1, it is assumed that all of 2,187.5 acres of upland habitat in the reserves consist of TNBC acquiring lands that currently do not provide foraging opportunities for Swainson's hawk and converting those lands to suitable foraging habitat. Similarly, the 546.9 acres of upland habitat associated with managed marsh is assumed to be created from lands that currently do not provide foraging opportunities for Swainson's hawk. The 10 percent of fallowed rice also is assumed to be derived for lands that do not currently provide foraging habitat for Swainson's hawk because it is assumed that in the absence of the NBHCP's fallowing requirement these lands would be flooded to produce rice. Thus, under Scenario 1, all potential foraging habitat for Swainson's hawk is considered to be newly created and, therefore, additive to other foraging habitat remaining in the Basin.

Under Scenario 2, upland habitat associated with managed marsh and fallowed rice come from lands that currently do not provide foraging opportunities for Swainson's hawk as assumed for Scenario 1. The 2,187.5 acres of upland habitat, however, is assumed to be derived from a row crop that can be used by Swainson's hawk for foraging. Row crops can provide Low or Moderate value as foraging habitat. For Scenario 2, the lands acquired for the reserve is used to consist of row crops that provide Low value. It was assumed that TNBC converted the row crops to a High-value cover type for Swainson's hawk foraging. To analyze the future temporal availability of foraging opportunities under Scenario 2, it is assumed that the row crops incorporated into the reserve consist of a crop harvested in September and, therefore, provide foraging opportunities in this month only. It is assumed that TNBC converted the crop to a cover type that provides foraging opportunities continually during April through September.

Scenario 3 constitutes the worst case for Swainson's hawk foraging habitat because it assumes that much of the upland habitat in the reserves consists of lands that currently provide High-value foraging habitat for hawks. For the habitat value analysis, all of the High-value habitat remaining outside of development areas (1,102 acres) is incorporated into the reserves. The remaining 1,085 acres of upland habitat required in the reserves are assumed to consist of lands that currently provide Moderate-value habitat. It is assumed that TNBC converts or manages these lands such that they provide High-value habitat. For the temporal availability analysis, all of the habitats remaining outside of development areas that provide foraging opportunities during April through September (1,102 acres) are assumed to be incorporated into the reserves with the balance of the required acreage assumed to come from a crop that is harvested in June. It was assumed that TNBC converted the crop to a cover type that provides foraging opportunities continually during April through September. Upland habitat associated with managed marsh and fallowed rice is assumed to come from lands that currently do not provide foraging opportunities for Swainson's hawk as assumed for Scenario 1.

Future habitat conditions identified in this Addendum, the 2002 Technical Memorandum, and the EIR/EIS are determined by first assuming that habitat in areas of Authorized Development were lost. Habitat conditions outside of Authorized Development areas are assumed not to change, based on the assumptions described above for each of the implementation scenarios. Future habitat conditions in the Natomas Basin are predicted in consideration of the implementation of the NBHCP. For Scenario 1, the acreage of upland habitat to be provided in the reserves is added to the foraging habitat projected to remain outside of development areas. For Scenario 2, the acreage of foraging habitat provided by fallowed rice and the upland component of managed marsh is added to the habitat projected to remain outside of development areas. To determine habitat value, the 2,187.5 acres of upland habitat in the reserves is accounted for by moving acres from the Low value class to the High value class. To determine temporal availability, the upland habitat in the reserves is assumed to provide additional foraging opportunities during April through August but not to provide any additional foraging opportunities in September. For Scenario 3, the 1,102 acres of High-value habitat is assumed to be incorporated into the reserves. To account for the remaining 1,085 acres, in this habitat value analysis this acreage is moved from the "Moderate" value class to the "High" value class. To determine temporal availability, the upland habitat in the reserves is assumed to provide additional foraging opportunities during April, May, July, August, and September, but not to provide any additional foraging opportunities in June.

TABLE 3
Summary of Assumptions for the Implementation Scenarios used to Evaluate the Range of Potential Effects to Foraging Habitat for Swainson's Hawk from Implementing the NBHCP.

Scenario	Description
Scenario 1	The 2,187.5 acres of upland habitat in the reserve is derived from cover types that currently do not provide foraging opportunities for Swainson's hawk. The upland habitat would be managed as High-value habitat and would provide consistently accessible prey throughout the hawk's residency period of April through September.
	Fallowed rice provides 437.5 acres of potential foraging habitat and is derived from non-habitat (i.e., formerly flooded rice fields). Fallowed rice is assumed to provide consistently accessible prey throughout the hawk's residency period but to be of Moderate value because of moderate prey abundance.
	The upland component of managed marsh would provide 546.9 acres of potential foraging habitat and is derived from lands that are not currently classified as foraging habitat. Upland habitat in managed marsh is assumed to provide consistently accessible prey throughout the hawk's residency period, but to be of Moderate value because of moderate prey abundance.
Scenario 2	For assessing future habitat value, the 2,187.5 acres of upland habitat in the reserve is derived from a crop providing Low-value habitat. For the analysis of temporal availability of foraging opportunities, the 2,187.5 acres of upland habitat in the reserve is derived from a crop that that provides foraging opportunities in September when it is harvested. The upland habitat in the reserve is assumed to be managed as High-value habitat and would provide consistently accessible prey throughout the hawk's residency period of April through September.
	Fallowed rice and the upland component of managed marsh provide foraging opportunities as under Scenario 1.
Scenario 3	For the 2,187.5 acres of upland habitat, 1,102 acres of High-value habitat remaining after Authorized Development is incorporated in the reserves. The remaining (1,085 acres) of upland habitat is derived from a crop providing Moderate-value habitat and harvested in June. The created upland habitat is of High value and provides consistently accessible prey throughout the hawk's residency period of April through September.
	Fallowed rice and the upland component of managed marsh provide foraging opportunities as under Scenario 1.

SECTION 3

Additional Information Clarifying Baseline Conditions

Using the assumptions presented in Section 2 of this Addendum, this section presents the refined analysis to clarify the 2002 Biological Resources Technical Memorandum.

3.1 Value of Foraging Habitat

On the basis of the habitat value ratings in Table 1 combined with DWR land cover data, the habitat database developed for the Draft EIR/EIS indicates that most of the potential foraging habitat in the Natomas Basin is of Moderate value (Table 4). Less than 10 percent of the potential foraging habitat in the Natomas Basin is classified as High value. High-value potential foraging habitat generally occurs in scattered patches throughout the Natomas Basin (Figure 1). Given the small amount of High-value habitat in the Basin, hawks might need to forage over large distances to find a sufficient amount of suitable prey.

TABLE 4
Baseline Conditions and Changes in Potential Swainson's Hawk Foraging Habitat by Habitat Value (acres)

Habitat Value Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Remaining Foraging Habitat[a]
High	1,835	(675)	(50)	(8)	(733)	1,102
Moderate	15,666	(5,098)	(349)	(1,852)	(7,299)	8,367
Low	4,550	(1,152)	(4)	0	(1,156)	3,394

(#) Decrease in acreage

[a] Remaining Foraging Habitat represents habitat assumed to remain outside of areas of Authorized Development. It does not include habitat created and maintained under the NBHCP.

Source: Habitat and Land Use Assessment Database prepared for NBHCP Draft EIR/EIS and Biological Resources Technical Memo (CH2M HILL 2002)

3.2 Temporal Availability of Foraging Opportunities

Swainson's hawks forage opportunistically and are reported to travel large distances (up to 18 kilometers [km]) to forage. Foraging patterns appear to reflect the temporal and spatial accessibility of prey. Estep (1989) reports that hawks with a large amount of alfalfa or pastureland in their territories tend to have smaller and more stable foraging ranges throughout the spring and summer than do hawks nesting in areas dominated by row crops. The smaller, more stable home range is attributed to alfalfa and pastureland providing consistently accessible prey such that the hawks did not need to travel long distances to forage.

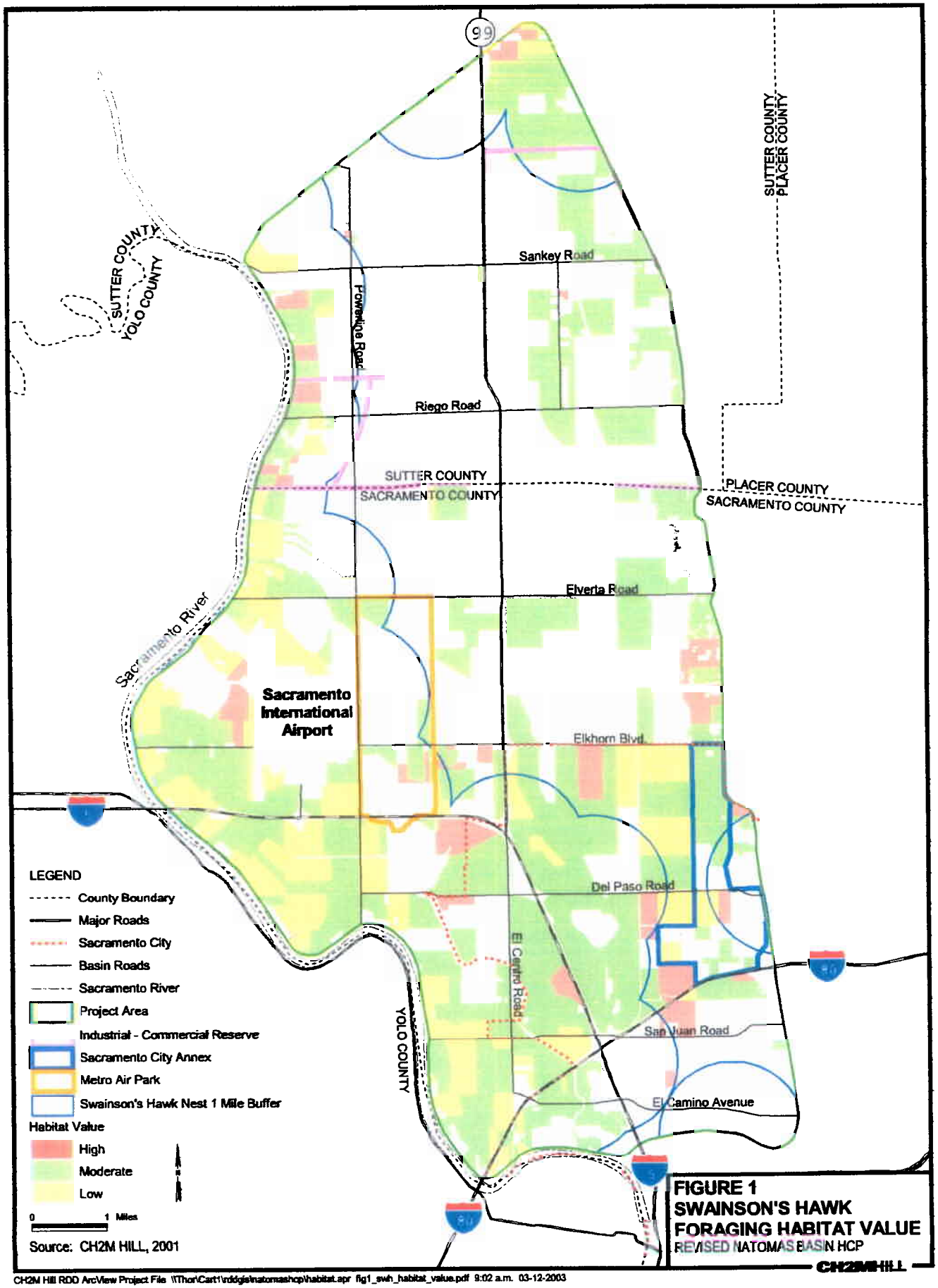


FIGURE 1
SWAINSON'S HAWK FORAGING HABITAT VALUE
REVISED NATOMAS BASIN HCP

CH2MHILL

CH2M Hill RDD ArcView Project File \\Thor\Cart1\rddgis\natomashcp\habitat.apr fig1_swh_habitat_value.pdf 9:02 a.m. 03-12-2003

For one hawk nesting in an area dominated by row and grain crops, Estep (1989) reports a marked increase in foraging range during June and July and attributed this increase to reduced accessibility of prey in row crops because of dense vegetation coverage. This hawk's foraging range constricted in the late summer (August) when crops were being harvested near its nest.

In Washington, Bechard (1982) reports that Swainson's hawk home ranges increase as the acreage of cultivated land consisting of wheat, peas or mustard increases and the acreage of uncultivated land (i.e., pasture and "eyebrows"[2]) decreases. As does Estep (1989), Bechard (1982) reports that cultivated fields have high prey abundance, but are not to be used by Swainson's hawk until harvest activities make prey accessible. Where habitats such as alfalfa, which provides consistently accessible prey, predominate near nest sites, home ranges of Swainson's hawk are small (Woodbridge, 1991, cited in England et al., 1997; Estep, 1989; Bechard, 1982).

Considering the seasonality of foraging opportunities of each cover type, the acreage of usable foraging habitat available in the Natomas Basin varies considerably during the period when Swainson's hawks are in the Basin (Figure 2). Most of the potential foraging habitat in the Basin consists of row and field crops that predominantly provide foraging opportunities only late in the summer and early fall when the crops are being harvested. The least amount of potential foraging habitat is available during April, May, and July.

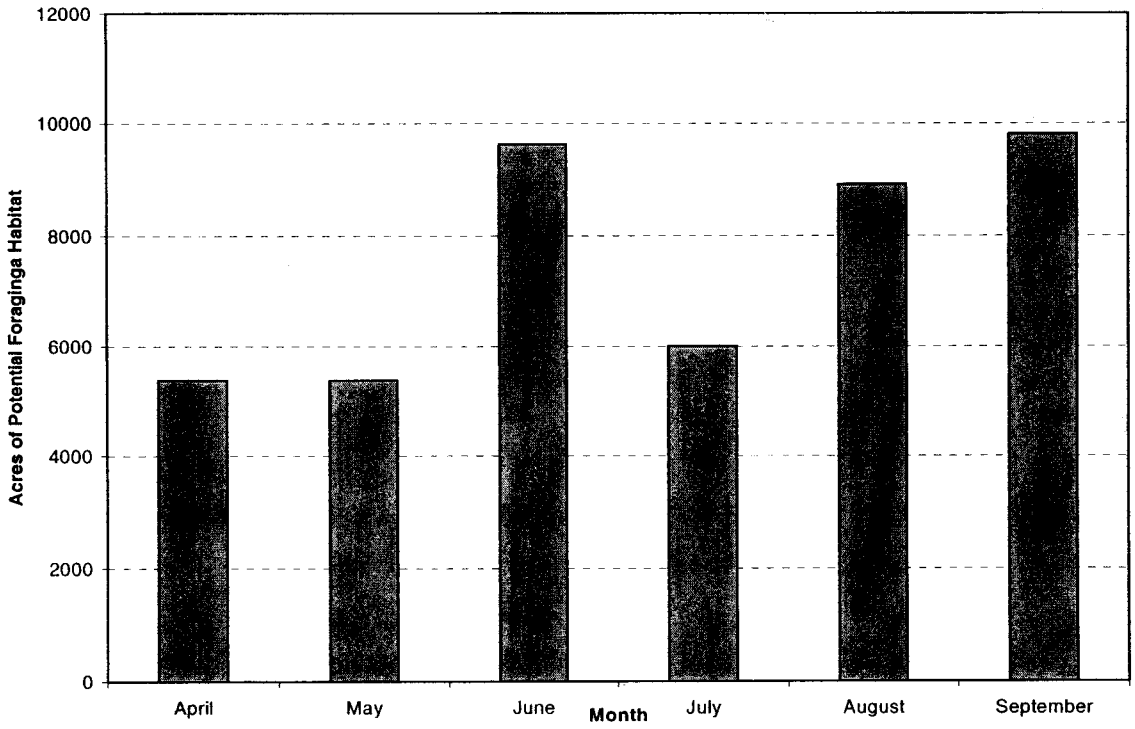


FIGURE 2
Monthly Availability of Potential Foraging Habitat for Swainson's Hawk under Baseline Condition.

[2] "Eyebrows" is a local term for narrow patches of unplowed land on steep hillsides.

Swainson's hawk lay eggs in April and young fledge in July (Estep 1989). Thus, much of the potential foraging habitat in the Natomas Basin does not provide accessible prey during the nesting period.

3.3 Habitat Conditions Close to Nest Sites

Swainson's hawk can forage over large areas (up to about 18 miles [Estep, 1989]), thus all of the Natomas Basin is accessible to Swainson's hawks nesting along the Sacramento River and elsewhere in the Basin. Reproductive success, however, declines as distance to foraging habitat from the nest increases (Woodbridge, 1991, cited in England et al., 1997). England et al. (1995) reports lower reproductive success for birds nesting in urban areas (Davis and Stockton, California) as compared to birds nesting in rural areas. Based on findings by Babcock (1995) that hawks typically did not return to the nest with prey caught far from a nest and the absence of nesting birds in nearby urban areas that are surrounded by habitats unsuitable for foraging (e.g., Lodi), he attributes this difference to urban nesting birds traveling farther to forage.

The availability and quality of habitat near nests has the potential to influence reproductive success, thus changes in foraging habitat within 1 mile of nest sites under the NBHCP also were evaluated in the 2002 Biological Resources Technical Memorandum and are further refined in this Addendum. The acreage of potential foraging habitat within 1 mile of nest sites identified through 2001 is shown in Table 5. Most of this acreage consists of Moderate-value habitat; only 899 acres of habitat designated as High value occurs within 1 mile (Table 6). Much of the Moderate-value habitat consists of row crops that predominantly provide foraging opportunities late in the summer and early fall during harvest, and therefore does not contribute to foraging habitat during the nesting season. Based on this information, it appears that hawks nesting in the Natomas Basin have little foraging habitat available near nest sites under existing conditions during the nesting season.

TABLE 5
Baseline Conditions and Change in Potential Foraging Habitat within 1 Mile of Swainson's Hawk Nest Sites (acres)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Remaining Foraging Habitat[a]
Alfalfa	280	0	0	0	0	280
Grassland	51	(21)	0	0	(21)	30
Idle	619	(264)	(47)	0	(311)	308
Non-rice Crops	9,698	(2,523)	(232)	(159)	(2,915)	6,784
Pasture	353	(3)	(20)	0	(23)	330
Ruderal	1,444	(868)	(6)	(5)	(879)	565
Total	**12,446**	**(3,679)**	**(305)**	**(165)**	**(4,149)**	**8,297**

(#) Decrease in acreage

[a] Remaining Foraging Habitat represents habitat assumed to remain outside of areas of Authorized Development. It does not include habitat created and maintained under the NBHCP.

Source: Habitat and Land Use Assessment Database prepared for NBHCP Draft EIR/EIS and Biological Resources Technical Memo (CH2M HILL, 2002)

TABLE 6
Baseline Conditions and Change in Potential Foraging Habitat by Habitat Value within 1 Mile of Swainson's Hawk Nest Sites (acres)

Habitat Value Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Remaining Foraging Habitat[a]
High	899	(264)	(47)	0	(311)	588
Moderate	8,532	(3,079)	(252)	(164)	(3,498)	5,035
Low	3,014	(336)	(4)	0	(339)	2,674
Total	**12,445**	**(3,679)**	**(305)**	**(164)**	**(4,148)**	**(8,297)**

(#) Decrease in acreage

a Remaining Foraging Habitat represents habitat assumed to remain outside of areas of Authorized Development. It does not include habitat created and maintained under the NBHCP.

Source: Habitat and Land Use Assessment Database prepared for NBHCP Draft EIR/EIS and Biological Resources Technical Memo (CH2M HILL, 2002)

SECTION 4

Additional Information Clarifying Effects of Implementing the NBHCP

4.1 Changes in Foraging Habitat from Authorized Development

With implementation of the NBHCP, Authorized Development would occur in the City of Sacramento, Sutter County, and Metro Air Park (Draft NBHCP EIR/EIS, 2002). As discussed in the Draft EIR/EIS (see Table 4-12 of the Draft EIR/EIS), this level of development would result in the loss of about 9,188 acres of potential foraging habitat in the Basin. Most (7,299 acres) of the habitat that would be affected would comprise a variety of row and field crops with Moderate habitat value (Table 4). Somewhat more than 10 percent (733 acres) would be High-value habitat. As noted in Section 1, above, the impact to Swainson's hawk from a reduction in foraging habitat was evaluated in the 2002 Biological Resources Technical memorandum. This Addendum provides additional information clarifying the less-than-significant impact determination made in the Draft EIR/EIS (see Section 4.4.5.2.11 of the Draft EIR/EIS).

The primary effect of urban development on foraging habitat for Swainson's hawk would be a reduction of the acreage of usable foraging habitat late in the summer (primarily August and September). Young have fledged by this time, the reduction in row and field crops would not be expected to affect immediate reproductive success. For hawks still on the breeding grounds and preparing to migrate in August and September, it is unlikely that foraging opportunities would be limiting. Of the crop and cover types investigated by Estep (1989), tomatoes and beets had the highest relative abundance of prey species. Prey species were two to three times greater in tomatoes and sugar beets than alfalfa and dryland pasture. These prey become available all at once during harvest in late July through September resulting in an abundance of accessible prey during these months.

Of the 9,188 acres lost, urban development would affect 733 acres of High-value potential foraging habitat. None of the 371 acres of alfalfa would be impacted. Most of the reduction would consist of idle lands that while designated as High habitat value in this analysis, probably encompass a wide range of habitat value for Swainson's hawk. Of this 733 acres, only 311 acres of foraging habitat classified as High value and within 1 mile of a known nest site would be affected by Authorized Development.

Reproductive success of Swainson's hawk appears to fluctuate in response to prey availability (Bechard, 1983; Houston and Schmutz, 1995). Houston and Schmutz (1995) report that the number of young per successful nest appeared stable between for three decades up until 1987 but declined thereafter with the six years of 1988 through 1993 showing the lowest number of young per successful nest. They noted that the decline in reproductive success corresponded with a decline in the hawk's primary prey of ground squirrel. Nesting density also was higher during years of high prey availability as compared to years characterized as normal prey availability. During a 4 year study, Bechard (1983) monitored reproductive success and nestling weight at hawk nests in cultivated areas and uncultivated but grazed

areas. He found lower reproductive success and lower nestling weights at nests in cultivated areas. Interpreting nestling weight as an index of food availability, he suggested that Swainson's hawks adjust brood size in response to prey availability.

Without the implementation of any habitat conservation measures, the loss of 733 acres of High-value habitat could adversely affect the reproductive success of Swainson's hawks in the Natomas Basin and/or the size of the nesting population. High-value foraging habitat for Swainson's hawk provides moderate to high abundance of prey that is consistently accessible. The loss of High-value areas has greater potential to adversely affect the size of the nesting population of Swainson's hawk in the Natomas Basin and its reproductive success than does the loss of Moderate or Low-value habitat because most of the Moderate and Low-value habitat consists of row and field crops that predominantly provide foraging opportunities when the crops are harvested after the nesting season.

4.2 Effects of NBHCP Conservation Measures on Foraging Habitat

4.2.1 General Discussion of Effects

Under the NBHCP, Mitigation Lands would be established outside of the area of Authorized Development. Mitigation Lands would be maintained in perpetuity and specifically managed to provide habitat for the Covered Species. The reserves would not be the only foraging habitat available to Swainson's hawks nesting in the Natomas Basin. Agricultural lands outside the Authorized Development areas in the Natomas Basin also would continue to provide foraging opportunities. In addition, foraging habitat is available in Yolo County on the west side of the Sacramento River. Yolo County supports more than 200,000 acres of non-rice agricultural crops with about 40,000 acres of alfalfa (California Agricultural Commissioners, 2003). While only a portion of this habitat would be within the foraging distance of hawks nesting on the Sacramento River, lands in Yolo County nonetheless contribute to the foraging habitat base for the Swainson's hawk population in the Natomas Basin.

Under the NBHCP, 2,187.5 acres of the Mitigation Lands would be upland habitat managed specifically to provide foraging habitat for Swainson's hawk. Upland habitat in the reserves would be managed to provide consistently available and abundant prey for Swainson's hawk. A specific habitat or crop type that would comprise the upland habitat is not specified in the NBHCP, thereby allowing TNBC to select the most effective and appropriate cover type for a particular property for providing foraging opportunities for Swainson's hawks. Effective cover types could include alfalfa where feasible, native grasses or other mixes of legumes, grasses and herbs. TNBC currently is working with agricultural experts from the University of California Davis Cooperative Extension Program to identify plant mixes that support abundant prey and allow management in a manner that makes prey regularly available to Swainson's hawk throughout their residency period (e.g., regular irrigations, harvest and/or mowing).

In addition to the 2,187.5 acres of upland habitat, foraging opportunities for Swainson's hawk also would be available in portions of the reserve system managed for the giant garter snake. The Mitigation Lands will include 4,375 acres of rice. Ten percent of the rice will be fallowed each year, providing 437.5 acres of foraging habitat for Swainson's hawk. Managed marsh created for giant garter snake would contain 20 to 30 percent upland habitat. These upland

areas predominantly would consist of grassland habitat comparable to native grassland habitat formerly present in the Natomas Basin. Managed marsh and rice fields of the reserves would provide 978.4 total acres of potential foraging habitat for Swainson's hawk.

4.2.2 Effects Considering the Value of Foraging Habitat

As discussed in the 2002 Biological Resources Technical Memorandum, future habitat conditions with implementation of the NBHCP cannot be predicted precisely because the foraging habitat value on Mitigation Lands yet to be acquired remains to be determined. The range of future conditions under the NBHCP is identified through consideration of the three implementation scenarios described above (Table 3).

Scenario 1 represents the best possible future condition for Swainson's hawk because all foraging habitat in the reserves would be derived from lands that currently do not provide foraging opportunities for Swainson's hawk, representing the largest increase in foraging habitat. Under this scenario, the Natomas Basin would support about 16,035 acres of potential foraging habitat, about 6,016 acres less than under the baseline condition (Table 7 and Figure 3). With the NBHCP, however, the amount of High-value habitat would nearly double relative to baseline conditions, with the reduction in habitat primarily affecting Moderate and Low-value habitats.

Scenarios 2 and 3 would result in about 13,847 acres of potential foraging, which is a reduction of about 8,204 acres relative to baseline conditions (Table 7). As in Scenario 1, the amount of High-value habitat would nearly double under Scenario 2. The acreage of Moderate and Low-value habitat would decrease under Scenario 2 with the acreage of Low-value habitat decreasing to a greater extent than under Scenario 1.

Scenario 3 would result in the least amount of High-value habitat and would result in only a small increase (about 350 acres) in High-value habitat over baseline conditions. Moderate- and Low-value habitat would decrease under Scenario 3 as under Scenario 1. The smaller increase in High-value habitat under Scenario 3 develops from the assumption of this scenario that all remaining High-value habitat is incorporated into the reserves.

TABLE 7
Change in Potential Foraging Habitat by Habitat Value With Implementation of the NBHCP (acres)

Habitat Value Class	Baseline	Acres Affected by Development	Remaining Foraging Habitat[a]	Scenario 1[b]	Scenario 2[b]	Scenario 3[b]
High	1,835	733	1,102	3,290	3,290	2,188
Moderate	15,666	7,299	8,367	9,351	9,351	8,265
Low	4,550	1,156	3,394	3,394	1,207	3,394
Total	**22,051**	**9,188**	**12,863**	**16,035**	**13,847**	**13,8475**

(#) Decrease in acreage

[a] Remaining Foraging Habitat represents habitat assumed to remain outside of areas of Authorized Development. It does not include habitat created and maintained under the NBHCP.

[b] See Table 3 for description of each scenario

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002)

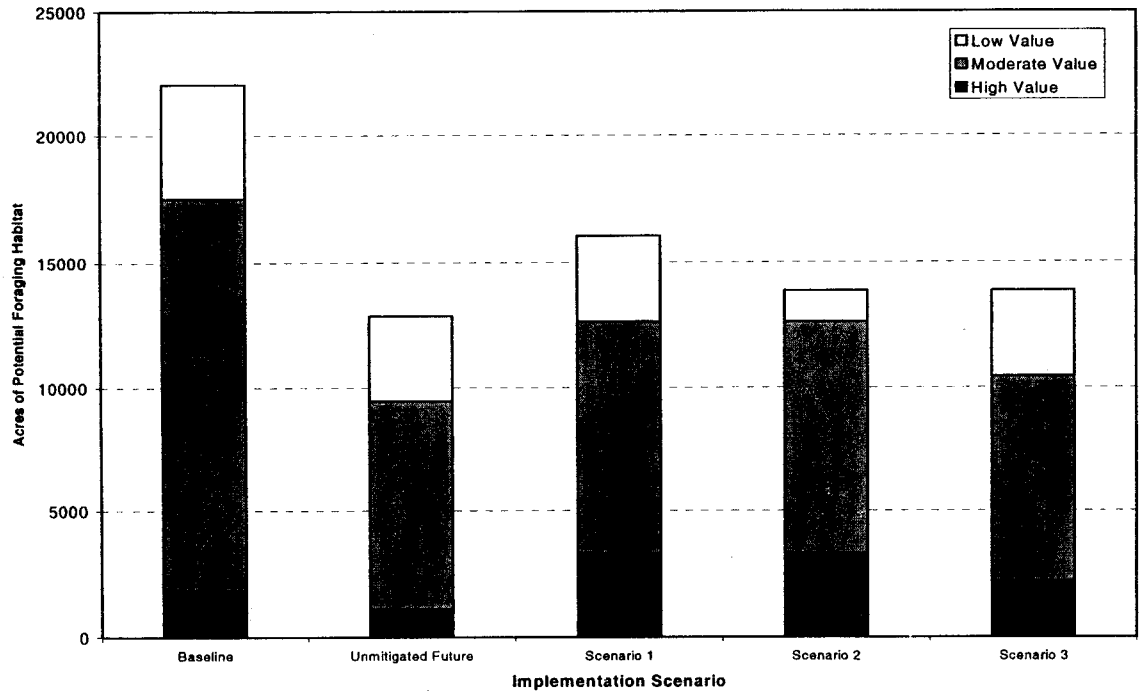


FIGURE 3
Acres of Potential Foraging Habitat for Swainson's Hawk by Habitat Value under Existing Conditions and with Implementation of the NBHCP.

4.2.3 Effects Considering the Temporal Availability of Foraging Opportunities

The upland habitat on the reserves will be managed to provide consistently accessible and abundant prey for Swainson's hawk throughout their residency. Table 8 and Figure 4 show the monthly distribution of foraging habitat availability under the three scenarios considered and assuming continuation of baseline cropping patterns in areas outside of Authorized Development and the NBHCP reserves.

TABLE 8
Change in acres providing foraging opportunities each month with implementation of the NBHCP

Month	Baseline	Acres Affected by Development	Remaining Foraging Habitat[a]	Scenario 1[b]	Scenario 2[b]	Scenario 3[b]
April	5,365	2,671	2,694	5,866	5,866	4,765
May	5,365	2,671	2,694	5,866	5,866	4,765
June	9,625	4,667	4,958	8,130	8,130	5,942
July	6,002	2,851	3,151	6,323	6,323	5,222
August	8,923	3,451	5,471	8,643	8,643	7,542
September	9,806	4,539	5,268	8,4702	6,282	7,369

(#) Decrease in acreage

[a] Remaining Foraging Habitat represents habitat assumed to remain outside of areas of Authorized Development. It does not include habitat created and maintained under the NBHCP.

[b] See Table 3 for description of each scenario

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002)

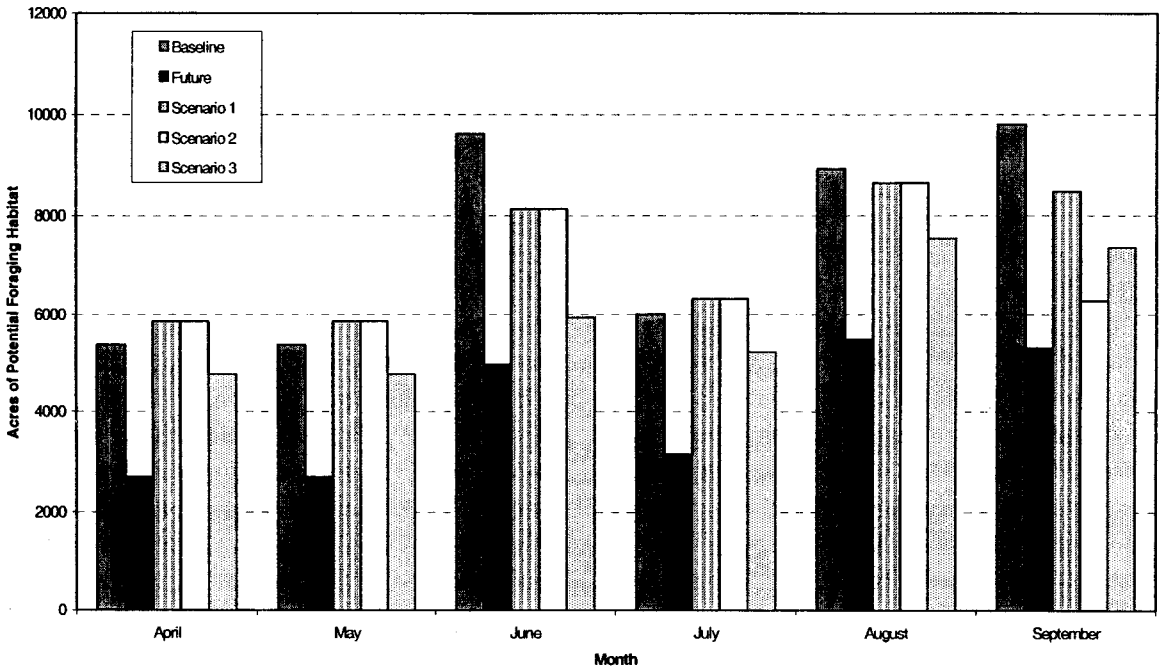


FIGURE 4
Monthly Availability of Potential Foraging Habitat for Swainson's Hawk under Baseline Conditions and With Implementation of the NBHCP

Scenarios 1 and 2 would increase the availability of foraging habitat relative to baseline conditions during April, May and July, the nesting period for Swainson's hawk. Prey availability during these months can influence nesting density (Houston and Schmutz, 1995) and reproductive success. In June, foraging habitat availability under Scenarios 1 and 2 would be slightly less than baseline conditions. Although the acreage of foraging habitat in June could be less than baseline conditions, it would be greater than that available during the other months of the breeding season (April, May, and July). Because the amount of habitat available during April, May, and July under the baseline condition is sufficient to support the current nesting population, providing at least that level of habitat during June is anticipated to be sufficient to continue to support this population level. With similar or improved habitat availability during the nesting season under Scenarios 1 and 2, no significant adverse effects to the nesting population or reproductive success would be expected from changes in foraging habitat.

The amount of foraging habitat available during August and September under Scenarios 1 and 2 would be less than that under baseline conditions. Accessible prey is anticipated to be abundant in these months because of the high abundance of prey that becomes available during the short harvest season and, therefore, foraging habitat is not anticipated to be limiting.

Further, because the young have fledged by this time, hawks are not restricted to areas near nests and can seek more productive foraging opportunities if necessary in more distant areas. Therefore, no adverse effects to Swainson's hawk are expected from reduced foraging opportunities during August and September.

Under Scenario 3, foraging opportunities would be reduced in all months relative to baseline conditions. For the following reasons, however, Scenario 3 is not likely to occur, and is included to provide a worst-case, yet unlikely scenario. The assumption of Scenario 3 is that all existing High-value habitat is incorporated into the reserve system. Areas of High-value habitat occur in many small, isolated parcels throughout the Natomas Basin. In acquiring reserve lands, TNBC must establish reserves at least 400 acres in size of which at least one must be at least 2,500 acres. TNBC is currently seeking to build upon its existing reserves to create several large reserve centers. With this approach and the acreage restrictions, it is not considered likely that TNBC will incorporate all of the isolated parcels of High-value habitat and therefore would need to create a greater amount of upland habitat than assumed under Scenario 3. The difference in acreage between baseline and Scenario 3 during April and May is only 600 acres. If only half of the lands providing foraging opportunities during the nesting season (April through July) are incorporated into the reserve system with the remainder of the required upland acreage created, foraging opportunities under the NBHCP would be about the same as baseline in April, May and July. The acreage of foraging opportunities in June would be less under Scenario 3 than under baseline, but would exceed the baseline acreage in April, May, and July. As explained for Scenarios 1 and 2, because habitat availability in June under Scenario 3 would be greater than what currently is available during the other months of the nesting season (April, May, July), foraging opportunities in June under Scenario 3 are expected to remain sufficient to support population levels.

Proximity to Nest Trees

An additional benefit of the NBHCP for Swainson's hawk that is not easily quantified is that foraging habitat provided in the Mitigation Lands often will be located in close proximity to nesting habitat. This will be accomplished through establishing upland reserves near known nest sites (e.g., within the Swainson's Hawk Zone) and by planting trees on the reserves that will provide new nesting opportunities near foraging habitat. Under the NBHCP, TNBC seeks to acquire land for upland reserves close to known nest sites because of the energetic benefit and associated reproductive success improvement from the availability of nearby foraging habitat. To date, TNBC has been successful in acquiring lands near known nest sites (e.g., Sousa, Cummings, and Alleghany 50). Several of the lands acquired to fulfill requirements for rice and managed marsh also are close to known nest sites (e.g., Bennett South, Frazer North). The Sousa, Cummings and Alleghany 50 tracts encompass about 160 acres and currently support non-rice crops that provide Low- or Moderate-value foraging habitat for Swainson's hawk. These lands will be converted to High-value foraging habitat under the NBHCP.

Currently, only 899 acres of High-value foraging habitat occurs near (within 1 mile) of known nest sites. Of this amount, 311 acres would be lost because of Authorized Development (Table 6). With the NBHCP, much if not all of the 2,187.5 acres of High-value upland habitat is expected to be within 1 mile of a nest site, substantially increasing the amount of High-value habitat near nest sites where it is most valuable.

4.3 Changes in Nesting Habitat

The Draft EIR/EIS identifies territories in or immediately adjacent to Authorized Development areas that could be eliminated by removal of the nest tree or affected by loss of foraging habitat in the vicinity of the nest tree. Based on data from surveys conducted in 2001, the Draft EIR/EIS identifies seven territories as potentially affected: five within the City, one immediately adjacent to Metro Air Park, and one in Metro Air Park. In 2002, the two nest sites on and adjacent to Metro Air Park were removed. Of the five territories located in the City, two (NB-2 and NB-6) are in the right of way of Interstate 5 and would not be removed although, as described in the Draft EIR/EIS (Section 4.4.5.2.11), they could be abandoned as a result of loss of nearby foraging habitat and urban encroachment. The remaining three territories could be lost if the nest trees are removed.

The potential loss of five territories is not expected to adversely affect the nesting population of Swainson's hawk for several reasons. Surveys for Swainson's Hawk territories in the Natomas Basin conducted annually since 1999 have identified 70 territories in the Natomas Basin and along the Sacramento River. Not all territories are active each year. For example, in 2002, of the 70 territories, 43 were active (i.e., had at least one adult present on the nesting territory), leaving 27 unoccupied territories (Estep, 2002). Similarly, in 2001, only 46 territories were occupied (Estep, 2002). At most, 5 nest trees would be removed or potentially abandoned because of adjacent urban development. Given that only a portion of the known territories are occupied each year, sufficient alternate nest sites are available to accommodate birds displaced from these territories.

Second, the NBHCP includes a tree planting program to provide additional nesting opportunities when the trees mature. In 2001, 200 trees were planted on the Betts-Kismat-Silva reserve. In 2002, an additional 60 trees were planted at the Bennett South reserve, and in 2003, 83 trees were planted at Betts-Kismat-Silva reserve in 2003. Species planted that could be used for nesting by Swainson's hawk are valley oak and western sycamore. In the Central Valley, nest trees averaged 57.7 feet tall with a standard deviation of 9.8 feet (Estep, 1989). Valley oaks can grow about 3 feet per year (Redwood Barn Nursery, Davis California) and could reach 48 feet (the lower end of the range of tree heights found to be used) in about 16 years. Sycamores grow at a faster rate of 6 to 10 feet per year (Empire National Nursery, 2003) and could achieve this height in 5 to 8 years. Tree planted in 2001 could reach a suitable size to support nesting as early as 2006. Over the longer term, trees planted as part of the conservation strategy of the NBHCP would provide additional nesting opportunities. Based on this information, the potential short-term loss of nest trees because of urban development covered by the NBHCP is not expected to significantly impact Swainson's hawk.

SECTION 5

Conclusions

Additional information on the value of foraging habitat for Swainson's hawk in the Natomas Basin shows that Basin currently supports little High-value habitat. Most of the available habitat is row and field crops that provide Moderate- or Low-value habitat. Further, the row and field crops predominantly provide foraging opportunities in August and September when harvest makes prey accessible. Most of the habitat that would be affected by Authorized Development consists of row and field crops.

Foraging opportunities provided by upland habitat in the reserves created under the NBHCP would be High- or Moderate-value habitat that would provide consistently accessible prey for Swainson's hawk. Assuming that most of the lands incorporated into the reserves are row crops, upland habitat in the reserves would offset reductions in habitat availability from urban development during most of the nesting season (April, May, and July). Foraging habitat availability in June is expected remain sufficient to avoid adverse effects to reproductive success. The NBHCP foraging habitat availability during the nesting season would remain similar to baseline conditions, thus adverse effects on reproductive success or the adult nesting population are not expected. Although foraging opportunities would decline during August and September, foraging opportunities likely are not a limiting factor during these months because of the high abundance of prey that becomes available during the short harvest season. Therefore, effects to Swainson's hawk from changes in foraging habitat under the NBHCP are considered less than significant.

SECTION 6

References

Babcock, K. W. 1995. Home range and habitat use of breeding Swainson's hawks in the Sacramento Valley of California. *J. Raptor Res.* 29: 193-197.

Bechard, M. J. 1983. Food supply and the occurrence of brood reduction in Swainson's hawk. *Wilson Bull.* 95 (2): 233-242.

Bechard, M. J. 1982. Effect of vegetative cover on foraging site selection by Swainson's hawk. *Condor.* 84: 153-159.

California Agricultural Commissioners. 2003. County Crop Report. Available at http://www.nass.usda.gov/ca/bul/agcom/indexcac.htm

CH2M HILL. 2002. Biological Resources Technical Memorandum. Appendix H of the Draft NBHCP. August.

Dickey, J. 2003. Personal communication with S. Taylor of CH2M HILL. February 12.

Empire National Nursery. On the web at: http://www.cdr3.com/nursery

England, A. S., J. A. Estep, and W. R. Holt. 1995. Nest-site selection and reproductive performance of urban-nesting Swainson's hawks in the Central Valley of California. *J. Raptor Res.* 29 (3): 179-186.

Estep, J. A. 2002. Nesting Swainson's hawks (*Buteo swainsoni*) in the Natomas Basin Habitat Conservation Plan Area 2002 Annual Survey Results. Prepared for The Natomas Basin Conservancy. Sacramento, CA.

Estep, J. A. 1989. Biology, movements, and habitat relationships of the Swainson's hawk in the Central Valley of California. California Department of Fish and Game. *Wildlife Management Branch Administrative Report 88-4.* Sacramento, CA.

Estep, J. A. and S. Teresa. 1992. Regional conservation planning for the Swainson's hawk (*Buteo swainsoni*) in the Central Valley of California. Pages 775-789. In D.R. McCullough and R.H. Barrett (eds.). *Wildlife 2001: Populations.* Elsevier Applied Science, New York, NY.

Houston, C. S. and J. K. Schmutz. 1995. Declining reproduction among Swainson's hawks in prairie Canada. *J. Raptor Res.* 29 (3): 198-201.

Rinek, L. 2003. Personal communication between L. Rinek, Wildlife Biologist, United States Fish and Wildlife Service, with S. Taylor, CH2M HILL. March.

Redwood Barn Nursery. 2003. Personal communication with R. Huddleston, CH2M HILL. February 21.

Smallwood, K. S. 1995. Scaling Swainson's hawk population density for assessing habitat use across an agricultural landscape. *J. Raptor Res.* 29 (3): 172-178.

Williams, J. 2003. Personal communication between J. Williams, Agricultural Advisor for the Natomas Basin, University of California, Davis, Agricultural Extension, and S. Taylor, CH2M HILL. February 12.

Woodbridge, B, 1991. Habitat selection by nesting Swainson's hawks: a hierarchical approach. M.S. Thesis, Oregon State University, Corvallis, OR. Cited in A. S England, M. J. Bechard, and C. S. Houston

Appendix L

Interim Survey Guidelines for Permittees for Recovery Permits under Section 10(a)(1)(A) of hte Endangered Species Act for Listed Vernal Pool Branchiopods, USFWS, April 19, 1996.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

April 19, 1996

Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods

The endangered Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool tadpole shrimp (*Lepidurus packardi*), and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) were listed on September 19, 1994, under the Endangered Species Act of 1973, as amended (Act) (59 Federal Register 48136). These species are endemic to vernal pools in the Central Valley, coast ranges, and a limited number of sites in the Transverse Range and Riverside County, California. The endangered Riverside fairy shrimp (*Streptocephalus woottoni*) was listed under the Act on August 3, 1993 (58 Federal Register 41391). This species inhabits Riverside, Orange and San Diego Counties, California, and northern Baja California, Mexico. These five species, hereafter referred to as vernal pool branchiopods, are fully protected under the Act. The San Diego fairy shrimp (*Branchinecta sandiegonensis*) is a proposed endangered species. Surveys for all these species should follow the methodologies described in these Interim Survey Guidelines (Guidelines). It is expected that the Guidelines will be revised in the future as additional information becomes available.

These Guidelines are issued as guidance to section 10(a)(1)(A) permittees. Because taking (killing, injuring, harming or harassing) endangered species is strictly prohibited under the Act, a section 10(a)(1)(A) recovery permit must be obtained prior to initiating any surveys or studies that might result in the take of endangered or threatened branchiopods. Failure to obtain this permit may result in violation(s) of section 9 of the Endangered Species Act. Additionally, violation(s) of a section 10(a)(1)(A) permit may result in its non-renewal, suspension or revocation.

For the purposes of these Guidelines, vernal pools and swales are defined as follows:

> Vernal pools and swales are ephemeral wetlands that form in areas of California with Mediterranean climates that have shallow depressions underlain by a substrate of

hardpan, clay, or basalt near the surface that restricts the percolation of water. They may be characterized by a barrier to overland flow that causes water to collect and pond. Vernal pools/swales may occur singly, but more typically occur in vernal pool/swale complexes, due to the local hydrology, geology, and topography. Initially, the dry soil in vernal pools/swales becomes wet and starts to saturate during the fall and early winter rains. The second stage in a typical vernal pool cycle is characterized by peak rainfall and inundation of the vernal pools/swales. Vernal pools may remain inundated until spring or early summer, sometimes filling and emptying numerous times during the wet season. The vernal pools gradually dry down during the spring, quite often forming the unique "bathtub ring" of flowers from endemic vernal pool plants blooming profusely at the pool margins. This drying down stage is typified by the production of seeds in the endemic plants and the dispersal of animals from the vernal pools. These pools eventually dry down totally, with the onset of drought conditions. During this final stage, early season and shallow-rooted plants turn brown, and the soil dries and may crack. With average rainfall patterns, vernal pools are typically characterized by a predominantly annual plant community dominated by wetland species.

Note: At this time, vernal pool-associated activities not directed toward the listed species, such as botanical surveys and wetland delineations, are not considered to require a permit. <u>However, persons conducting such activities should minimize any potential impact on the vernal pool branchiopods or plants by reducing the amount of walking through vernal pools to the lowest extent practical</u>. Persons conducting projects that require permits (e.g., branchiopod or amphibian surveys) should also minimize walking through the pools.

I. Survey Approval

Unless otherwise authorized by the U.S. Fish and Wildlife Service (Service) in writing, these Guidelines shall be utilized for all surveys conducted for the listed vernal pool branchiopods. Any deviations from the methods prescribed by these Guidelines must be approved by the Service <u>before</u> surveys are conducted. The permittee shall provide the appropriate Service Field Office (see XI, Service Contact section) with all of the following information in writing for each project site at least 10 working days prior to the anticipated start date of survey work:

a. The precise location of the project site clearly delineated on either an original or high quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1"=2000 ft.). The map should contain the project name, type of project by category [the categories are: development, mitigation banking, or other (specify)], the estimated area (acreage) of the project site and an estimated number or area (acreage) of pool/swales on the site, quad name, and county name;

b. Names of all vernal pool biologists and associated personnel with reference to their section 10(a)(1)(A) permit number; and

c. A written request to commence wet season or dry season sampling for each project to

be surveyed for the listed vernal pool branchiopods.

II. Sampling Survey Completion

a. Once initiated, surveys conducted pursuant to these Guidelines may be suspended prior to completion if:

1. the presence of one or more of the five listed branchiopods on the subject site is determined through identification at any point within the wet season survey cycle; or

2. it is agreed that one or more of the listed vernal pool branchiopods are present on the subject site.

b. Permission to dry season survey for the listed vernal pool branchiopods requires the completion of both the full wet season survey and the dry season survey, including the complete analysis of all dry soil samples (see V).

c. A complete survey consists of sampling for either:

1. two full wet season surveys done within a 5-year period; or

2. two consecutive seasons of one full wet season survey and one dry season survey (or one dry season survey and one full wet season survey).

d. Each vernal pool/swale in a vernal pool/swale complex shall be surveyed as per these Guidelines. However, in the case of a large vernal pool/swale complex, the Service may authorize a representative portion or portions of the vernal pool/swale complex to be surveyed as per these Guidelines.

III. Notification of Presence

Should the permittee determine that any of the five listed vernal pool branchiopods are present at a site, the appropriate Service Field Office (see XI, Service Contact section) shall be notified within 10 working days by letter or telephone.

IV. Wet Season Surveys

Wet season survey sampling shall not be conducted at any project site unless the permittee receives prior permission from the Service (see I (c)).

a. Survey Initiation, Frequency, and Termination

1. Surveyors should visit sites after initial storm events to determine when pools/swales have been inundated. A pool/swale is considered to be inundated when it holds greater than 3 cm of standing water 24 hours after a rain event.

2. Pools/swales shall be adequately sampled once every two weeks, beginning no later than two weeks after their initial inundation and continuing until they are no longer inundated, or until they have experienced 120 days of continuous inundation.

3. In cases where the pools/swales dry and then refill in the same wet season, sampling shall be reinitiated within eight days of refilling every time they meet the 3 cm of standing water criteria and shall continue until they have experienced 120 days of continuous inundation, or until they are no longer inundated.

4. If a vernal pool/swale has already experienced 120 days of continuous inundation, but then dries down and subsequently refills in the same wet season, surveys must be re-initiated in accordance with IV(a)(3) above, each time the vernal pool/swale refills and meets the 3 cm of standing water criteria.

5. Once initiated, surveys conducted pursuant to these Guidelines may be suspended prior to completion if the presence of one or more of the five listed branchiopods on the subject site is determined through identification at any point within the <u>wet season</u> survey cycle

b. Survey Sampling

At each wet season visit, representative portions of the pool/swale bottom, edges, and vertical water column shall be adequately sampled using a seine, dip net or aquarium net appropriate for the size of the pool or swale. Net mesh size shall not be larger than (1/8) inch. Seines shall be examined and emptied of material at least once every five linear meters.

c. Voucher Specimens

1. Voucher specimens shall be collected only once for each individual vernal pool/swale and shall be accessioned to either the California Academy of Sciences (CAS) or the Natural History Museum of Los Angeles County (LACM) (see VIII).

2. Voucher specimens of all listed vernal pool branchiopods captured shall be collected and all other specimens shall be returned in good condition to the vernal pool/swale where they were found as quickly as possible.

3. No more than 20 specimens of each species of listed vernal pool branchiopods from each pool/swale, or less than 10% of the subpopulation present in the pool/swale,

whichever is the lesser amount, shall be retained and preserved as voucher specimens.

4. Only sexually mature, adult branchiopods shall be used for purposes of voucher specimens for species identification. The Service will not accept species identifications made using immature specimens.

5. The sample of 20 voucher specimens shall include no less than three specimens of either sex.

V. Dry Season Surveys

Dry season soil sampling shall not be conducted at any project site unless the permittee receives prior written permission from the Service (see I (c)).

a. Soil Collection

Soil shall be collected when it is dry to avoid damaging or destroying cysts which are more fragile when wet. A hand trowel or similar instrument shall be used to collect approximately one liter volume sample per pool/swale of the top 1-3 cm of pool sediment. Whenever possible, soil samples shall be collected in chunks. The trowel shall be used to pry up intact chunks of sediment, rather than loosening the soil by raking and shoveling which can damage cysts.

In southern California there are a number of federally listed plant species (*Orcuttia californica, Pogogyne abramsii,* and *Pogogyne nudiscula*) that often co-occur with the fairy shrimp. Removal of soil could damage populations of these plants by inadvertently removing seed. Dry sampling should be minimized or avoided within those vernal pools/swales that are known to, or may, contain these species. The permittee shall contact the Carlsbad Field Office (see XI, Service Contact section) regarding the distribution of these listed plants species prior to conducting dry sampling in Los Angeles, Orange, Riverside and other southern California counties.

b. Soil Sample Volume

Each soil sample from the 10 soil sample locations shall be labeled, stored, and analyzed individually.

1. A total of 10 soil samples of approximately 100 ml each shall be taken from each pool/swale, for a total soil sample volume of approximately one liter per pool/swale.

2 In the case of a very large playa, dry lake, or vernal pool, the Service may authorize the removal of more than one liter of soil.

3. If a pool has a diameter of less than three meters, the total soil sample taken shall not exceed ½ liter in volume per pool, and the 10 soil samples shall be approximately 50 ml each in volume.

c. Soil Sample Locations

A total of 10 soil samples shall be collected from the following locations within each pool/swale sampled:

1. Starting with one soil sample taken from the edge of the pool/swale, at least four soil samples shall be taken from equidistant points along the longest transect of the pool/swale.

2. Starting with one soil sample taken from the edge of the pool/swale, at least four soil samples shall be taken from equidistant points along the widest transect of the pool/swale.

3. If neither the longest or the widest transect encompasses the deepest part (or parts) of the pool/swale, then at least two soil samples shall be taken from the deepest part (or parts) of the pool/swale..

d. Soil Storage

1. The soil samples from each soil sample location shall be stored in separate bags, labeled with the specific location within the pool/swale from where each soil sample was taken. A sketch of the pool/swale showing the specific location of each soil sample shall be included in the 90-day report.

2. Soil samples containing any residual moisture initially shall be adequately ventilated and allowed to air dry thoroughly before storage of the sample. The bags containing the soil samples shall be kept out of direct sunlight in order to avoid excessively heating the sample.

3. All soil samples shall be retained and stored as directed in V(d)(1) and V(d)(2) above until the Service is able to provide direction in species-level identification of the cysts of all the aforementioned branchiopod species.

e. Soil Sieving

1. The soil samples shall not be ground, crushed, or otherwise manipulated in order to expedite the sieving process. A relatively short period of pre-soaking the soil sample may be helpful/necessary in order to facilitate the sieving process. Small aliquots (approximately 50 ml in volume) of soil shall be gently washed with water through a graded series of U.S. standard eight inch soil sieves ending in mesh sizes 300 micron (um), and 150 micron (um).

2. Sieves must be thoroughly rinsed and visually inspected for any cysts adhered to the sieves prior to the start of sieving. This process must be repeated for each individual soil sample location. Sieves shall also be rinsed and thoroughly inspected upon completion of sieving soil samples.

f. Soil Examination

1. Washed and sieved soil fractions from the 300 um and 150 um sieves shall be examined under a dissecting microscope for tadpole shrimp and fairy shrimp cysts. The process shall be repeated until all individual soil samples have been examined. All sieved material shall be processed and dried as quickly as possible, preferably within one hour from the initial wetting.

   Note: Do not return soil to survey sampling site.

2. All fairy shrimp and tadpole shrimp cysts shall be removed from the soil, separated by cyst type into labeled vials, allowed to air-dry, and then stored dry.

g. Cyst Density

Cyst density information for each soil sample location shall be calculated by dividing the total number of cysts recovered by the total amount of soil from the individual aliquots from that soil sample location. Total cyst density information for each soil sample location shall be reported for each species in terms of: none; 1-25 cysts/100 ml soil; 26-50 cysts/100 ml soil; 51-100 cysts/100 ml soil; 101-199 cysts/100 ml soil; or more than 200 cysts/100 ml soil.

h. Cyst Identification

Each fairy shrimp and tadpole shrimp cyst type shall be identified to genus by a qualified biologist. The Service may require an independent review by a crustacean biologist(s) of any vernal pool branchiopod or cyst identification.

There are two options when a branchiopod cyst identification is made to genus:

1. the survey, pursuant to these Guidelines, may be suspended if it is agreed one or more of the listed species are present on the project site; or

2. one subsequent complete wet season sampling survey shall be conducted to complete survey requirements.

VI. Cyst Voucher Specimens

A representative sample of each cyst type from each pool/swale shall be accessioned to either CAS or LACM (see VIII).

VII. 90-Day Reports

a. U.S. Fish & Wildlife Service

The permittee shall provide the appropriate Service Fish and Wildlife Office (listed in the Service Contact section) with all of the following information in writing, using the appropriate Vernal Pool Data Sheet where applicable as the reporting form, no more than 90 calendar days after completing the last field visit of the season at each project site:

1. The location of the project site clearly delineated on an original or high quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1"=2000 ft.). The location of the listed vernal pool branchiopods is to be included on the 7.5 minute maps in as precise a manner as possible (e.g., lat/long or location within a section).

2. Five color photographic 35mm slides and/or 3" x 5" photographs of each project site taken during sampling in the wet season; this is to include two slides and/or photographs taken from standing position that portray the general landscape of the site [i.e., two photos from an opposing axis of the site (e.g., north and south compass headings)]; and three slides and/or photographs of representative vernal pools, swales, and other areas within the site sampled for the five listed vernal pool branchiopod species. The following information shall be legibly written on each slide/photograph with permanent ink: precise location of the project site, direction from which photograph was taken, date of photograph, initials of photographer, and initials of the scientific names of any of the five listed vernal pool branchiopod species that were found at the depicted site.
   Note: Slides and/or photographs only need to be submitted once per project site.

3. The estimated number of individuals of any of the listed vernal pool branchiopods observed in each pool/swale shall be reported in terms of an order of magnitude (e.g., 10's, 100's, 1000's).
   (Refer to the Vernal Pool Data Sheet)

4. The number of individuals of any of the listed vernal pool branchiopods or cysts preserved from each pool/swale and the name of the institution in which they are accessioned.
   (Refer to the Vernal Pool Data Sheet)

5. A qualitative description of the vernal pool/swale community. A general list of amphibian species and non-listed vernal pool crustacean species (by common and/or scientific name) encountered at the project site is desirable. For purposes of this permit a full survey for these species is not required. However, if more detailed information is collected, it shall be included in the Vernal Pool Data Sheet.
   (Refer to the Vernal Pool Data Sheet)

6. Data collected during each field visit, including: date, air temperature, water temperature, weather conditions (e.g., sunny, overcast), maximum depth of each pool/swale, and size (area in square meters) of each pool/swale.
   (Refer to the Vernal Pool Data Sheet).

7. (Optional) water chemistry data collected during each field visit, including: alkalinity (total: ppm or mg/l), conductivity (uMHO), dissolved oxygen (ppm or mg/l), dissolved NH_4 (ppm or mg/l), pH, salinity (ppt), total dissolved solids (TDS, ppm), and turbidity.
   (Refer to the Vernal Pool Data Sheet)

b. California Department of Fish & Game

1. Permittees should consult with the California Department of Fish and Game (916/653-4875) to determine their responsibilities under the California Endangered Species Act and the California Fish and Game Code.

2. The permittee shall supply the California Department of Fish and Game (Natural Diversity Data Base, California Department of Fish and Game, 1807 13th Street, Suite 202, Sacramento, California 95814; telephone 916/322-2494) with completed California Native Species Field Survey Forms, no more than 90 calendar days after completing the last field visit of the season at each project site.

VIII. Accessioning Voucher Specimens

a. All vernal pool branchiopod voucher specimens (including individuals collected and cysts) shall be accessioned into either the California Academy of Sciences (CAS) or the Natural History Museum of Los Angeles County (LACM). All specimens shall be preserved according to the accession standards of the repository which will accession and maintain the specimens. The October 1995 CAS and September 1995 LACM standards are attached to these Interim Survey Guidelines.

b. All vernal pool branchiopod voucher specimens (including individuals collected and cysts), along with a copy of the Vernal Pool Data Sheet containing all of the items listed in VII (a), shall be permanently deposited in the CAS or LACM within 90 calendar days of the completion of the field survey and the Service shall be supplied with the CAS or LACM catalog numbers given to the specimens.

c. The permittee shall supply the CAS or LACM with a photocopy of their section 10(a)(1)(A) permit to validate that the specimens supplied to them were taken pursuant to a permit. The Service will likely consider refusal by the CAS or LACM to accession any listed branchiopod specimens to be a violation by the permittee of their section 10(a)(1)(A) permit (e.g., if due to improper preservation/storage).

California Academy of Sciences (CAS)
Department of Invertebrate Zoology and Geology, Golden Gate Park,
San Francisco, California 94118; telephone (415) 750-7082

Natural History Museum of Los Angeles County (LACM)
Crustacea Section, Invertebrate Zoology, 900 Exposition Boulevard,
Los Angeles, California 90007; telephone (213) 744-3450

IX. Additional information, limitations, and caveats with respect to these Guidelines are as follows:

a. From time to time, specific circumstances may justify or necessitate revision of these Guidelines, on a case-by-case basis. At the discretion of the Service, such a variance may be allowable under these Guidelines if:

1. the permittee explains to the Service in writing why the variance to the Guidelines is needed and justified; and

2. the Service concurs, in writing, with the variance requested by the permittee.

b. The Service reserves the right to reject vernal pool branchiopod surveys conducted under these protocols as inadequate if:

1. survey methods used are inconsistent with these Guidelines, unless prior written permission (see I, Survey Approval) has been obtained; or

2. other information indicates that the survey is inadequate as determined by the Service.

X. Permit Infractions

The Service may consider any of these actions to be a violation by the permittee of their section 10(a)(1)(A) permit:

a. falsification of any reporting or information;

b. failure to follow the stated Guidelines sampling methodologies;

c. failure to obtain prior permission to commence wet season surveys or failure to obtain written permission to commence dry season surveys (see section I (c));

d. failure to notify the Service within 10 days of a determination of presence of one or more of the listed vernal pool branchiopods on a survey site;

e. failure to accession voucher specimens or improperly accessioned voucher

specimens;

f. failure to file completed 90-day reports with the Service within 90 calendar days after completing the last field visit of the season at each project site; or

g. failure to file completed Natural Diversity Data Base forms with the California Department of Fish and Game within 90 calendar days after completing the last field visit of the season at each project site.

Violation(s) of a section 10(a)(1)(A) permit may result in its non-renewal, suspension or revocation.

XI. Service Contact

For the Central Valley hydrographic basin and the coast ranges north of the Santa Cruz County line, the Sacramento Fish and Wildlife Office (2800 Cottage Way, W-2605, Sacramento, California 95825; telephone 916/414-6600) should be contacted regarding vernal pool branchiopod issues.

For areas from Santa Cruz County south to Ventura County, contact the Ventura Field Office (2493 Portola Road - Suite B, Ventura, California 93003; telephone 805/644-1766).

For areas from Los Angeles County south to the U.S.- Mexico border, contact the Carlsbad Field Office (2730 Loker Avenue West, Carlsbad, California 92008; telephone 619/431-9440).

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ____ yes

Required color slides and/or photographs for the project site are included: ____ no ____ yes

Date: ____/____/____ Time: _____ County: _____ Quad: _____

Collector(s): _____ Permit #: _____

Site/Project Name: _____ Pool #: _____

Township: _____ Range: _____ Section: _____ _____lat._____long.

Temperature: Water: _____ °C Air: _____ °C

Pool Depth:
at time of sampling: _____cm
estimated maximum: _____cm

Surface Area:
at time of sampling: _____m x _____m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing

- ungrazed grazed: cattle horses sheep other_____
light moderate heavy

- land use of habitat:

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status)

Notostracans:
(note reproductive status)

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)			
Conchostracans:	yes	no		Anisoptera:	yes	no
Copepods:	yes	no		Zygoptera:	yes	no
Ostracods	yes	no		Hydrophilidae:	yes	no
Fish	yes	no		Dytiscidae:	yes	no
Frogs yes	no		Corixidae:	yes	no	
Salamanders	yes	no		Notonectidae:	yes	no
Waterfowl	yes	no		Belostomatidae:	yes	no
Other (specify) _____				Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: _____ no _____ yes

Required color slides and/or photographs for the project site are included: _____ no _____ yes

Date: ____/____/____ Time: _____ County: _____ Quad: _____

Collector(s): _____ Permit #: _____

Site/Project Name: _____ Pool #: _____

Township: _____ Range: _____ Section: _____ _____lat. _____ long.

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing

- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy

- land use of habitat:

Pool Bottom Surface: (circle where appropriate)
hardpan claypan cobbly/rocky lava flow other_____

Pool Depth: _____cm (estimated maximum) Surface Area: _____m^2 (estimated maximum)

Sketch of pool and transects showing:
- scale
- indication of North
- sampling locations

U.S Fish and Wildlife Service Vernal Pool Data Sheet
Dry Season Survey
Soil Analysis

Note: Please fill out the required information completely for each site visit.

Sample ID	Sample Volume(ml)	Genus (/species)	# Cysts (or None)	Cyst Density (#/100ml)

Voucher Specimens
Cysts shall be stored dry and shall be preserved according to the standards of the institution in which they will be accessioned.

Genus (/species)	# Cysts	Catalog/Accession #	Pool #

Collection, Preservation, Handling, and Accessioning Information for Small Crustaceans

Crustacea Section, Invertebrate Zoology
The Natural History Museum of Los Angeles County
900 Exposition Boulevard
Los Angeles, California 90007

Collection Data

To the extent possible, the following data should be included. The Museum reserves the right to refuse acceptance of any specimens without a minimum of usable, legible collection data. Archival quality materials (including glass vials, permanent ink or pencil and permanent label paper, and glass outer jars with screw-top polypropylene lids) should always be used (see below). All collections should include the following information:

Taxon name: (Lowest available or known, down to species where possible)
Date: (day, month, year)
Time of Day: (if known)
Detailed Location:
Latitude and Longitude:
Specific habitat information:
Name of collector:
Collecting method(s) / device(s):
Preservative used:
Notes: (to include any observations on behavior, co-occurring species, etc.)

Preservation

Ideally, even small crustaceans should be initially fixed in 5 to 10% formalin (37% formaldehyde in solution, as commercially purchased, mixed with 90-95% water). As an alternative, 100% ethyl alcohol, although not a fixative and so not as good for long term tissue preservation, can sometimes be used (not recommended for animals longer than 20 mm total length). With either method, specimens should be transferred to 70% ethyl alcohol (ethanol) after a minimum of 8 hours of fixation. The 70% ethanol to tissue ratio should be approximately 3 to 1 for long term storage.

Storage

Archival quality materials (including glass vials, permanent ink or pencil and permanent label paper, and glass outer jars with screw-top polypropylene lids) should always be used. Specimens should be placed in small glass vials completely filled with 70% ethanol and plugged with cotton (not foam). Vials are then inverted and stored in a slightly larger outer storage jar of glass or plastic, also filled with 70% ethanol and fitted with a polypropylene-closure lid. Labels are ideally situated in the outer jar containing the vial rather than in the shell vial, never on the outside of the jar or affixed to the lid.

Shipping
Specimens should be shipped in plastic, leak-proof bottles, jars, or vials, and must be adequately cushioned by bubble-wrap, plastic peanuts, etc. to ensure their safe arrival. It is preferred that specimens that are designated types or vouchers be sent by registered or certified mail, although this is at the discretion of the sender. Use the complete address given at the top of this document.

Cost of Specimen Accessioning
Because of the rising costs of accessioning and maintaining valuable collections, the Natural History Museum reserves the right to charge on a per-sample basis for accessioning collections. This fee varies with the size of the collection, duration of the project, and availability of Museum staff at the time of deposition. The fee may be waived at the discretion of the Curator or Collections Manager of Crustacea and may fluctuate depending upon our evaluation of lots received.

Accessioning Information
The Natural History Museum of Los Angeles County will accept for permanent care and curation selected collections of Crustacea, including those from vernal pools and other ephemeral freshwater habitats and representatives of threatened or endangered taxa. The Museum is willing to act as the repository for collections acquired during USFWS or other surveys.

To be accepted for accessioning, the collections must be in reasonably good shape, meaning that the animals themselves must not be overly deteriorated and that all previously stated collecting, preserving, and labeling protocols have been followed. Furthermore, all collections must be accompanied by a detailed list of the specimens being sent.

The Museum reserves the right to charge an accessioning fee to cover the costs of accessioning any and all deposited specimens. This fee may be waived at the discretion of the curator in charge of the Museum Section that will be overseeing the accessioning and curation of the collection.

The Museum reserves the right to decide whether an incoming collection should be stored topically vs. separated and stored according to taxonomic divisions (i.e. storing all members of one family together rather than keeping all collections from one site together).

The Museum further reserves the right to decide which specimens will be kept and maintained for long term storage and which may be passed on to other institutions in exchange or as long term loans for research purposes.

For further information contact: (Or write to the address given above)

Dr. Gary Pettit, Collections Manager, Crustacea 213-744-3450 fax 746-2999
Dr. Joel W. Martin, Curator of Crustacea 213-744-3440 fax as above

This document current as of 25 September 1995

California Academy of Sciences
Department of Invertebrate Zoology and Geology
Golden Gate Park
San Francisco, CA 94118

October 1995

Protocols and standards for preservation and archival of vernal pool crustaceans.

Specimens of vernal pool crustaceans listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS) and collected during surveys permitted by the USFWS may be deposited as voucher specimens at the California Academy of Sciences, Department of Invertebrate Zoology and Geology (CASIZG). However, only those specimens which have been properly fixed, preserved and documented will be accepted for archival. The vendors listed below can supply the necessary materials for specimen storage, however these vendors are not specifically required and materials from other sources will be acceptable provided they meet the standard requirements of CASIZG.

Any questions regarding these standards and protocols may be directed to Dr. Robert Van Syoc, Senior Collection Manager of invertebrates at CASIZG (415-750-7082). Visits to the collection to deposit potential voucher specimens must be at least 7 days in advance. Specimens may be shipped to CASIZG, but shipments with damaged specimens or broken containers will not be accepted. Each shipment must be accompanied by a packing list of specimens sent. CASIZG catalog numbers will be assigned by CAS staff and notification sent to you by U. S. mail. This will be done in an expeditious manner, but staffing limitations may cause delays. Therefore, allow several days for notification of CASIZG catalog numbers.

Materials required:

- 100% or 95% non-denatured ethanol
- 75% non-denatured ethanol (diluted from 100% or 95% with de-ionized or distilled water)
- 2 dram, 4 dram, 6 dram glass shell vials
- Clean cotton
- 8 oz. tall flint glass bottles, 48 mm aperture (inside diameter) or 32 oz. glass *bottles,* 74 mm aperture (inside diameter)
- White polypropylene screw-top closures with solid (no holes) smooth surface, 58 mm diameter (8 oz. bottles) or 85 mm diameter (32 oz. bottles), with foam or plastic liners Nalgene polypaper
- Dot-matrix printer and alcohol-proof ink ribbons, or technical pen with alcohol-proof ink, or #2 pencil'

Standards and Protocols:

1. Vernal pool crustaceans must be fixed in 100-95% non-denatured ethanol and preserved for archival in 75% non-denatured ethanol. Enough 100-95% ethanol should be used in the initial fixation to insure proper fixing of tissues. A ratio of at least 10 parts 100-95% ethanol to 1 part tissue is required for initial fixation. A ratio of at least 3 parts 75% ethanol to 1 part tissue is required for preservation.

2. All specimens must be sorted by collecting event (each locality/date/time of collection). They must be identified to species level, each species from each collecting event placed into a vial or vials in it's own 8 or 32 oz. bottle (use the smaller size if possible).

3. Specimens are placed into 2 dram, 4 dram, or 6 dram glass shell vials filled with 75% ethanol. The vial or vials are plugged with clean cotton in such a manner that no air bubbles are trapped inside and placed inverted into an 8 or 32 oz. glass bottle filled with 75% ethanol (Fig. 1). If open vials with specimens are inserted upright into the larger container, then plugged with cotton, air bubbles will not be trapped in the vial. The vial may then be removed and placed back into the bottle with cotton plug down for archival. It is important to remember that the specimens should not be jammed into the vials. The purpose of placing specimens into vials is to protect them from potential damage which could be caused by contact with labels placed into the jar or during removal from the 8 or 32 oz. container. However, putting too many specimens into a vial or putting specimens into a vial which is too small will damage them. The required ratio of preservative to tissue inside the vial is at least 3 parts 75% ethanol to 1 part tissue. This may require splitting a species sample from a single collecting event into two or more vials within a bottle or even into two bottles.

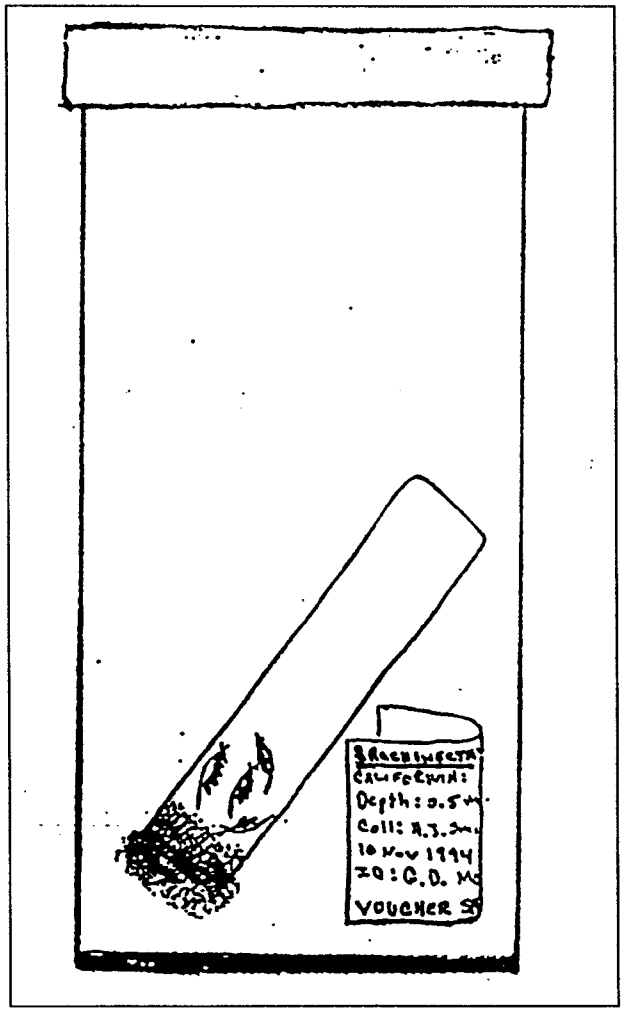
4. The 8 or 32 oz. glass bottle is capped with the foam or plastic lined, screw-top polypropylene closure.

5. Each 8 or 32 oz. bottle must contain a label with collecting event data on Nalgene polypaper in alcohol-proof ink or #2 pencil. Labels must be placed into the specimen bottle which contains the specimen vial(s), not directly inside the vials and not attached to the outside of the bottle. The data may be printed using a dot-matrix printer with alcohol-proof ink ribbon. Alternatively, it may be hand printed with technical pen using alcohol-proof ink or a #2 pencil. Laser printed or photocopied labels are not acceptable. All labels must be easily readable by CAS staff. If labels are not legible, specimens will not be accepted or cataloged into the CAS collection. Labels should be no larger than 3 x 5 inches and no smaller than 2 x 3 inches.

Data required for specimen labels:

- Species name
- County, city/town, and other clearly worded description of collection locality so as to enable another scientist to find the collection locality
- Latitude and longitude
- Environmental data regarding habitat (temperature, turbidity, depth and size of pool)
- Full names of collector(s) and identifier
- Dates of collection and identification, dates should clearly indicate day, month and year (e.g. 10 Jan 1995)
- The phrase "Voucher specimen: Vernal Pool Crustacean Survey"

Fig. 1: 8 oz. bottle containing inverted glass vial plugged with cotton.
Note label inside jar, but not inside vial.



List of potential (not specifically required) vendors of some required materials.

Glass vials: S-930	Acme Vial and Glass 1601 Commerce Way Paso Robles, CA 93446 (805) 239-2666
Glass bottles: and polypropylene lids	California Glass 155 98th Ave. Oakland, CA 94603 (510) 635-7700
Polypropylene lids:	Berlin Packaging 7900 Edgewater Dr. Oakland, CA 94621 (510) 562-7201
Cotton: non-sterile	California Medical Supplies 3315 Broadway Oakland, CA (510) 885-5105
Nalgene Polypaper:	VWR Scientific (415) 468-7150 (800) 932-5000
Alcohol-proof ("non-bleeding") printer ribbons:	Automated Office Products Inc. 9700-A Martin Luther King Jr. Hwy. Lanham, MD 20708
Non-denatured ethanol 190 or 200 proof (95% or 100%)	Gold Shield Chemical 3111 Depot Rd. Hayward, CA 94545 510-782-2040

Materials may be obtained from other sources, but should conform to the specific standards listed above. CASIZG will not act as a supplier of materials.

Field survey forms and information regarding the California Natural Diversity Database can be accessed on the internet at http://www.dfg.ca.gov/whdab/cnddb.htm.

State of California • The Resources Agency
Department of Fish and Game • Wildlife & Habitat Data Analysis Branch
The California Natural Diversity Database
Commonly Asked Questions

What is the California Natural Diversity Database (CNDDB)?

The CNDDB is a program within the Department of Fish and Game' s Habitat Conservation Division and wit hin the Wildlife & Habitat Data Analys is Branch. The CNDDB' s mission is to track the location and condition of California's many species of rare and sensitive plants, animals, and natural communities (e.g., marshes, riparian systems, desert scrub, etc .). These species and natural communities are collectively referred to as "elements."

The CNDDB includes in its inventory all federally and state listed plants and animals, all species that are candidates for listing, all species of special concern, and those species that are considered "sensitive" by government agencies and the conservation community. Th is is a computerized inventory and information is available for a fee in hard copy and digital forms. The CNDDB is a dynamic system with information continually being added and upgraded. The CNDDB contains over 36,000 locational records for over 3,000 elements.

How is CNDDB information set up or organized?

CNDDB data are organized geographically and taxonomically. Information is retrieved by Unit ed States Geological Survey (USGS) map sheet (e.g., typically 1:24,000, 1:100,000, or 1:250,000 scale), or by taxa. Most CNDDB clients request information for USGS 7.5U minute quads. The approximately 49 square miles covered by a single USGS 7.5U minute quad is the smallest area for which we will perform a data retrieval. Due to the nature of our inventory , it is important that our clients query surrounding quads as well as the quads on which their project site or area of interest is located.

What types of information can I obtain?

OVERLAYS & TEXT We can produce computer generated overlays for the 1:24 ,000 -, 1:100,000-, or 1:250,000-scale base maps. Text reports are included only with the USGS 7.5' scale overlays. An Element Table on the USGS 7.5' (1:24,000) overlay provides the following information for each element occurrence: a map feature number, occurrence number, map index number, element code, accuracy class, element count, the common and scientific names, numbers of components, and legend. Most of our clients request overlays for USGS 1:24,000 and 1:100,000 scale maps (map index numbers only with legend for 1:100,000 scale). Overlays cost $30 (standard vellum media) per quad which include text reports, except for RAREFIND subscribers (see below).

RAREFIND 2 - We can also make our data available via a microcomputer database application called RAREFIND 2. You can obtain our entire statewide data set. RAREFIND 2 is available on a yearly subscription basis. The cost for the statewide data set is $1,250 for government agencies and nonprofit conservation organizations or $2,500 for commercial clients. A subscription includes an initial set of data with the RAREFIND 2 application followed by an updated data set 6 months later. The GIS digital layer is also available to subscription customers. Renewing customers are given a 10% discount.

RAREFIND 2 subscribers are also afforded a special overlay price of $20 per quad. RAREFIND 2 is a compiled, stand alone application that requires a 386 or higher series PC, with 560 K free DOS memory and 100 MB free hard disk space. RareFind 2 will run on M S-DOS version 5.0 or higher, Windows 3.1, Windows 95 or NT. No additional software is required.

How do I order information from t he CNDDB?

It is easy to request information from the CNDDB. Call one of our Information Services staff at (916) 324-3812 at to place your order by phone or e-mail u s at kbates@dfg.ca.gov . It is most helpful to have the name or names of the 7.5' quad maps for which you want information contact us. We will give you a cost estimate before we proceed with your request.

How long does it take t o get information from the CNDDB?

The usual turn around time for data requests is one to two weeks. We ask you to remember that this is a computerized system and it does go down from time to time. Such unforeseen event scan interfere with our normal response time.

How do I pay?

You are invoiced directly from our accounting department after the products have been sent to you. You do not need to pay up front; but invoices are due and payable upon presentation—no terms are available. Delinquent accounts will be denied additional services until the balance has been paid.

NOTE: There is a 50% cancellation charge if you cancel your order after we have already processed your request and generated our products. There is a no-return policy on products already delivered.

Why is there a charge f or this information?

Our enabling legislation requires that we " insure cost -sharing by all who use the CNDDB, and develop a fee structure to recover actual costs" for its use. The Department of Finance has determined that this will include not only direct costs for generating and distributing our data, but will also include some program overhead. We recover about $225,000 per year in fees, which amount to about 25% of our program costs.

The Wildlife & Habitat Data Analysis' Mission and Vision:

" ..to provide high quality scientific information, tools, and expertise needed by Department employees, other public agencies, private organizations, and the public for making informed conservation decisions regarding our biological resources. ...to serve as the State's clearinghouse for biological data and center for conducting conservation analyses at statewide, regional, and local scales and actively acquire, integrate, improve, and distribute biological resource data and associated spatial data in support of conservation policy and planning needs."

NDDB Questions & Answers.wpd//Rev:1/26/00
(from http://www.dfg.ca.gov/whdab/cnddb.htm.)