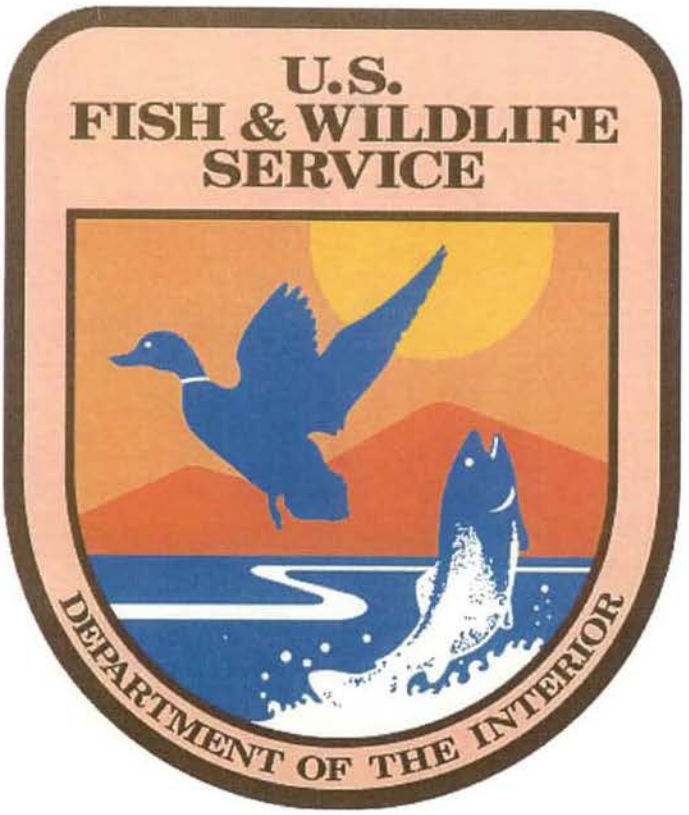
ANNUAL HABITAT WORK PLAN



WERTHEIM NATIONAL WILDLIFE REFUGE
SHIRLEY, NEW YORK

February 2005

TABLE OF CONTENTS

I. INTRODUCTION 6

II. HABITAT OBJECTIVES 6

A. UPLAND MANAGEMENT 6

GOAL: 6

OBJECTIVE 1 (White-tailed deer): 6

FY2004 Activities 7

Deer Density Surveys 7

Vehicle 7

Expenditures 7

Aerial 7

Expenditures 8

Vegetation Monitoring 8

Expenditures 8

FY2005 Plans 9

Deer Density Surveys 9

Vehicle 9

Projected Expenditures 9

Aerial: 9

Projected Expenditures 9

Vegetation Monitoring: 9

Projected Expenditures 10

Pre and Post Hunt Monitoring 10

Projected Expenditures 10

OBJECTIVE 2 (Prescribed Fire): 10

FY2004 Activities 10

Expenditures 10

FY2005 Plans 11

Projected Expenditures 11

OBJECTIVE 3 (Forest Pests): 11

FY2004 Activities 11

Expenditures 11

FY2005 Plans: 11

Projected Expenditures 11

OBJECTIVE 4 (Landbird Monitoring): 11

FY2004 Activities 11

Expenditures 12

FY2005 Plans 12

Projected Expenditures 12

OBJECTIVE 5 (Pine Barrens Research): 12

FY2004 Activities 12

Expenditures 12

FY2005 Plans 13

Projected Expenditures 13

B. GRASSLAND MANAGEMENT 14

GOAL 1: 14

OBJECTIVE 1 (Restoration): 14

FY2004 Activities 14

Invasive Species Control 14

Expenditures 14

Mechanical Treatment of Grassland Habitats 14

Expenditures 14

Restoring Habitat through Building Removal 14
Expenditures 15
Photo Monitoring 15
Expenditures 15
FY2005 Plans 15
Invasive Species Control 15
Projected Expenditures 15
Mechanical Treatment of Grassland Habitats 15
Projected Expenditures 16
Restoring habitat through building removal 16
Projected Expenditures 16
Photo Monitoring 16
Projected Expenditures 16
OBJECTIVE 2 (Nest Box Program): 16
FY2004 Activities: 16
Bluebird Nest Box Program 16
Expenditures 16
FY2005 Plans: 17
Bluebird Nest Box Program 17
Projected Expenditures 17

C. WETLAND MANAGEMENT 18
GOAL: 18
OBJECTIVE 1 (Phragmites Management): 18
FY2004 Activities: 18
Phragmites Management 18
Report 18
Expenditures 18
Pesticide Use 18
Expenditures 19
Mechanical Treatments and Restoration 19
Expenditures 19
FY2005 Plans: 19
Phragmites Management 19
Report 19
Pesticide Use 20
Projected Expenditures 21
Mechanical Treatments and Restoration 21
OBJECTIVE 2 (Impoundment Management): 21
FY2004 Activities: 21
Impoundment Water Levels 21
Expenditures 21
Bird Monitoring 21
Expenditures 22
Vegetation Monitoring 22
FY2005 Plans: 22
Impoundment Water Levels 22
Projected Expenditures 23
Bird Monitoring 23
Shorebirds 23
Projected Expenditures 23
Marshbirds 23
Projected Expenditures 23
Waterfowl 23
Projected Expenditures 24
Vegetation Monitoring 24

Projected Expenditures 24
OBJECTIVE 3 (Saltmarsh sparrow Monitoring): 24
FY2004 Activities: 24
Expenditures 25
FY2005 Plans: 25
Projected Expenditures 25
OBJECTIVE 4 (OMWM Project): 25
FY2004 Activities: 26
OMWM Project Background 26
OMWM Project 26
Expenditures 27
Mosquito Monitoring 27
Expenditures 27
FY2005 Plans: 27
OMWM Project 27
Equipment for the Project: 28
Projected Expenditures 29
Mosquito Monitoring 29
Projected Expenditures 29
OBJECTIVE 4 (Marshbird Nesting Structures): 29
FY2004 Activities: 29
Osprey Nesting Platform Program 29
Expenditures 30
Wood Duck Nest Box Program 30
Expenditures 30
FY2005 Plans: 30
Osprey Nesting Platform Program 30
Projected Expenditures 30
Wood Duck Nest Box Program 31
Projected Expenditures 31
OBJECTIVE 5 (Amphibian Monitoring): 31
FY2004 Activities: 31
Vernal Pool Egg Mass Monitoring 31
Expenditures 31
Anuran Call Counts 31
Expenditures 31
Future Research 31
Expenditures 31
FY2005 Plans: 31
Vernal Pool Egg Mass Monitoring 31
Projected Expenditures 32
Anuran Call Counts 32
Projected Expenditures 32
Future Research 32

I. INTRODUCTION

Wertheim NWR is 2,550 acres in size and is located on the south shore of Long Island in Shirley. Wertheim NWR serves as the headquarters of the Long Island National Wildlife Refuge Complex. The Refuge is the second largest NWR on Long Island and contains a diversity of habitats. The Refuge is bisected by the Carmans River, a New York State designated Wild and Scenic River and the second longest river on the Island. Yaphank Creek, Little Neck Run, Big Fish Creek, and Little Fish Creek tributaries all join the Carmans River within Wertheim boundaries. The Refuge protects one of the last undeveloped estuary systems remaining on Long Island.

Approximately half the Refuge is composed of aquatic habitats and the other half upland habitats. The aquatic habitats include a marine bay, a tidal river, freshwater streams, ponds, salt marsh, brackish marsh, freshwater marsh, red maple swamps, and shrub swamps. Uplands include old fields, brush, and an assortment of forest types such as, mixed oaks, oak-pitch pine, pitch pine, red maple, and red cedar.

Management Goals:

Management activities include forest protection, grassland management, wetland restoration, wildlife nesting structures and restoring derelict lands. This involves the maintenance and restoration of native communities, including grasslands and pine barren habitats for wildlife, prescribed burning, maintaining nesting structures (Eastern bluebird boxes, Osprey platforms, and wood duck boxes), and controlling invasive species, such as bittersweet (*Celastrus scandens)* and Japanese knotweed *(Polygonum cupidatum*). Wildlife management goals include maintaining and enhancing populations of migratory birds and other fauna, and enhancing populations of federally and state listed threatened and endangered species where appropriate. Current management activities include monitoring of habitat and water quality, tidal wetland restoration, subtidal restoration, and invasive species control (i.e., *Phragmites australis).*

II. HABITAT OBJECTIVES

A. UPLAND MANAGEMENT

GOAL:

Improve the biological diversity and integrity of upland cover types to sustain high quality habitat for migratory passerine birds.

OBJECTIVE 1 (White-tailed deer):

Achieve and sustain white-tailed deer densities at 20-30 deer/square mile. Deer densities below 30 deer/square mile encourage biological diversity and increase habitat for other wildlife. Currently, deer densities exceed 20-30 deer/square mile and effect migratory bird habitat, vegetation diversity, and forest regeneration.

FY2004 Activities

Deer Density Surveys

Vehicle

During December 2003 and the first 2 weeks in January 2004, Refuge personnel conducted 11 vehicle-based deer density surveys. Personnel followed established survey routes to observe deer. Refuge personnel were divided into teams consisting of a driver and spotter. One team surveyed the eastern portion of the Refuge and the other team covered the western portion conducting the survey co-jointly. The survey routes totaled 8.5 miles and traversed wooded trails and 4-wheel drive roads encompassing oak, red maple, pitch pine, and grassland vegetation types (Map 1). Refuge personnel recorded the number of deer observed along each route and their distance from the road following a protocol (Appendix L) established in FY2000. The vehicle surveys are based on scientific protocols and procedures which take into account a number of variables. The information gathered by the surveyors helped to determine deer densities by examining the effective viewing distance of deer observed on the Refuge. The results of the survey were incorporated into the Wertheim Deer Management Program and EA. Deer densities were calculated at 81deer/mi^2, not correcting for deer detectability (Figure 1). With approximately 64% of Refuge, or 1,630 acres considered deer habitat, the Refuge contains an estimated 350 deer. The Ground Count Survey resulted in a sex ratio of 8.6 antlerless deer per one antlered deer.

Expenditures

Staff Hours: 66 Hours (hours based on 3 Refuge staff conducting 11 surveys at 2 hour intervals)

Refuge Cost:

GS-9 Step 6 = $556.38
GS-9 Step 1 = $476.96
GS-12 Step 1 = $691.46
Total = **$1,724.80**

Volunteer Hours: 22 Hours (hours based on 1 volunteer conducting 11 surveys at 2 hour intervals)

Aerial

In February 2004, an aerial survey was conducted to validate the Refuge's vehicle-based surveys, the Service (Wertheim, 2,500 acres) along with the Department of Energy (Brookhaven Laboratory, 5,000 acres), and the New York DEC (Rocky Point, 5,000 acres) contracted to have infrared aerial surveys conducted on their property. The purpose of the aerial survey was to locate, map, and determine deer populations at each site. An aircraft flew over the entire Refuge and counted the number of deer observed using infra-red cameras. The aerial survey counted 231 deer on the Refuge. An

overwhelming majority of animals were concentrated in the Refuge's upland habitats (1,630 acres) which was the same area covered by the vehicle-based survey (Figure 2). Deer densities, based on the aerial survey for the Refuge, were calculated at 93 deer/mi2 within 2.5 mi^2 of prime deer habitat. Aerial surveys do not assume a 100% detection rate, with the exception of grassland cover types, due to the inability to document deer under forested or closed canopies. Data collected from the infrared surveys was incorporated in the Wertheim Deer EA and Deer Management Plan.

Expenditures
Unit Cost: $18,000

Vegetation Monitoring
Refuge personnel conducted vegetation monitoring following established protocols and datasheets (Appendix M) of the forested woodlands between August and September 2004 to observe the effects of deer on vegetation. Vegetation monitoring included: using a quadrat to estimate percentage of vegetation cover per plot, identifying and counting the number of woody seedlings per plot and saplings, measuring diameter of trees, and photo point monitoring to document the changes in vegetation and diversity. Refuge personnel randomly selected six deer exclosures (10ft by 50ft and 8ft high) on the Refuge. Deer exclosures were erected during the summer of FY2002 by Refuge personnel. Three exclosures were located on the west side of the Carmans River and three were selected for the east side of the river. The exclosures were surveyed before the end of the growing season. Refuge personnel observed in 5 of the 6 exclosures a distinct increase in vegetation diversity and vegetation growth when compared to the control sites which showed signs of deer browse and reduced vegetative cover. Deer were able to access vegetation within one exclosure and there were signs of deer browse.

During FY2004, Refuge personnel made improvements to the deer exclosures to prevent access from white-tailed deer. Extra poles were added and tightly fitted to exclosures that showed signs of sagging or drooping. Wooden stakes were used to secure fence to ground preventing wildlife access underneath the fence. There have been no signs of wildlife access to the interior of the exclosures after the improvements were made.

Expenditures
Refuge Staff Hours for Vegetation Survey: 6 days
Refuge Staff Hours for Exclosure Repair: 16 days
Cost of Materials: No cost.

FY2005 Plans

Deer Density Surveys

Vehicle

During December 2004 and the first 2 weeks in January 2005, Refuge personnel will conduct 12 vehicle-based deer density surveys to estimate deer density on the Refuge following same protocol used in FY2004. Refuge personnel will follow the same protocols and routes as last year.
The completion of all 12 surveys will depend on staff /volunteer availability and favorable weather conditions. Results from the surveys will be incorporated into the Wertheim Deer Management Program. Deer densities for Wertheim will be calculated, not correcting for the observability of deer.

Projected Expenditures

Staff Hours: 72 (hours based on 3 Refuge staff conducting 11 surveys at 2 hour intervals)

Refuge Cost:

GS-9 Step 6 = $606.96
GS-9 Step 1 = $520.32
GS-12 Step 1 = $754.32
Total = **$1,881.60**

Volunteer Hours: (hours based on 1 volunteer conducting 11 surveys at 2 hour intervals)

Equipment: Cost of Gas and Vehicle Maintenance built into base funds

Aerial:

This survey is not scheduled for FY2005.

Projected Expenditures

None

Vegetation Monitoring:

Refuge personnel plan to follow the same protocols for conducting vegetation monitoring of the forested woodlands at Wertheim. Vegetation monitoring will be conducted between August and September 2005 to determine the effects of deer on vegetation. The deer exclosures will be examined for needed repairs throughout the year. The six deer exclosures located at Wertheim will be surveyed just before the end of the growing season. Collected data will be incorporated into the Wertheim's deer management program.

Projected Expenditures
Estimated Refuge Staff Hours (Vegetation Survey): 7 Staff Days
Estimated Refuge Cost: $900
Refuge Staff Hours (for Exclosures Repairs) 16 Staff days
Cost of Materials: Scraps and leftover items from other projects

Pre and Post Hunt Monitoring
Vehicle surveys will be conducted before and after the hunting season. The surveys will follow the same protocol for vehicle surveys with the exception that surveys will be conducted for 7 consecutive days prior to the hunting season and 7 consecutive days post hunting season. In addition, during pre and post hunt season surveys at least 1 night of spotlight surveys will be conducted. Spotlight surveys will be used to test the validity of our daytime counts because we may be underestimating the total population as deer are typically more active at night. Survey results will be entered into the Deer Density Estimator Program to determine a population estimate for the Refuge and determine hunt objectives for the following year. At the conclusion of the hunt season's surveys, driving routes will be reevaluated and altered based on changes in habitat and denseness of vegetation. If routes are altered, they should represent similar habitats surveyed and survey lengths. Datasheets are located in Appendix M.

Projected Expenditures
Staff Hours: 84 Hours (hours based on 3 Refuge staff conducting 14 surveys at 2 hour intervals)
Refuge Cost:
GS-9 Step 6 = $708.12
GS-9 Step 1 = $607.04
GS-12 Step 1 = $880.04
Total = **$2,195.20**
Volunteer Hours: 28 Hours (hours based on 1 volunteer conducting 14 surveys at 2 hour intervals)

OBJECTIVE 2 (Prescribed Fire):

By 2008, initiate a prescribed fire regime that mimics the appropriate historic fire return interval for pine forest, hardwood forest, shrub land, and grassland.

FY2004 Activities
No activities during this time period.

Expenditures
None

FY2005 Plans
Currently, no plans have been made for prescribed burning at Wertheim. Fire trained personnel will continue to assist other organizations with controlled burns within the Pine Barrens and/or wildfires, when available.

Projected Expenditures
None

OBJECTIVE 3 (Forest Pests):

Establish and maintain surveillance programs for forest pest species such as Asian long-horned beetle, gypsy moth, emerald ash borer, etc.

FY2004 Activities
The New York Department of Agriculture (NYDA) monitored the woodland areas of the Wertheim NWR for the Asian long-horned beetle in August 2004. A grid of GPS points was laid out across the Refuge and each point was surveyed for beetle evidence within a 50 meter radius. The Refuge does not have NYDA's survey protocols or a results summary. However, they reported Asian long-horned beetles were not found on the Refuge during these surveys.

Expenditures
None

FY2005 Plans:
The NYDA will continue to monitor the woodland areas of the Wertheim NWR for the Asian long-horned beetle in August 2005. The Refuge will be responsible for obtaining NYDA's protocols prior to the survey and summaries at the conclusion of the survey.

Projected Expenditures
None

OBJECTIVE 4 (Landbird Monitoring):

Initiate a biological monitoring program that assesses bird use and habitat conditions within upland cover types.

FY2004 Activities
R5 landbird monitoring surveys were conducted at Wertheim NWR following Region 5 protocol (Appendix J). Volunteers conducted landbird breeding surveys during the last week of May 2004, the second week in June 2004, and first week in July 2004. Refuge staff escorted volunteers to routes during each survey. Surveys were conducted at sunrise and completed before 10:00 am for each day surveyed. Forty survey points, encompassing 4 survey routes, traversed the

woodland areas of the Refuge (Figure 3). Data collected from the surveys were input in the Census Database and sent to R5 South Zone Biologist for analysis.

Overall, 51 landbird species were recorded during 2004 surveys. Dominant species were red-winged blackbirds, gray catbirds, Eastern towhees, Northern orioles, common yellowthroats, and Northern cardinals. No Federal or State threatened, endangered, or species of concern were recorded during surveys. However, Partners in Flight has established a Bird Conservation Plan for Southern New England that ranks priority species by the following categories: high continental priority-high regional responsibility, high continental priority-low regional responsibility, high regional concern, high regional responsibility, high regional threats, and additional watch list species. During landbird surveys species recorded that fell within the 'high continental priority-high regional responsibility' were wood thrush, black-billed cuckoos, scarlet tanagers, and blue-winged warblers. Species recorded of 'high regional concern' were Eastern wood-pewees, black-and-white warblers, and Eastern towhees. Species recorded of high regional responsibility were American black ducks. The

Expenditures
Refuge Staff Hours: 60 hours
Refuge Cost:
Salary: GS-9 Step 6 Biologist = $153.54
Volunteer Hours: 42 hours

FY2005 Plans

Refuge personnel along with the expert birders will continue to conduct the Region 5 landbird breeding monitoring at Wertheim and try to expand the survey to other Refuges, if possible.

Projected Expenditures
Refuge Staff Hours: 60 hours
Refuge Cost:
Salary: GS-9 Step 6 Biologist = $153.54
Volunteer Hours: 42 hours

OBJECTIVE 5 (Pine Barrens Research):

To restore and protect the Long Island Pine Barrens community, which is a globally unique ecosystem.

FY2004 Activities
No activities conducted in FY2004.

Expenditures
None

FY2005 Plans

A challenge cost share proposal (Appendix N) was submitted for funding in November 2004 to conduct baseline biological monitoring and identify priority research needs for the Core Preservation Area of the Long Island Pine Barrens. This proposal was based on collaboration and partnership with the Foundation for Ecological Research in the Northeast (FERN), a non-profit organization. As of February 16, 2005 the Refuge has not been notified as to whether the proposal was accepted. Monitoring efforts will be based on a protocol (Appendix N) developed by Michael Batcher although development of the official monitoring program and datasheets will be developed in the spring of 2005. Interns hired by FERN will conduct monitoring on and off the Refuge.

Projected Expenditures

Refuge Hours: 8

Refuge Cost: $14,600.00 (covered by Challenge Cost Share)

GS-12 Step 1 Biologist = $255.00 (coordination between Refuge and FERN)

B. GRASSLAND MANAGEMENT

GOAL 1:

Perpetuate the biological diversity and integrity of native grasslands for migratory birds and other fauna and to foster endangered plant recovery and the communities upon which they depend.

OBJECTIVE 1 (Restoration):

Manage and restore grasslands to expand warm season grasslands for the benefit of migratory birds and other fauna.

FY2004 Activities

Invasive Species Control
Pesticide Use Proposals (PUP) for 2004 proposed to treat 15 acres of Refuge lands, primarily for Asiatic bittersweet (*Celastrus orbiculatus*), multiflora rose (*Rosa multiflora*), black locust (*Robinia pseudo-acacia*), Japanese honeysuckle (*Lonicera japonica*), Russian olive (*Elaeagnus angustifolia*), autumn olive (*Elaeagnus umbellata*), and Japanese barberry (*Berberis thunbergii*). Invasive vegetation control was scheduled for early spring and late fall. The Service hired a licensed pesticide applicator to chemically treat invasive vegetation with Garlon 4 and mechanically remove woody vegetation at Conscience Point, Seatuck, and Wertheim NWRs.

Management included chemical and mechanical removal of invasive black locust, Asiatic bittersweet and autumn olive within 15 acres of a former duck farm. Additionally, derelict structures once serving the duck farm was demolished and the land restored to native grassland/shrubland. Additional habitat restoration, in the form of *Phragmites* control and native plant establishment is planned for Little Neck Run, adjacent to the site.

Expenditures
Total cost = $40,000

Mechanical Treatment of Grassland Habitats
No activities in FY2004.

Expenditures
None

Restoring Habitat through Building Removal
The Refuge received a grant to restore upland habitats adjacent to Little Neck Run on Wertheim's western boundary. The purpose of the project was to remove derelict buildings and treat invasive plant in what was the former Luskowitz duck

farm. The work started during early winter and progressed through the spring. Five buildings were slated for removal. After the chemical treatment and removal of woody vegetation, three more buildings were discovered and are slated for removal by a private contractor for FY2005.

Expenditures
Project cost: $25,000

Photo Monitoring
Refuge personnel established 6 grassland monitoring photo points to document grassland restoration progress at Wertheim. Photos were taken in early August after the 1st Phase of the project was completed. A panoramic view (north, east, south, and west) of the site was taken at each point (Figure 4). The photo points are intended to show visual changes in the grassland over time and not to be the sole basis for future management actions.

Expenditures
Refuge Staff Hours: 4 Hours
Refuge Cost:
GS-9 Step 6 Biologist = $105.00

FY2005 Plans

Invasive Species Control
The grassland restoration project at Wertheim will continue with spot treatment of emerging invasive vegetation species. Refuge staff will conduct spot treatment within the 15 acre FY2004 treatment siteusing Roundup in early spring or late fall. A site survey will follow to determine effectiveness of spot treatment.

Projected Expenditures
Refuge Hours: 24
Refuge Cost:
Equipment Cost: Accounted for in Seatuck's AHWP
Equipment Operator Salary = $190.00
GS-12 Step 1 Biologist = $505.00

Mechanical Treatment of Grassland Habitats
Refuge personnel plan to mow approximately 12 acres of grassland to deter woody vegetation growth. Wertheim NWR has approximately 25 grassland fields of various acreage and size throughout the Refuge. Refuge personnel plan to mow 2 acres at the Wellington, 6 acres off of Old Stump Road, and 4 acres off of Brunnett Lane in February-April of 2005.

Projected Expenditures
Refuge Hours: 24
Refuge Cost:
Equipment Operator = $565.00

Restoring habitat through building removal
The project will continue by removing 3 buildings found during the initial demolition in FY2004. A Liere Brothers Corporation, a private contractor, will be responsible for the work.

Projected Expenditures
Project Cost: $2,500 (An estimate provided by Liere Brothers Corp.)

Photo Monitoring
Refuge personnel will continue to use photo monitoring to document progress and habitat change during the project.

Projected Expenditures
Refuge Hours: 4
Refuge Cost:
GS-9 Step 6 Biologist = $105.00

OBJECTIVE 2 (Nest Box Program):

To implement a nest box monitoring program to provide habitat for cavity nesting songbirds in field-forest ecotone habitats.

FY2004 Activities:

Bluebird Nest Box Program
There are 140 Eastern bluebird boxes on Wertheim NWR. Nest boxes are monitored by volunteers 3 times per year in 1 week intervals. Data collected was entered onto datasheets (Figure 5) for nest boxes included: location, box number, species, use, and comments. Species that used the boxes in 2004 were Eastern bluebirds, tufted titmouse, house sparrows, black-capped chickadees, house wrens, tree swallows, mice, and flying squirrels. No additional information for 2004 is available as data is currently being summarized by a volunteer. Once the information is available it will incorporated.

Expenditures
Refuge Hours: 8 (coordination with volunteers)
Refuge Cost:
GS-9 Step 6 Biologist = $205.00
Volunteer Hours: 140

FY2005 Plans:

Bluebird Nest Box Program
The nest box program will continue in 2005 following the same methods used in 2004 and will rely on volunteers for data collection and summarization.

Projected Expenditures
Refuge Hours: 8 (coordination with volunteers)
Refuge Cost:
GS-9 Step 6 Biologist = $205.00
Volunteer Hours: 140

C. WETLAND MANAGEMENT

GOAL:

Restore the biological health of aquatic habitats to high quality conditions on Wertheim's salt marshes, bays, tidal tributaries, and impoundments to benefit waterfowl and shorebirds, while also supporting other native, wetland dependent species.

OBJECTIVE 1 (Phragmites Management):

Prevent the expansion of *Phragmites australis* by 2007 and reduce its overall distribution to half of 2005 levels by 2015.

FY2004 Activities:

Phragmites Management

Report
In order to understand the changes in *Phragmites* cover at Wertheim over time, an ecologist was hired to examine historical aerial photographs and prepare a report. The study documented changes in the distribution of *Phragmites* at Wertheim NWR from 1974 to 2000. His report showed that in 1974, *Phragmites* covered approximately 155 acres, 245 acres by 1989, and 335 acres by 2000. There were 128 patches in 1974, decreasing to 81 in 1989 and 51 in 2000 as patches coalesced. In the northern portion of the Refuge, shorelines and islands within the main river had become dominated by *Phragmites*, while in the southern part of the Refuge, expansion occurred on shorelines and ditches. From 1974 to 1989 the area covered by *Phragmites* increased approximately six (6.0) acres per year (2.5 ha/year). This rate increased to 8.2 acres per year (3.4 ha/year) from 1989 to 2000.

Expenditures
Document cost $4,950.00.

Pesticide Use
In October 2004, the Service contracted the services of a private company to spot treat 5.5 acres of *Phragmites* with Rodeo within the Big Fish Creek impoundment and 6 acres of *Phragmites* was initially treated in the smaller sub-impoundment (Figure 6). The contractor was a NY-State certified pesticide applicator that specialized in herbicide treatments. A ground-based spraying system was employed, utilizing boom and/or hand-held sprayers from amphibious vehicles. Water levels within the impoundments were reduced to improve access.

Refuge personnel observed improvement in plant diversity and species composition within the Big Fish Creek Impoundment. Before treating the impoundment with Rodeo, dense stands of *Phragmites* had covered 90% of the

impoundment area. Following a single spray-burn-disc cycle, the coverage of *Phragmites* had been reduced to approximately 40%. The newly emerged *Phragmites* plants, sparse and scattered, showed signs of stress and were not fully developed. The native plants re-appeared within the impoundment, covering between 30%-60% of the site. In addition, the species diversity and quantity of shorebirds, wading birds, and waterfowl increased between 50% - 80% since the reduction of *Phragmites* stands.

After the initial treatment of *Phragmites* in the sub-impoundment, Refuge personnel observed approximately 80% dead cane *Phragmites* within the impoundment.

Expenditures
Project Cost: $7,590.00

Mechanical Treatments and Restoration
During the winter months, Refuge personnel disced approximately 20.5 acres of chemically treated *Phragmites* canes. The impoundment and sub-impoundment were disced in January of 2004 when the impoundment was frozen and could support the weight of the tractor. Approximately, 14.5 acres of *Phragmites* canes were disced within the Big Fish Creek impoundment and 6 acres in the sub-impoundment (Figure 7).

After the *Phragmites* spot treatment and burning of Big Fish Creek Impoundment, Refuge and DU personnel established several plots within the impoundment and planted Japanese millet (*Echinochloa crusgalli*), smartweed (*Polygonum spp.*), duck potato (*Sagittaria spp.*), bur-reed (*Sparaganium americanum*), and bulrush (*Scripus robustus*). The purpose of the project was to increase the seed bank of desirable vegetation for wildlife use.

Expenditures
Refuge Hours: 36 hours
Refuge Cost:
GS-9 Step 6 Biologist = $635.00
Equipment Operator = $375.00
Seed cost: $583.00
DU Hours: 60 Hours

FY2005 Plans:

Phragmites Management

Report
The report was completed in FY2004 no additional reports are planned for FY2005.

Pesticide Use

Refuge personnel propose (PUP 2004, Rodeo) to treat dense stands of common reed (*Phragmites australis*) with Rodeo along two freshwater creeks (i.e., Yaphank and Little Neck Run) at Wertheim NWR. These creeks are tidal tributaries of the Carmans River. A licensed pesticide applicator will be hired to chemically treat approximately 1.9 acres along Yaphank Creek and 4.4 acres along Little Neck Run, where dense stands of *Phragmites* interface with the natural plant communities (Figure 8). The headwaters for each creek provide wintering habitat for black ducks, green-winged teal, gadwall, and American widgeon and breeding habitat for wood ducks and mallards.

The purpose of the project is to control further encroachment of *Phragmites* into areas with native vegetation thereby allowing native vegetation to flourish and providing for the needs of marsh-dependent wildlife. Since 1974, *Phragmites* has rapidly encroached upon the shorelines and ditches of the Carmans River and its tributaries. Based on an analysis of historic aerial photographs, *Phragmites* has recently invaded the proposed project area. Given the recentness of the invasion, we believe such a treatment is particularly opportune. These creeks are the most attractive areas on the Refuge for waterfowl and this project will enhance this standing. The project is scheduled to commence between September 1 and October 15 of 2005.

An additional 15 acres of Phragmites (Figure 9) will be treated on the south side of the impoundment along the impoundment road. Treatment of this stand will prevent further growth of Phragmites in the impoundment. Refuge personnel propose to spot treat re-growth of *Phragmites* with Rodeo® in its two freshwater impoundments as part of an ongoing restoration project.

For each *Phragmites* project, the Service will contract the services of a private contractor that specializes in herbicide treatments. *Phragmites* will be treated with one application of Rodeo between September 1 and October 15. Dead canes will be burned, mowed, and/or disced during the winter or in some cases allowed to decay naturally. Rodeo will be applied in accordance with label directions by a NY-State certified pesticide applicator. The contractor will employ a ground-based spraying system utilizing boom and/or hand-held sprayers from amphibious vehicles and/or boats.

In areas along the creeks where native desirable plants and *Phragmites* canes interface, the contractor will use the wipe/wick method to treat individual *Phragmites* canes, and in areas with dense canes of *Phragmites*, the contractor will use the broadcast method. For the easy accessibility in the impoundments, low water levels will be maintained during *Phragmites* treatment.

Allied Biological has supplied an estimate for work based on number of acres sprayed in certain habitats (Appendix O).

Projected Expenditures
Project Cost: $16,000 (Funds available through a 10-year RONS project)

Mechanical Treatments and Restoration
No activities are planned for FY2005.

OBJECTIVE 2 (Impoundment Management):

Manipulate impoundment water levels to maximize production of waterfowl, shorebird, marsh and wading bird food plants during the growing season. Provide exposed moist soil conditions covering 50% of each impoundment to provide feeding areas for shorebirds in the spring and fall migration periods.

Maximum water surface elevations for each impoundment were determined by considering the levels most beneficial to waterfowl and other wildlife. Full pool level, as compared to maximum level, generally represents maximum feeding depths for dabbling ducks and geese. A staff measurement gauge has been installed on the water control structure in the impoundment. The staff gauge is affixed directly to the structure to preclude damage or movement during winter icing and storm events.

FY2004 Activities:

Impoundment Water Levels
Drawdown was initiated on March 29 for spring shorebird migration. Water levels varied between 2 and 3 feet at the measurement gauge from March through October and varied considerably throughout the impoundment. On October 13 boards were placed in the water control structure to provide habitat for overwintering dabbling ducks and geese. No information is available on gauge readings after October 13.

Expenditures
Refuge Hours: 16
Refuge Cost:
GS-12 Step 1 Biologist = $505.00

Bird Monitoring
No shorebird or waterbird surveys conducted only anecdotal observations. Species observed during the winter included: ring-necked ducks, northern shoveler, green-wing teal, black ducks, mallards, and pintails. On April 7, 2004, ~1,200 ducks were observed using the impoundment. May 7, 2004 was the only date shorebirds were recorded using the impoundment. During this time, unidentified peeps and dunlin were observed with water level gauge readings of 2.1 ft.

Marshbirds
Marshbird surveys will be conducted and will continue to follow the Region 5 Marshbird Survey Protocol (Appendix P). Datasheets and maps for the project are located in Appendix P.

There are 2 marshbird survey routes, the Wellington Marsh, and the impoundment/sub-impoundment marsh. An additional route along the Carmens River was dropped because it required a licensed boat operator. There are 10 survey points per route. The points are identified with white PVC pipe less than a ½" wide, approximately 3 feet tall with red tape on the top. Each pipe is numbered with the corresponding number on the maps provided. Survey points along the impoundment and sub-impoundment need to be checked the day prior to the survey as trespassers on the Refuge have been known to remove survey stakes from their locations. During the 2004 field season, Ducks Unlimited interns conducted marshbird surveys.

During the surveys, 41 species were recorded in marsh habitats during mid to late June. Dominant species were saltmarsh sharp-tailed sparrows, red-winged blackbirds, European starlings, common grackles, barn swallows, and tree swallows. No federal or state threatened or endangered species were recorded. The following species were ranked in Partners in Flight's Priority species for southern New England: saltmarsh sharp-tailed sparrows as a 'high continental priority-high regional responsibility', American black ducks as a 'high regional threat', and osprey as threatened in New York. Other marshbirds recorded during surveys were Virginia rails, snowy egrets, black skimmers, killdeer, willets, great egrets, willow flycatchers, and a great-blue heron.

Expenditures
Refuge Hours: None
Refuge Cost: None
Volunteer Hours: 40

Vegetation Monitoring
No surveys conducted and no anecdotal observations.

FY2005 Plans:

Impoundment Water Levels
Gradual dewatering will be initiated in March 1 to aid in water removal for spring shorebird migration. A shallow water depth of no greater than 4 inches will be maintained for shorebirds.

Gradual reflooding of the impoundment, through available rainfall, will begin in September. Full pool level should be accomplished by November 15 and maintained until the following spring drawdown.

Projected Expenditures
Refuge Hours: 24
Refuge Cost:
GS-12 Step 1 Biologist = $755.00

Bird Monitoring

Shorebirds
Weekly shorebird surveys will begin March 15 and continue to October 15, until the Refuge is able to determine peak shorebird use. Four survey points will divide the impoundment into quadrants with visual delineations between points. The survey points will be located on the impoundment road and placed to maximize observation of the entire impoundment. The surveys will be conducted once a week and the total number of birds and species seen will be recorded during a 10 minute interval at each observation point. Datasheets and maps are located in Appendix Q.

Projected Expenditures
Refuge Staff Hours: 33 survey hours (based on 2.5 survey hours per week for 13 weeks)
Refuge Cost*: GS-9 Step 6 = $834.57
*Ducks Unlimited, depending on funding, may have 2 interns available to assist with surveys

Marshbirds
Marshbird surveys will be conducted starting the May 15 and ending June 30 following the Region 5 Marshbird Survey Protocol and will be conducted at the impoundment and Wellington marsh. All survey points will be GPSed during surveys and entered into an ArcGis project file.

Projected Expenditures
Staff Hours: 20
Refuge Cost:
Salary: GS-9 Step 6 = $505.00

Waterfowl
Weekly waterfowl surveys will be conducted from March 15 through March 15, until peak use is determined, at the observation points established for the shorebird surveys. During periods where surveys overlap with shorebird surveys, both surveys will be conducted simultaneously. During March 15- The surveys will be conducted once a week between sunrise and 10:00. The total number of birds and species seen will be recorded for a 10 minute interval at each observation point. Datasheets are located in Appendix R.

Projected Expenditures
Refuge Staff Hours: 16 monitoring hours
Refuge Cost*:

GS-9 Step 6 = $404.64
GS-12 Step 1 = $502.88
Total = $907.52
*Ducks unlimited, depending on funding, may have 2 interns available to assist with surveys

Vegetation Monitoring
To determine whether we are establishing and maintaining desirable forage and cover plants for shorebirds and waterfowl a vegetation monitoring program will be implemented this year and continue every year the Refuge conducts the impoundment management program. Thirty $1m^2$ sampling plots will be randomly assigned within the impoundment area. Each plot will be sampled during June before plants go to seed. Dominant species in each plot will be recorded following the vegetation protocol and using Datasheet 1 located in Appendix S. All species will be counted within the sampling plot, plants will be recorded to species, and percent cover estimates will be obtained for all species.

Projected Expenditures
Refuge Staff Hours: 16 monitoring hours
Refuge Cost*:

GS-9 Step 6 = $404.64
GS-12 Step 1 = $502.88
Total = $907.52
*Ducks unlimited, depending on funding, may have 2 interns available to assist with surveys

OBJECTIVE 3 (Saltmarsh sparrow Monitoring):

Enhance saltmarsh sharp-tailed sparrow (SSTS) and seaside sparrow (SESP) habitat, establish permanent survey locations to assess current species locations, and track population trends on Service lands.

FY2004 Activities:
Point counts were conducted for saltmarsh birds following Region 5 protocol (Appendix T) during the second week of June and the first week of July in 2004. There are a total of 4 routes surveyed with route 1 containing 5, route 2 containing 5, route 3 containing 3, and route 4 containing 4 point count locations. Point counts were conducted from sunrise to 11 a.m. for 10 minutes and repeated 3 times throughout the season. Birds were recorded from 0-50 m, 50-100m, and outside 100m. Surveys were conducted by Ducks Unlimited personnel.

During the surveys, 31 species were recorded during saltmarsh surveys. Dominant species recorded were marsh wrens, red-winged blackbirds, seaside

sparrows, common grackles, and tree swallows. The following species recorded are ranked in Partners in Flight's Priority species for southern New England: saltmarsh sharp-tailed sparrows and seaside sparrows as a high continental priority-high regional responsibility, common tern and osprey as threatened in New York. Other birds recorded using saltmarshes on the Refuge include: yellow warblers, killdeer, great egrets, willets, great black-backed gulls, herring gulls, double-crested cormorants, gadwall, American kestrels, and little terns.

Expenditures
Refuge Staff Hours: 8 – Accounts for contract maintenance with DU, allocating funds, survey coordination with DU, and project summarization for AHWP
Refuge Cost: Surveys conducted by Ducks Unlimited personnel through a contractual agreement with the Refuge
GS-12 Step 1 = $251.44

FY2005 Plans:
Saltmarsh bird surveys will continue following the same protocol as outlined in FY2004. Ducks Unlimited personnel will continue to conduct surveys as long as the contractual agreement exists.

Projected Expenditures
Refuge Staff Hours: 8 – Accounts for contract maintenance with DU, allocating funds, survey coordination with DU, and project summarization for AHWP
Refuge Cost: Surveys conducted by Ducks Unlimited personnel through a contractual agreement with the Refuge
GS-12 Step 1 = $251.44

OBJECTIVE 4 (OMWM Project):

Conduct the OMWM demonstration project to monitor and learn the biotic effects of marsh management on the Refuge and surrounding marshes. Reduce mosquito breeding sites and restore wetland hydrology, plant diversity, and wildlife habitat.

Refuge personnel are participating in a new OMWM demonstration project sponsored by Suffolk County Vector Control and Suffolk County Health Department. The proposed project will examine the marsh dynamics and detail the effectiveness of different marsh treatments in controlling mosquitoes. The bulk of the study will be conducted in Wertheim's Eastern marsh. This project consist of two phases: 1) Biological Monitoring-Refuge personnel, SCVC personnel, and Ducks Unlimited personnel will set up and established monitoring sites on Wertheim's East Marsh; 2) Conduct wetland restoration project with portions of the East marsh to reduce mosquito breeding habitat.

FY2004 Activities:

OMWM Project Background

During the 1930's a large percentage of the Long Island's marshes was grid ditched by Vector control to control mosquito populations. This method reduced marsh hydrology, vegetation biodiversity (established monotypic plant communities like *Phragmites, Spartina patens, and Spartina alterniflora*), and degraded habitat for migratory birds. During the 1980's and 1990's many of the grid ditches on the Refuge were plugged to restore wetland hydrology and fish habitat, and improving the wetlands for migratory waterfowl, waterbirds, and shorebirds. Although, plugging the ditches help with controlling mosquito breeding in the tidal saltmarshes areas, it was inefficient in controlling mosquitoes in areas near the brackish upland marsh and maintaining adequate fish habitat during low tides and droughts.

A team consisting of Service personnel, experts from Ducks Unlimited, Suffolk County Vector Control, Suffolk County Department of Health Services, Stony Brook University, Cashin and Associates, and U.S. Geological Survey reviewed aerial photography, mosquito breeding maps, topographic surveys with elevations, and salinity data to purpose the following alterations for two areas, designated Area 1 and Area 2 (Figure 10), at Wertheim NWR. The proposed alterations to these marshes included the addition of tidal creeks, tidal channels, shallow spurs, sill channel and ponds. In addition, many of old grid ditches will be filled, and some mosquito-breeding depressions will be re-graded using materials excavated during pond construction. These alterations are recommended based on existing hydrology, vegetation, habitat needs for fish and wildlife, existing mosquito breeding sites and anticipated new breeding sites that would develop once the marsh hydrology is restored.

OMWM Project

In order to detect impacts from the OMWM construction projects, pre-project environmental monitoring was undertaken to establish a data baseline. Similar monitoring will be conducted post-construction to assess any changes resulting from the project. Refuge personnel and DU interns set-up monitoring transects for the new OMWM demonstration project in the Refuge's East marsh. Comparative data on mosquito breeding locations will be collected from the Refuge's West marsh and Seatuck's saltmarshes. The Refuge East marsh was divided into four study areas, Area 1 approximately 39.5 areas in size, Area 2 approximately 46.6 acres in size, Area 3 approximately 30.2 acres, and Area 4 approximately 47.8 acres which Refuge personnel and DU interns started baseline data monitoring. The study included monitoring soil salinity, well depth, vegetation biomass, invertebrate sampling, fish (Nekton sampling), bird usage, water salinity, and mosquito breeding locations (Figure 11). Refuge personnel and DU interns used monitoring protocols established by USFWS/USGS for OMWM studies. Also included in the study was the determination of groundwater flow within the

eastern section of the Refuge. Groundwater wells were drilled and capped randomly throughout the eastern section of the Refuge and monitored for the freshwater/salinity interface.

Expenditures
Refuge Hours: 210 Hours
Refuge Cost: $3500
DU/Cashin Associates/SCVC: Hours Unknown
DU/Cashin Associates/SCVC Cost: Unknown

Mosquito Monitoring
As part of the study, Refuge personnel and personnel from Ducks Unlimited and Suffolk County Vector Control collected data on mosquito breeding habitats within Wertheim's East and West marshes and comparative data from Seatuck saltmarshes. Using a palm pilot with a GPS (Global Positioning System) unit attached, Refuge personnel documented mosquito breeding, intermit breeding, and non-breeding areas (Appendix K). Mosquito larvae surveys were conducted weekly from May through September. If mosquito breeding exceeds 0.2 larvae per dip in established marsh locations, the marsh would be treated with larvicide (primarily with methropene) to reduce adult mosquito emergence. At the end of the mosquito breeding season, a map showing the mosquito breeding and non-breeding areas was created by SCVC (Figure 12).

Expenditures
Refuge Staff Hours: 66
Refuge Cost:
GS-9 Step 6 Biologist Salary = $1670.00
Biological Intern = $660.00
Total = $2,330.00
DU/SCVC Intern Hours: 178 Hours
DU/SCVC Cost: Unknown

FY2005 Plans:

OMWM Project
Refuge and DU personnel will continue to collect data for the OMWM Demonstration Project. Intense data collection is planned in support of future OMWM studies of the East Marsh. Data will be collected on invertebrate biomass, bait fish diversity, vegetation composition, water and soil salinity, and groundwater flow through the eastern sections of the Refuge (Figure 11).

The following is a summary of the proposed FY2005 Plans for the Wertheim East Marsh wetland restoration project as stated from the Suffolk County Vector Control and Wetlands Management Long-Term Plan: Wertheim Open Marsh Water Management (OMWM) Demonstration Project (Appendix U). The summary discusses the changes to the marsh in Area1 and 2 and the benefit of

those changes. Areas 3 and 4 will remain biological monitoring sites for comparative data.

Area 1 is approximately 39.5 acres and is characterized by widespread mosquito breeding and a high proportion of *Phragmites*. The creation of more natural water features, such as tidal creeks and pond, will facilitate better movement of water and allow fish access to mosquito breeding sites. In this area, a perimeter channel will be constructed along the *Spartina/Phragmites* interface on the eastern side to allow fish passage into mosquito breeding sites that are concentrated along the upland edge of the marsh. The channel is also intended to draw freshwater from this upland *Phragmites* area. The tidal channels will provide habitat for estuarine fish and invertebrates that normally utilize natural tidal creeks. The ponds will be inhabited primarily by typical high marsh fauna, such as killifish, but will have exchange with the estuarine system via sill channels and/or through periodic flooding.

In Area 1 there will be 11 ponds constructed with varying dimensions to attract certain bird species, such as black ducks, migratory waterfowl, and shorebirds. Total acreage of the 11 ponds is approximately 1.48 acres. The depth of the ponds will be shallow with a deeper sump approximately 2-3 feet in the middle, which allows fish to escape predators. The ponds will have gradually sloping sides towards the edges allowing access for fish and birds, and to support emergent vegetation. In addition, nine of the eleven grid ditches that are not needed for fish habitat will be filled using material from pond construction, and some mosquito-breeding depressions will be eliminated by back-blading material from the ponds over these areas (Figure 10).

Area 2 consists of approximately 46.6 acres and is characterized by having less *Phragmites* than Area1 and an increase abundance of low and high marsh vegetation. There are also fewer mosquito-breeding sites than in Area 1. The proposed plan calls for filling in ten of the eleven ditches in this area, essentially restoring vegetation lost due to pond construction. An existing perimeter channel on the east side of this area will be extended. The plan proposes twelve ponds ranging in size to attract black ducks, migratory waterfowl, and shorebirds. Total acreage of the twelve ponds is approximately 1.28 acres (Figure 11). Some of the mosquito-breeding depressions will be eliminated by back-blading material from the pond into the depressions.

Equipment for the Project:
Equipment needed for the project includes: 2 amphibious excavators used primarily to excavate ponds and tidal channel, and will be particularly useful along the soft, upland edge of the marsh; 2 low ground pressure excavators will be used primarily for pond and tidal channel construction where fine grading is required; 2 rotary ditchers, one with a 23 inch cutter, to be used to produce shallow sill or spur ditches 6-8 inches in depth and approximately 20 inches wide, and a 36 inch cutter head to cut or dig tidal channels and some of the fish

reservoirs; and 2 dump/grader carriers will be used primarily to transport material excavated during pond construction to areas where ditches will be filled. The dump carriers will also be used to back blade materials from the ponds to fill in mosquito breeding depressions. The dump carriers have a 12-way blade mounted on the front vehicle that will be perfect for manipulating and filling in mosquito breeding depression and smoothing out the marsh.

The OMWM Demonstration Wetland Restoration Project is scheduled to start February 2005 and continue through March 2005. Construction will take place while marsh vegetation is dormant and disturbance of wildlife is minimal. Estimated time for completion of the project is 2 months depending on weather conditions and equipment availability. Suffolk County Vector Control will be responsible for most of the construction work in the marsh, and Refuge personnel will supervise the work on daily basis to ensure the quality and safety of the work.

Projected Expenditures
Refuge Hours: 240 Hours
Refuge Cost: $8000
SCVC Hours and Cost: Unknown at this time

Mosquito Monitoring
Mosquito breeding surveys will be conducted in Wertheim's East and West Marshes following established protocols and the results will be supplied to the SCVC. If significant mosquito breeding occurs in the marshes, SCVC will be given permission to the treat only the areas with breeding. Mosquito breeding surveys will be conducted from May to September.

Projected Expenditures
Refuge Hours: 276
Refuge Cost: $7600
DU/Cashin Associates/SCVC Hours: Unknown Hours

OBJECTIVE 4 (Marshbird Nesting Structures):

To provide nesting habitat for marsh nesting birds, wood ducks and osprey.

FY2004 Activities:

Osprey Nesting Platform Program
There are 5 osprey platforms on Wertheim NWR. Platforms are monitored by Refuge biological staff and seasonal interns. There is no established monitoring program or datasheets only anecdotal observations are made for each platform. In 2004, all 5 platforms were used for nesting. One platform had a video camera installed to show the progress of osprey hatchlings and their behaviors. This can be viewed yearly at http://puleston.osprey.bnl.org/. It is unknown how many

platforms successfully fledged young, with the exception of the osprey camera platform which fledged 2 young.

Expenditures
None, observations made while Refuge personnel are conducting work on other projects.

Wood Duck Nest Box Program
The nest box program is conducted in collaboration with Project SOAR volunteers, Ducks Unlimited personnel, and South Shore Waterfowlers Association members. Monitoring occurs once per year in January-February when the ground is frozen and water is iced over to facilitate access to boxes. It takes 5 days to monitor the wood duck nest boxes. Information collected during surveys includes: box number, location, number of membranes, number of unhatched eggs, other wildlife use, and maintenance needs and comments (Figure 13). There are 180 wood duck boxes on the Refuge however only 86 boxes are monitored. The remaining 94 boxes either cannot be located or need major repair. Of the 86 monitored boxes, only 38 boxes were used by nesting wood ducks with 25 boxes successfully hatching wood ducks. This gives the wood duck boxes a 66% success rate. An additional 23 boxes were used by raccoons, mice, squirrels, and one Eastern screech owl.

Expenditures
Refuge Hours: 56
Refuge Cost:
GS-9 Step 6 Biologist Salary = $1420.00
Volunteer Hours: 40

FY2005 Plans:

Osprey Nesting Platform Program
Incidental observations will continue in 2005 for the 5 existing osprey platforms. Currently, monitoring protocols and datasheets do not exist for the program. One platform off of the White Oak Nature Trail needs is leaning and needs to be repaired. A video camera will continue to document the progress of osprey hatchlings and their behaviors at 1 platform.

Projected Expenditures
Refuge Hours: 16
Refuge Cost:
GS-9 Step 6 Biologist Salary = $205.00
Equipment Operator and Maintenance Worker Salary = $190.00
Materials and Equipment = $100.00
Total: $495.00

Wood Duck Nest Box Program
The nest box program will continue in 2005 with the assistance of Project SOAR volunteers, Ducks Unlimited personnel, and South Shore Waterfowlers Association members. Of the 86 boxes that are monitored on the Refuge, 45 boxes need repair. Prior to the 2005 nesting season, these 45 boxes will be replaced or repaired on site. The remaining 94 boxes currently not be monitored are slated for removal this year.

Projected Expenditures
Refuge Hours: 56
Refuge Cost:
GS-9 Step 6 Biologist Salary = $1420.00
Volunteer Hours: 40

OBJECTIVE 5 (Amphibian Monitoring):

To document and protect amphibian and reptile populations and restore their habitats on Refuge lands.

FY2004 Activities:

Vernal Pool Egg Mass Monitoring
No surveys were conducted in FY2004.

Expenditures
None

Anuran Call Counts
No surveys were conducted in FY2004. However, past surveys were conducted on the Refuge following the Region 5 Anuran call count protocol.

Expenditures
None

Future Research
No research projects or needs identified in FY2004.

Expenditures
None

FY2005 Plans:

Vernal Pool Egg Mass Monitoring
Vernal pools will be monitored in the spring during egg laying periods for wood frogs and spotted salamanders following J. A. Alvarez's protocol (Appendix V) for monitoring California tiger salamanders. This involved creating artificial

structures, called oviposition grids, for frogs and salamanders to lay their eggs on. This project will be conducted by Valerie Titus, a graduate student that is volunteering her expertise on amphibian monitoring and research. The oviposition grids will be constructed as part of an Eagle Scout volunteer project.

Projected Expenditures
Refuge Hours: 8 (Biologist coordination with volunteer)
Refuge Cost:
GS-9 Step 6 Biologist = $205.00
Equipment (PVC piping and netting) = $300.00
Total: $505.00
Volunteer Hours: 40

Anuran Call Counts
Anuran call count surveys will follow the Region 5 Anuran Call Count protocol and addendum (Appendix W). Any changes to the protocol are outlined in the addendum along with new datasheets. The survey period will run from March 1, 2005 to June 1, 2005. These dates are based on a phrenology graph for anuran calls in New Jersey, which has similar calling start dates and peaks to Long Island.

Projected Expenditures
Refuge Hours: 52 hours (based on surveying once per week in 4 hour intervals)
Refuge Cost:
GS-9 Step 6 Biologist = $1,315.00

Future Research
Amphibian and reptile research needs were identified for future work on the Refuge. These research needs are located in Appendix X.

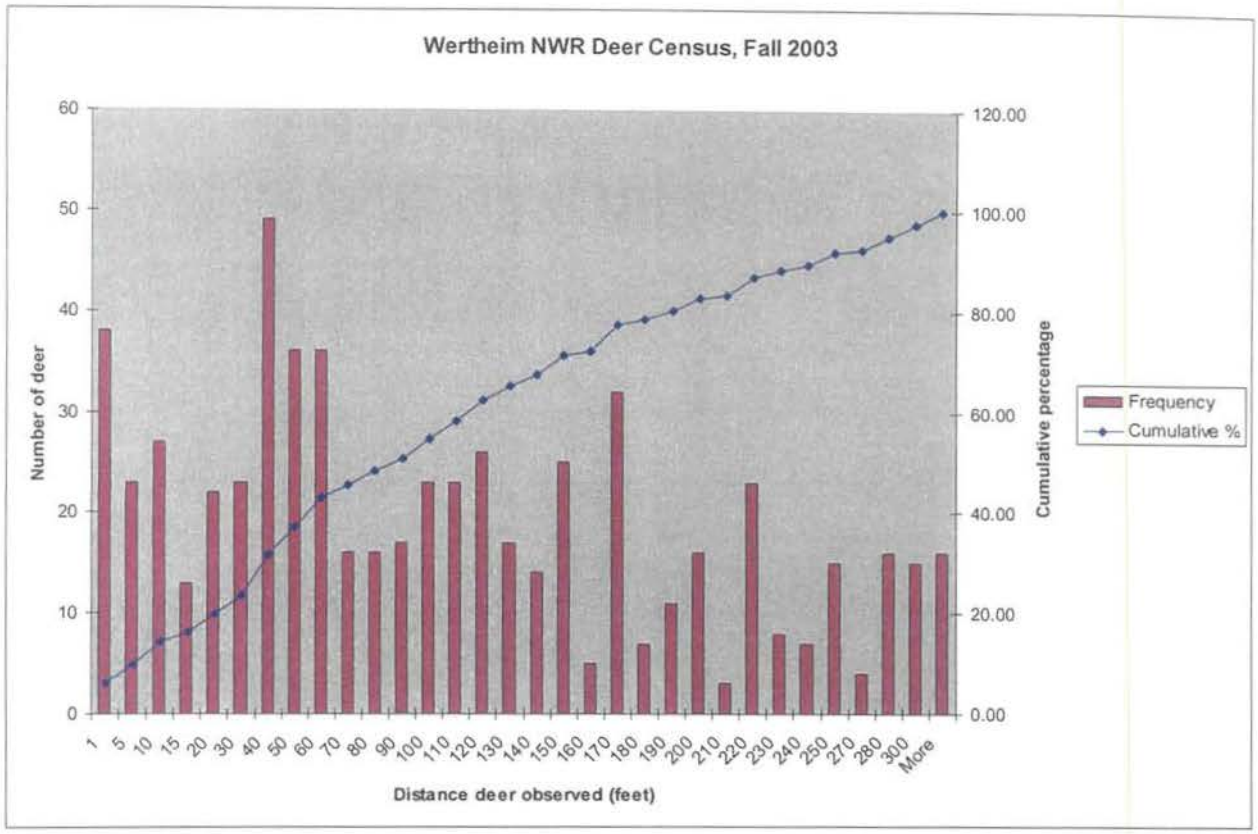
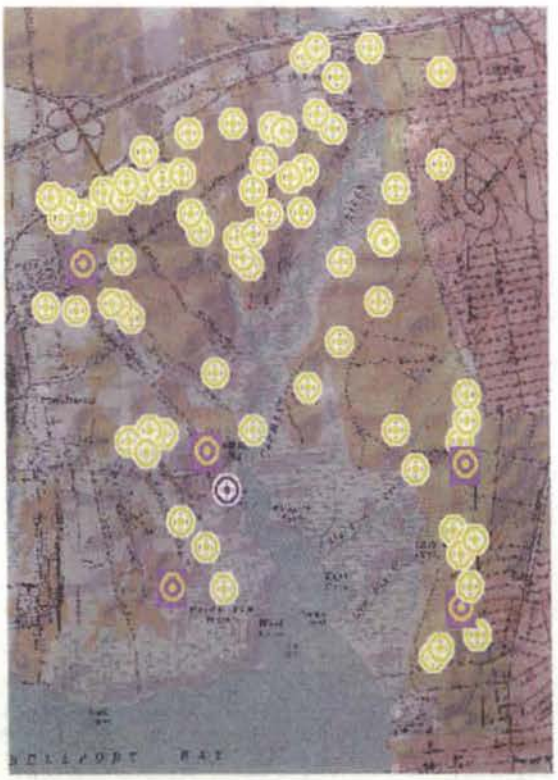
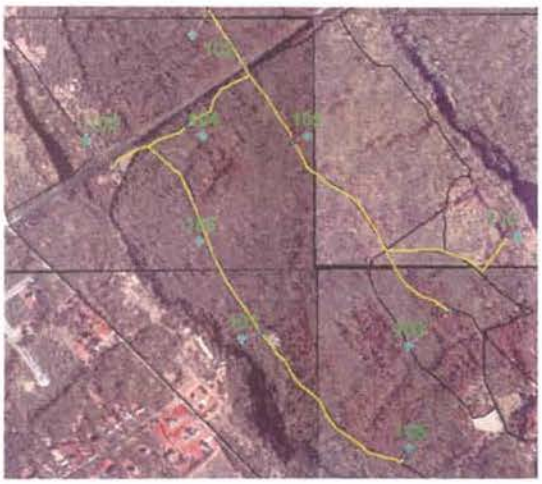


Figure 1: Deer Observation/Frequency Graph: Results from the vehicle-based white-tailed deer survey count conducted during the fall of 2003 (FY2004). Refuge personnel recorded the number of deer and distance observed from the road to statistically determine deer densities.

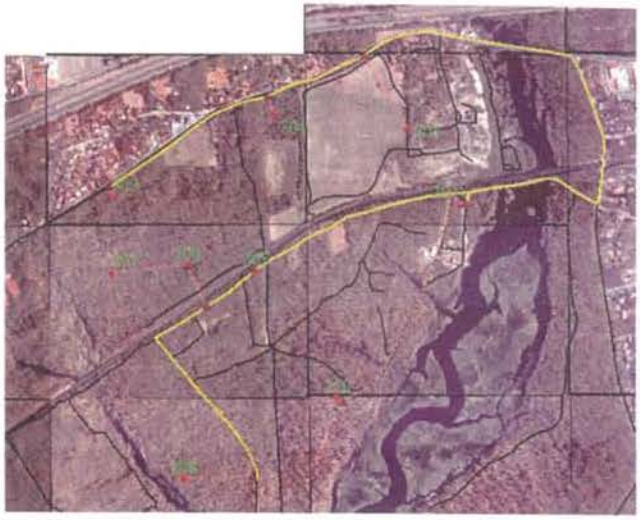
Figure 2 . Deer groups located on Wertheim National Wildlife Refuge during the FLIR survey in February 2004. Yellow targets are deer groups. Pink highlighted targets are deer groups with video footage attached.



WERTHEIM NWR: LANDBIRD BREEDING MONITORING ROUTES



Landbird Survey Route 100



Landbird Survey Route 200

Landbird Survey Route 300

Landbird Survey Route 400

Figure 3: The four Region 5 landbird breeding bird survey routes with survey points used by Refuge personnel and expert birders since FY2001 to record forest nesting bird activities.

Figure 4: Locations of Wertheim Grassland Restoration photo monitoring points

FIGURE 5.

Songbird Nest Box Monitoring

Refuge: ______________ Date: ______________ Observer: ________________________

Box Location	Box Number	Easting	Northing	Use	Comments?

Wertheim National Wildlife Refuge

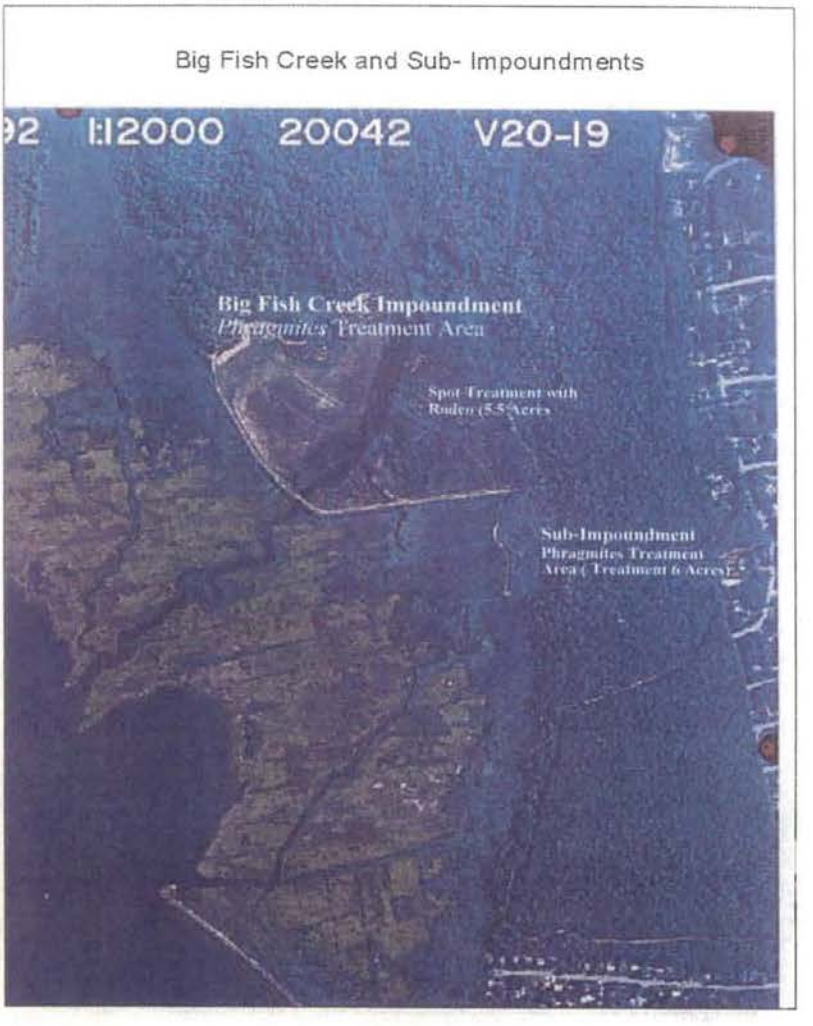


Figure 6: Wertheim's Big Fish Creek and Sub-impoundments, *Phragmites* treatment areas.

Figure 7: Areas within the impoundments were dead canes of *Phragmites* (treated with Rodeo in October 2003) were disced in January 2004.

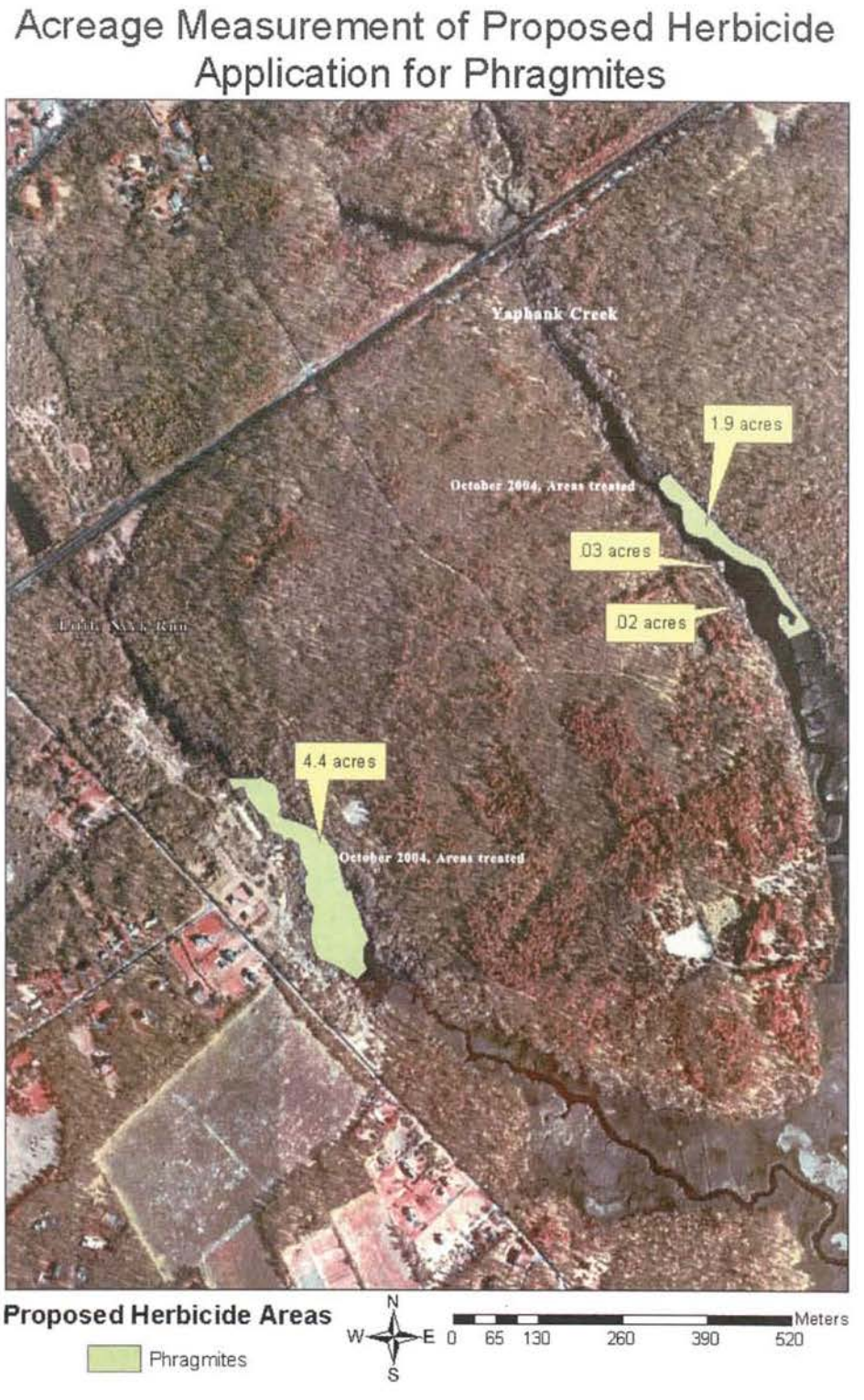


Figure 8: Areas with dense stands of *Phragmites australis* along Yaphank Creek and Little Neck Run scheduled to be treated with Rodeo during FY2005.

Figure 9. Shorebird and waterfowl survey locations at Big Fish Creek Impoundment, Wertheim NWR.

WERTHEIM NWR: EAST MARSH
Proposed OMWM Demonstration Wetland Restoration Project Areas 1 & 2

Figure 10: Maps showing the proposed alterations to Areas 1 and 2 of Wertheim's East Marsh which includes filling in mosquito ditches, creating tidal creeks, grading mosquito breeding depressions, and creating fish reservoirs. (Photos by SCVC and Cashen & Associates)

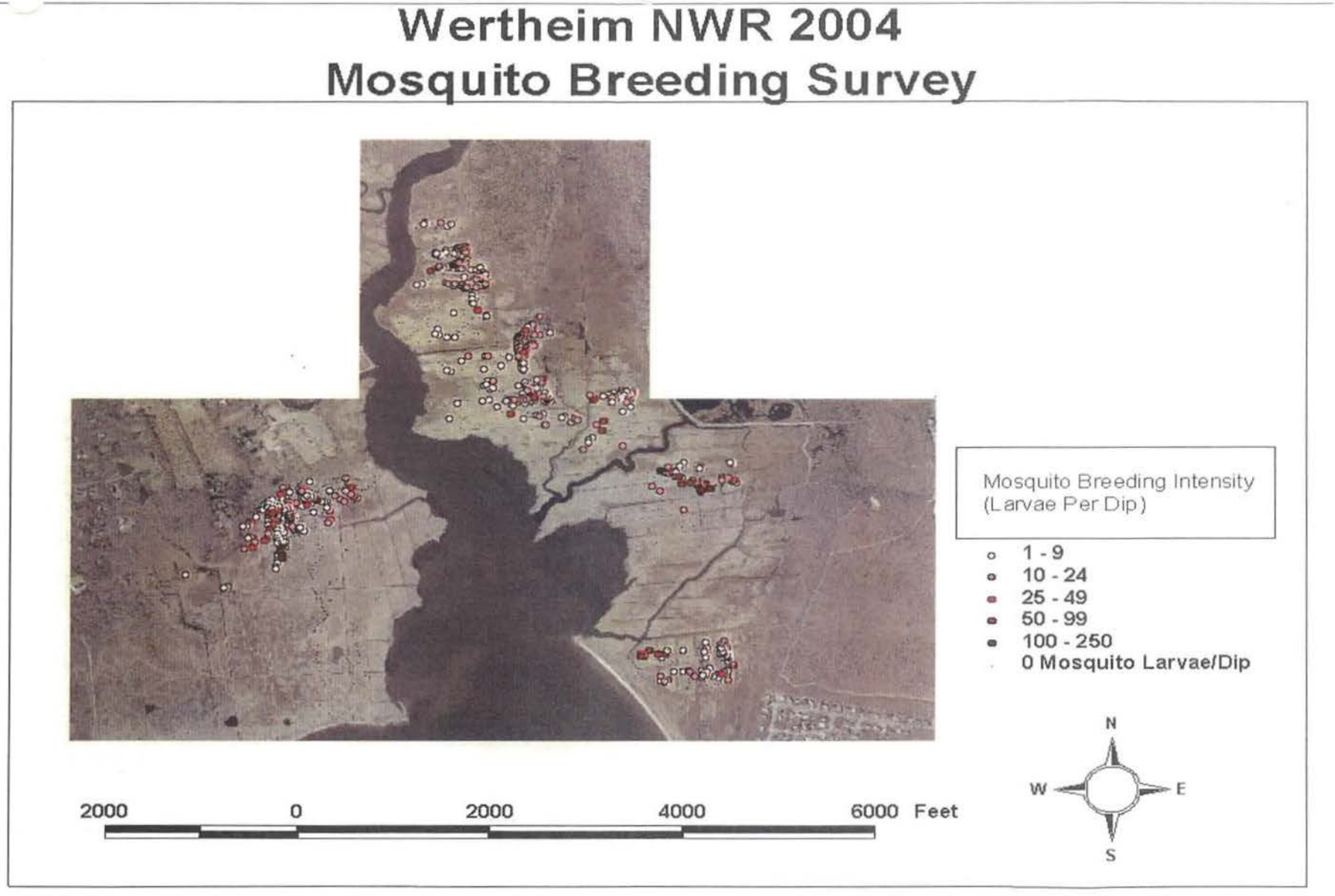


Figure 12: Locations of mosquito breeding and non-breeding sites at Wertheim NWR East and West Marshes.

Wood Duck Box Monitoring

Date: _____ Participants: _____

Wood Duck Box Location Upper, Lower Carmans, impoundment, Creeks, other	Box Number	Easting (GPS)	Northing (GPS)	Number of Membranes	Number of unhatched eggs	Other wildlife Use	Maintenance needs and comments