V. IMPLEMENTATION SCHEDULE

The following implementation schedule outlines actions and estimated costs for this draft recovery plan. It is a guide for meeting the objectives discussed in Chapter III. This schedule describes and prioritizes actions, provides an estimated timetable for performance of actions, indicates the responsible agencies, and estimates costs of performing actions. These actions, when accomplished, should further the recovery and conservation of the covered species.

Key to terms and acronyms used in the Implementation Schedule:

Definition of action priorities:

Priority 1- an action that must be taken to prevent extinction or to prevent a species from declining irreversibly in the foreseeable future.

Priority 2 - an action that must be taken to prevent a significant decline in the species *population*/habitat quality or some other significant negative impact short of extinction.

Priority 3 - all other actions necessary to meet recovery or conservation objectives.

The numeric recovery priority system follows that of all U.S. Fish and Wildlife Service recovery plans. Some relatively long-term actions, such as *tidal marsh* restoration, may be assigned Priority 1 where they are needed to stabilize and secure *populations* or ecological functions undergoing degradation. Because of the long lead time for "immediately" needed habitat-stabilizing actions, restoration actions which must be initiated as soon as possible to avoid collapse of essential *populations* or habitat for recovery are assigned Priority 1. Actions are labeled Priority 2 if they are needed for full recovery of listed species or to prevent the decline or local extinction of species with conservation significance which occur in *tidal marsh* ecosystems.

Where an action involves several species, the recovery/conservation priority number reflects both the needs of the individual species and that of the broader suite of species. Because situations change over time, priority numbers must be considered in the context of past and potential future actions at all sites. Therefore, the priority numbers assigned are intended to guide, not to constrain, the allocation of limited conservation resources.

Definition of action durations:

Continual - An action that will be implemented on a routine basis once begun.

Ongoing - An action that is currently being implemented and will continue until action is no longer necessary.

Unknown - Either action duration or associated costs are not known at this time.

Total costs:

TBD - to be determined

Responsible Parties:

ALL-	All Applicable Entities
AUD-	Audubon Society
CDFG -	California Department of Fish and Game
CDPR-	California Department of Parks and Recreation
CNPS -	California Native Plant Society
CONS-	Land Conservation Organization
DOD -	Department of Defense (Includes U.S. Army Corps of Engineers)
DWR -	Department of Water Resources
GGNRA-	Golden Gate Naitonal Recreation Area
ISP-	Invasive Spartina Project
LOC-	County, City or Other Local Government
MAD-	Mosquito Abatement District
MBNEP-	Morro Bay National Estuary Program
NRCS-	Natural Resource Conservation Service
OWN -	Agency or organization that administers or owns each site
PORT O-	Port of Oakland
PORT SF-	Port of San Francisco
PRBO-	PRBO Conservation Science
PVT-	Private Contractor
RWQCB-	Regional Water Quality Control Board
SFBNWR-	San Francisco Bay National Wildlife Refuge
SFBO-	San Francisco Bird Observatory
SFEI-	San Francisco Estuary Institute
SLT-	Solano Land Trust
STO -	Organization to Store/Propagate Seeds or Cysts (*e.g.*, Rancho Santa Ana Botanic Garden)
SLC -	State Lands Commission
TEAM-	Tidal Marsh Recovery Team
UFID-	Utility, Flood or Irrigation District
UNIV -	University
USFWS-	U.S. Fish and Wildlife Service
USGS-	U.S. Geological Survey

Responsible parties are those agencies who may voluntarily participate in any aspect of implementation of particular tasks listed within this draft recovery plan. Responsible parties may willingly participate in project planning, funding, staff time, or any other means of implementation.

* - Lead Agency

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
1	1.1	Maintain underlying ecosystem processes and functions.	Ongoing	ALL	TBD	-	-	-	-	-	
2	1.2.1.1	Acquire/protect currently unprotected Zone 1 and Zone 2 *tidal marsh* habitat.	Until recovery criteria are met	**USFWS,** CDFG	380,000	-	-	-	-	-	Maximum cost, based on fee title acquisition of approximately 38K acres of unprotected *tidal marsh* multiplied by $10K/acre (average price paid over last 10 years for salt ponds in San Francisco Bay)
2	1.2.1.2	Investigate opportunities to acquire/protect Zone 1 and Zone 2 lands restorable to *tidal marsh* ("potential restoration" in **Figures III-7-III-32**).	Until recovery criteria are met	**USFWS,** CDFG	TBD	-	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	1.2.2	Acquire/protect currently unprotected Zone 1 and Zone 2 high *marsh* and ecotonal habitat and land restorable to high *marsh* and ecotonal habitat for *Cordylanthus mollis* ssp. *mollis, Cirsium hydrophilum* var. *hydrophilum* and salt marsh harvest mouse by purchase of fee title or conservation easement.	Until recovery criteria are met	**USFWS,** CDFG	46,940	-	-	-	-	-	Maximum cost, based on fee title acquisition of approximately 4,694 acres of unprotected high *marsh*/ecotonal habitat multiplied by $10K/acre (average price paid over last 10 years for salt ponds in San Francisco Bay)
3	1.2.3	Acquire/protect currently unprotected habitat for *Suaeda californica.*	Ongoing	**USFWS,** CDFG, CDPR	0	-	-	-	-	-	No cost if accomplished through management partnerships.
2	1.2.4	Acquire/protect habitat for *Cordylanthus maritimus* ssp. *maritimus.*	Until recovery criteria are met	**USFWS,** CDFG, CDPR, MBNEP	0	-	-	-	-	-	No cost if accomplished through management partnerships.

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
3	1.2.5	Acquire/protect habitat or potential habitat for other species of concern discussed in this draft recovery plan.	Until recovery criteria are met	**USFWS,** CDFG	0	-	-	-	-	-	No cost if accomplished through management partnerships.
3	1.3	Strengthen regulatory and legal protections by improving coordination with federal, state, and local regulatory authorities to ensure consistent, close attention to preservation of *tidal marsh* habitats and species.	Ongoing	ALL	263.1	52.6	52.6	52.6	52.6	52.6	Assumes 10 hrs/wk x 50 wks/yr @ $842/d
2	2.1.1.1	Ensure Federal agencies use their authorities to protect habitat and promote the recovery and conservation of the species covered in this draft recovery plan.	Ongoing	ALL	2,021+	404.16	404.16	404.16	404.16	404.16	2 FWS biologists FT @ $842/d x 20 d/mo x 12 mo; To implement section 7(a)(1) and 7(a)(2) and other obligations

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	2.1.1.2	Ensure that State and local agencies that manage land use their authorities to beneficially manage habitat and promote the recovery and conservation of *tidal marsh* ecosystems and the species covered in this draft recovery plan.	Ongoing	ALL	2,880+	576	576	576	576	576	4 DFG biologists FT @ $600/d x 20 d/mo x 12 mo/yr; To implement section 10 and other obligations
2	2.1.1.3	Develop and maintain a web-based clearinghouse for information about managing the effects of climate change on wetland restoration.	Ongoing	ALL	216+	72	36	36	36	36	60d to develop and 5d/mo x 12 mo/yr @ $600/d x 50 yrs.
1	2.1.2	Continue to manage Zone 1 existing *tidal marsh* habitat, as shown in **Figures III-7 through III-32**.	Ongoing	**USFWS,** CDFG	TBD	-	-	-	-	-	21,849 acres
2	2.1.3	Continue to manage Zone 2 existing *tidal marsh* habitat,	Ongoing	**USFWS,** CDFG	TBD	-	-	-	-	-	26,755 acres

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		as shown in **Figures III-7 through III-32**.									
1	2.1.4.1	Work with existing Federal, State, local agencies, and land managers and private landowners to use their authorities to conduct interim habitat management to promote the recovery and conservation of the species covered in this draft recovery plan.	Ongoing	ALL	TBD	-	-	-	-	-	
2	2.1.4.2	Develop and implement standardized monitoring techniques to evaluate ecosystem, species, and threat response to interim habitat management activities.	1 yr	**USFWS,** CDFG, CCC, CNPS	32.2	32.2	-	-	-	-	38.25 d @ $842/d
2	2.1.5.1	Develop management plans, where lacking, in	Ongoing	USFWS, CDFG, LOC, **OWN**	TBD	-	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		cooperation with appropriate agencies and organizations.									
1	2.1.5.2	Implement existing, newly developed, or revised management plans to protect *tidal marsh* habitat and promote recovery and conservation of the species covered in this draft recovery plan.	Ongoing	USFWS, CDFG, LOC, **OWN**	TBD	-	-	-	-	-	
3	2.1.5.3	Revise existing management plans, if necessary.	Ongoing	USFWS, CDFG, LOC, **OWN**	TBD	-	-	-	-	-	
2	2.1.6.1	Maintain normal *tidal* cycles.	Until recovery criteria are met	ALL	TBD	-	-	-	-	-	
2	2.1.6.2	Minimize or avoid over-management of estuarine *salinity* variation.	Continual	**DWR,** CDFG	0	-	-	-	-	-	
1	2.1.6.3	Develop and implement site-specific oil spill prevention and	Continual	**OWN**	TBD	-	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		response plans for lands supporting known *populations* of any of the listed species covered in this draft recovery plan.									
2	2.1.6.4	Manage groundwater extraction to prevent salt water intrusion in Los Osos Valley.	Ongoing	DWR, OWN, **RWQCB**	TBD	-	-	-	-	-	
3	2.1.6.5	Modify ditching and other mosquito abatement activities in *tidal* marshes to avoid impacts to species covered in this draft recovery plan.	Ongoing	**MAD**	0	-	-	-	-	-	
2	2.1.6.6	Engineer and implement solutions to direct current and future urban runoff away from *tidal marsh* habitat at Benicia State Recreation Area.	6 mo	USFWS, CDPR, RWQCB**, LOC**	48	48	-	-	-	-	20 d/mo x 6 mo @ $400/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
1	2.1.6.7	Avoid shoreline stabilization or development between White Point and Fairbank Point in Morro Bay.	Ongoing	**LOC**	0	-	-	-	-	-	
1	2.1.7.1.1.1	Develop site-specific management plans to control *non-native Spartina* species, especially *Spartina alterniflora* and its hybrids.	5 yrs	**ISP,** SFBNWR, CDFG	140	80	20	20	10	10	Per Director, SF Invasive Spartina Project (pers com 2006), $80K so far, but doesn't include revised plans (for follow up treat.)+ any new sites
1	2.1.7.1.1.2	Control *non-native Spartina* species, especially *Spartina alterniflora* and its hybrids.	5 yrs	**ISP,** SFBNWR, CDFG	3,603	1,000	1,000	853	500	250	Per SF Invasive Spartina Project (pers com 2007).
1	2.1.7.1.1.3	Monitor the success of *non-native Spartina* control sites.	Ongoing	**ISP,** SFBNWR, CDFG	895	495	100	100	100	100	Assumes 2 surveys/site/yr; Includes admin, environmental compliance, inventory monitoring, efficacy monitoring, and CLRA monitoring

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	2.1.7.1.2.1	Prioritize possible sites to control or eradicate *Lepidium latifolium.*	3 d	**CDFG,** UNIV, SLT, DWR	3	3	-	-	-	-	3 sites@ 1d/site@ $1K/d
1	2.1.7.1.2.2	Develop site-specific management plans to control or eradicate *Lepidium latifolium.*	15 d	**CDFG,** UNIV, SLT, DWR	15	15	-	-	-	-	3 sites@ 5 d/site@ $1K/d
1	2.1.7.1.2.3	Control or eradicate *Lepidium latifolium.*	15 d	**CDFG,** UNIV, SLT, DWR	15	15	-	-	-	-	4 sites@ 5 d/site@ $1K/d
1	2.1.7.1.2.4	Monitor the success of *Lepidium latifolium* control sites.	3 yrs	**CDFG,** UNIV, SLT, DWR	24	8	8	8	-	-	3 sites@ 2 d/site@ $1K/d@ 3 yrs + 2 d/yr for report of all sites
2	2.1.7.1.3.1	Develop site-specific management plans to eradicate *Carpobrotus edulis.*	15 d	USFWS, CDFG, UNIV, MBNEP, CDPR, **PVT**	15	15	-	-	-	-	3 sites@ 5d/site@ $1K/d
2	2.1.7.1.3.2	Eradicate *Carpobrotus edulis.*	15 d	USFWS, CDFG, UNIV, MBNEP, CDPR, **PVT**	15	15	-	-	-	-	4 sites@ 5d/site@ $1K/d

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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	2.1.7.1.3.3	Monitor the success of *Carpobrotus edulis* eradication sites.	3 yrs	USFWS, CDFG, UNIV, MBNEP, CDPR, **PVT**	24	8	8	8	-	-	3 sites@ 2 d/site@ $1K/d@ 3 yrs + 2 d/yr for report of all sites
3	2.1.7.1.4	Develop management plans for, implement, and monitor success of control or eradication of other *invasive non-native* plants.	TBD	**USFWS,** CDFG, UNIV, PVT	TBD	-	-	-	-	-	
2	2.1.7.1.5	Develop a system for early detection of and rapid response to *invasive* plant species.	6 mo	CNPS, CDFG	72	72	-	-	-	-	20 d/mo x 6 mo @ $600/d
1	2.1.7.2.1	Develop and implement management plans to monitor and control red fox.	5 yrs	USFWS, **SFBNWR,** CDFG, CCC, USACE, LOC	126.3	25.26	25.26	25.26	25.26	25.26	30d/yr @ $842/d
2	2.1.7.2.2	Develop and implement management plans to monitor and control Norway rats.	5 yrs	USFWS, **SFBNWR,** CDFG, CCC, USACE, LOC	126.3	25.26	25.26	25.26	25.26	25.26	30d/yr @ $842/d

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					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
3	2.1.7.2.3	Develop and implement management plans to monitor and control other animals that threaten species covered in this draft recovery plan.	5 yrs	**USFWS,** SFBNWR, CDFG, CCC, USACE, LOC	126.3	25.26	25.26	25.26	25.26	25.26	30d/yr @ $842/d
3	2.1.7.2.4	Monitor the success of, and adapt control plans for, the above *non-native* or native animal predators.	5 yrs	USFWS, SFBNWR, CDFG, CCC, USACE, LOC	21.05	4.21	4.21	4.21	4.21	4.21	5 d/yr @ $842/d
2	2.1.8	Manage for the protection of native pollinators, insect predators, and their habitats.	Ongoing	SLT, LOC, **OWN**	0	-	-	-	-	-	
2	2.1.9.1.1	Route access points and trails away from sensitive *Cordylanthus maritimus* ssp. *maritimus* habitat in Morro Bay.	2 wks	CDPR, MBNEP, **LOC**	4	4	-	-	-	-	10 d (re-routing & signage) @ $400/d
2	2.1.9.1.2	Minimize impacts from boat haulouts to *Cordylanthus maritimus* ssp.	5 d	CDPR, MBNEP, **LOC**	2	2	-	-	-	-	5 d (signage) @ $400/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		maritimus habitat in Morro Bay.									
2	2.1.9.1.3	Manage dredge disposal to minimize threats to *Cordylanthus maritimus* ssp. *maritimus* and *Suaeda californica* habitat in Morro Bay.	Ongoing	UFID, OWN, **LOC**	0	-	-	-	-	-	
2	2.1.9.2.1	Develop and implement a management plan for lands adjacent to the Bay Trail and other public access areas that reduces predation by feral cats and other human-related disturbance to species and habitat.	Ongoing	**LOC,** OWN	0	-	-	-	-	-	
2	2.1.9.2.2	Implement and enforce pet restrictions.	Ongoing	**LOC,** OWN	0	-	-	-	-	-	
2	2.1.9.2.3	Avoid relocation of nuisance animals to California clapper rail habitat.	Ongoing	**LOC,** OWN	0	-	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	2.1.9.2.4	Provide wardens, agents, or officers to enforce above protective measures.	Ongoing	CDPR, USFWS, CDFG, **LOC**	1,440	28.8	28.8	28.8	28.8	28.8	1 warden x 4d/mo x 12 mo/yr @ $600/d x 50 yrs
2	2.1.9.2.5	Create and fill a permanent position at Rush Ranch to coordinate management of, and access to, sensitive habitat in Suisun Marsh.	Ongoing	USFWS, CDFG, **SLT**	720	14.4	14.4	14.4	14.4	14.4	3d/mo x 12 mo/yr @$400/d x 50 yrs
3	2.1.9.2.6	Bury distribution lines from power utilities where they traverse restored *tidal* marshes; Prevent routing of new transmission lines through restored or protected *tidal marsh*.	Ongoing	LOC, **UFID**	5,000	5,000	-	-	-	-	
2	2.1.9.2.7	Carry out vegetation clearing, mosquito management, dredging, and other activities after the breeding season of birds covered in this draft recovery plan.	Ongoing	MAD, **LOC,** Port O, Port SF	0	-	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
3	2.1.10.1	Manage black-tailed deer to minimize impacts to *Suaeda californica* at Morro Bay.	1 mo.	**OWN**	5						Based on fencing/repair costs.
3	2.1.10.2	Manage cattle grazing to minimize impacts to the birds of the high *tidal marsh*, such as saltmarsh common yellowthroat.	Ongoing	CDFG, SRCD, SLT, **PVT,** GGNRA	TBD	-	-	-	-	-	
3	2.1.10.3	Manage feral pig disturbance to minimize impacts to sensitive plants and the birds of the middle and high *tidal marsh*, such as saltmarsh common yellowthroat.	Ongoing	**CDFG,** PVT, SRCD	TBD	-	-	-	-	-	
2	2.2.1	Create an interdisciplinary review panel to coordinate and review the design of *tidal marsh* restoration projects throughout San Francisco Bay.	5 yrs	**USFWS,** CDFG, PVT, UNIV, USGS	95.5	19.1	19.1	19.1	19.1	19.1	Creation and administration of panel only- not review. 4 Feds+ 5 state/private X 3 days/yr.

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
1	2.2.2.1	Restore habitat to achieve 1,250 acres of high quality *tidal marsh* habitat ("near-term restoration" and "future *tidal* restoration") in each *marsh* complex except Corte Madera marsh, in the Central/Southern SF Bay Recovery Unit (7,500 acres total), as indicated in **Figures III-15** through **III-26.**	Until recovery criteria are met	**USFWS,** CDFG	255,000	-	-	-	-	-	Maximum cost, assuming no existing *marsh* currently meets criteria. Timing of restoration is unknown and will likely be opportunistic based on available funding.
1	2.2.2.2	Restore habitat to achieve 2,500 acres of high quality *tidal marsh* habitat ("near-term restoration" and "future *tidal* restoration") in each *marsh* complex except Point Pinole *marsh*, in the San Pablo Bay Recovery Unit (10,000 acres	Until recovery criteria are met	**USFWS,** CDFG	340,000	-	-	-	-	-	Maximum cost, assuming no existing *marsh* currently meets criteria. Timing of restoration is unknown and will likely be opportunistic based on available funding.

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
		total), as indicated in **Figures III-9** through **III-14.**									
1	2.2.2.3	Restore habitat to achieve 400 acres of high quality *tidal marsh* habitat ("near-term restoration" and "future *tidal* restoration") each in the Corte Madera marsh complex in the Central/South SF Bay Recovery Unit **(Figure III-15)** and the Point Pinole marsh complex in the San Pablo Bay Recovery Unit **(Figure III-14)** (800 acres	Until recovery criteria are met	**USFWS,** CDFG	27,000	-	-	-	-	-	Maximum cost, assuming no existing *marsh* currently meets criteria. Timing of restoration is unknown and will likely be opportunistic based on available funding.

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
		total).									
1	2.2.2.4	Restore habitat to achieve 5,000 total acres of high quality *tidal marsh* habitat ("near-term restoration" and "future *tidal* restoration") in the Suisun Bay Area Recovery Unit, as indicated in **Figures III-7** and **III-8.**	Until recovery criteria are met	**USFWS,** CDFG	170,000	-	-	-	-	-	Maximum cost, assuming no existing *marsh* currently meets criteria. Timing of restoration is unknown and will likely be opportunistic based on available funding.
3	2.2.2.5	Reverse current trend of *tidal marsh* loss in Elkhorn Slough and speed *accretion* at erosion hot spots.			TBD						

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
3	2.2.2.6	Conduct *tidal marsh* restoration at Parsons Slough and North Marsh in Elkhorn Slough, as indicated in **Figure III-31**.			TBD						
1	2.2.2.7	Restore ecotonal habitat ("future *ecotone* restoration"), as indicated in **Figures III-7** through **III-32**.	Until recovery criteria are met	**USFWS,** CDFG	46,940	-	-	-	-	-	Maximum cost. Timing of restoration is unknown and will likely be opportunistic based on available funding.
2	2.2.2.8	Create/restore *tidal marsh* and adjacent habitat ("near-term restoration" and "future *tidal* restoration") beyond minimum acreage above, in each Recovery Unit, as indicated in **Figures III-7** through **III-32**.	Until recovery criteria are met	**USFWS,** CDFG	TBD	-	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
3	2.2.2.9	As deemed necessary by the Service, with guidance from the Recovery Implementation Team, enter into conservation easements to restore *tidal* habitat on private lands ("potential restoration"), as indicated in **Figures III-7** through **III-32**.	Until recovery criteria are met	**USFWS,** CDFG	TBD	-	-	-	-	-	
1	2.2.3.1	Protect, manage, and monitor large *populations* and occupied *marsh* complexes as interim reserves selected to represent the full range of both subspecies of salt marsh harvest mouse.	10 yrs	**USFWS,** CDFG, PVT	2,595.6	259.6	259.6	259.6	259.6	259.6	1 FWS, 1 DFG x 20 d x 9 mo; To be maintained at least until large-scale restoration sites can support SMHM.
2	2.2.3.2	Supplement protection of each large *population* with a series of	10 yrs	**USFWS,** CDFG, PVT	TBD	-	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		smaller satellite reserves, where feasible.									
3	2.2.3.3	Transition from *diked* wetlands to restored or enhanced *tidal marsh* habitat, where feasible.	30 yrs	**USFWS,** CDFG, SRCD, PVT	TBD	-	-	-	-	-	
2	2.2.4	Restore or enhance buffer zones in existing habitat adjacent to *populations* of species covered in this draft recovery plan.	10 yrs	**USFWS,** CDFG	TBD	-	-	-	-	-	
1	2.2.5	Replant native dune-stabilizing vegetation in Morro Bay if excessive dune mobility threatens *populations* of *Cordylanthus maritimus* ssp. *maritimus* and *Suaeda californica.*	2 yrs	CNPS, MBNEP, **UNIV**	4	2	2	-	-	-	If dune mobility threatens *populations*, then 2 yrs @ 5d/yr @ $400/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
3	2.2.6	Conduct hazardous waste cleanup of the Superfund-listed landfill in the northwestern portion of Benicia State Recreation Area and restore the site to its historic habitat for endangered species.	TBD	USFWS, CDPR, LOC	TBD	-	-	-	-	-	
2	2.2.7.1.1	Bank seeds of *Cirsium hydrophilum* var. *hydrophilum* during years of high seed production.	3 yrs	SLT, **STO**	5.3	5.3	-	-	-	-	Per Rancho Santa Ana Bot. Gardens, $2500 flat rate + $150, per *population*; 2 pops/species X 1 species; 3 yrs (no charge for multiple yr sampling)
3	2.2.7.1.2	Bank seeds of *Cordylanthus maritimus* ssp. *maritimus,*	3 yrs	SLT, MBNEP, **STO**	10.6	10.6	-	-	-	-	Same as above, but for two species.

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		Cordylanthus mollis ssp. *mollis* during years of high seed production.									
2	2.2.7.1.3	Maintain a clone bank of *Suaeda californica.*	10 yrs	USFWS, MBNEP, PVT, **STO**	10	1	1	1	1	1	UCB estimated $50/yr per individual, 20 individuals
2	2.2.7.2.1.1	Develop introduction/ *reintroduction* plan for *Cirsium hydrophilum* var. *hydrophilum.*	10 d	USFWS, CDFG, **PVT,** SLT	10	10	-	-	-	-	10 days x $1K/d
2	2.2.7.2.1.2	Conduct site preparation, propagate plants, and transplant seedlings for *Cirsium hydrophilum* var. *hydrophilum* introduction/ *reintroduction.*	2 yrs	USFWS, CDFG, **PVT,** SLT	10	6	4	-	-	-	$1K/d; 2 d for site prep, 2 d/yr-propagation, 2 d/yr-transplanting, assuming 2-3 sites
2	2.2.7.2.1.3	Monitor and conduct maintenance of transplanted *Cirsium hydrophilum* var. *hydrophilum.*	5 yrs	USFWS, CDFG, **PVT,** SLT	25	5	5	5	5	5	5 d/yr @ $1K/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	2.2.7.2.1.4	Assess introduction/ *reintroduction* success, review reports, and adapt introduction/ *reintroduction* plan for *Cirsium hydrophilum* var. *hydrophilum*, as necessary.	5 yrs	**USFWS,** CDFG, PVT, SLT	4.2	0.84	0.84	0.84	0.84	0.84	1 d/yr @ $842/d
3	2.2.7.2.2.1.	Develop introduction/ *reintroduction* plan for *Cordylanthus maritimus* ssp. *maritimus.*	10 d	USFWS, MBNEP, UNIV, **PVT**	10	10	-	-	-	-	10d x $1K/d
3	2.2.7.2.2.2.	Conduct site preparation, propagate plants, and transplant seedlings for *Cordylanthus maritimus* ssp. *maritimus* introduction/ *reintroduction.*	2 yrs	USFWS, MBNEP, UNIV, **PVT**	10	6	4	-	-	-	$1K/d; 2 d site prep, 2 d/yr-propagation, 2 d/yr-transplanting, assuming 2-3 sites
3	2.2.7.2.2.3	Monitor and conduct maintenance of transplanted *Cordylanthus*	5 yrs	USFWS, MBNEP, UNIV, **PVT**	25	5	5	5	5	5	5 d/yr @$1K/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		maritimus ssp. *maritimus.*									
3	2.2.7.2.2.4	Assess introduction/ *reintroduction* success and maintenance levels of *genetic* diversity, review reports, and adapt introduction/ *reintroduction* plan for *Cordylanthus maritimus* ssp. *maritimus*, as necessary.	5 yrs	**USFWS,** MBNEP, UNIV, PVT	4.2	0.842	0.842	0.842	0.842	0.842	1 d/yr @$842/d
3	2.2.7.2.3.1	Develop introduction/ *reintroduction* plan for *Cordylanthus mollis* ssp. *mollis.*	20 d	USFWS, CDFG, **PVT,** SLT	20	20	-	-	-	-	$1K/d
3	2.2.7.2.3.2	Conduct site preparation, propagate plants, transplant seedlings for *Cordylanthus mollis* ssp. *mollis* introduction/ *reintroduction.*	2 yrs	USFWS, CDFG, **PVT,** SLT	24	14	10	-	-	-	$1K/d; 4 d site prep, 2 d/yr-propagation, 8 d/yr-transplanting, assuming 4 sites
3	2.2.7.2.3.3	Monitor and conduct maintenance of	5 yrs	USFWS, CDFG, **PVT,** SLT	100	20	20	20	20	20	20d/yr @ $1K/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		transplanted *Cordylanthus mollis* ssp. *mollis*.									
3	2.2.7.2.3.4	Assess introduction/ *reintroduction* success, review reports, and adapt introduction/ *reintroduction* plan for *Cordylanthus mollis* ssp. *mollis*, as necessary.	5 yrs	**USFWS,** CDFG, PVT, SLT	8.42	1.684	1.684	1.684	1.684	1.684	2 d/yr @ $842/d
2	2.2.7.2.4.1	Implement *California Sea-blite Reintroduction Plan, San Francisco Bay, California.*	5 yrs	USFWS, **PVT,** CNPS, AUD	60	16	14	10	10	10	Assumes 2 sites (assumes success of recent *reintroduction*); 2 d site prep, 2 d/yr prop & 2 d/yr transplant for 2 years, 10 d/yr maint & monitor for 5 yrs@$1K/d
2	2.2.7.2.4.2	Assess *reintroduction* success, review reports, and adapt *reintroduction* plan for *Suaeda californica*, as necessary.	5 yrs	**USFWS,** PVT	8.42	1.68	1.68	1.68	1.68	1.68	2 d/yr @ $842/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
3	2.2.7.2.5	Periodically review and assess the need for *reintroduction* programs for species covered in this draft recovery plan. If warranted, develop and implement *reintroduction* programs, monitor, evaluate success, and adapt the programs, as appropriate.	Continual	**USFWS**	TBD	-	-	-	-	-	
2	2.3.1	Develop consistent guidelines for habitat monitoring for use throughout the geographic scope of this draft recovery plan.	20 d	**USFWS,** CDFG	16.84	16.84	-	-	-	-	20d @ $842/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	2.3.2.1	Develop and implement habitat monitoring plans at a geographically representative suite of remnant mature ("pre-historical") salt and *brackish tidal* marshes, as a baseline and early-warning network.	30 yrs	**USFWS,** CDFG, OWN	47.16	13.48	6.74	6.74	6.74	6.74	Once per 5 yrs; 4 sites @ 2d/site. Assumes using results of Action 2.3.1 as a base for plan, then making specific to sites; devel. of plan= 2d/site (=$6,736)
2	2.3.2.2	Develop and implement habitat monitoring plans at *tidal marsh* restoration sites.	Ongoing	**USFWS,** CDFG, OWN	TBD	-	-	-	-	-	
2	2.3.2.3	Develop and implement habitat monitoring plans at species *reintroduction* sites.	Ongoing	**USFWS,** CDFG, OWN	TBD	-	-	-	-	-	
2	2.3.2.4	Develop and implement habitat monitoring plans at sites selected to observe sand dune movement.	Continual	USFWS, CDFG, MBNEP, **CDPR,** OWN	14.4	7.2	3.6	3.6	-	-	3 sites at Morro Bay; 2d/site/yr.+ devel. of plan= 2d/site
3	2.3.2.5	Prepare and implement habitat monitoring plans for other areas, as	TBD	USFWS, CDFG, OWN	TBD	-	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		necessary.									
2	2.3.3	Make habitat monitoring results publically available.	30 yrs	**USFWS**	50.52	1.68	1.68	1.68	1.68	1.68	2 d/yr @ $842/d
2	2.3.4	Evaluate and improve habitat monitoring methods, as needed.	3 yrs	**USFWS,** CDFG	7.58	2.53	2.53	2.53	-	-	3 d/yr @ $842/d
3	3.1.1.1	Review existing species survey guidance to determine it's adequacy.	3 d	**USFWS**	2.53	2.53	-	-	-	-	
3	3.1.1.2	If necessary, revise existing guidance or develop new standardized, scientifically based, and species-specific survey guidance.	0.05 yr	USFWS	TBD	-	-	-	-	-	
1	3.1.2.1	Survey/monitor for *Cirsium hydrophilum* var. *hydrophilum.*	5 yrs	CDFG, PVT, SLT, **UNIV**	10	2	2	2	2	2	Rank abundance estimates only. 3 d/yr + report (2d/yr) @$400/d
2	3.1.2.2	Survey/monitor for *Cordylanthus maritimus* ssp. *maritimus.*	5 yrs	CDFG, MBNEP, PVT, **UNIV**	10	2	2	2	2	2	Rank abundance estimates only. 3 d/yr + report (2d/yr) @$400/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	3.1.2.3	Survey/monitor for *Cordylanthus mollis* ssp. *mollis*.	5 yrs	CDFG, PVT, SLT, **UNIV**	26	5.2	5.2	5.2	5.2	5.2	Rank abundance estimates only. 10 d/yr + report (3d/yr) @$400/d
3	3.1.2.4	Survey/monitor for *Suaeda californica.*	5 yrs	CDFG, MBNEP, PVT, **UNIV**	12	2.4	2.4	2.4	2.4	2.4	Rank abundance estimates only. 4 d/yr + report (2d/yr) @$400/d ; If initial SF Bay reintro plan unsuccessful, only half these costs/yr.
3	3.1.2.5.1	Develop certification/training programs for California clapper rail surveyors and survey coordinators.	10 d	USFWS, **PRBO, SFBO**, PVT	6	6	-	-	-	-	Calculated at $600/d
2	3.1.2.5.2	Conduct annual California clapper rail call counts during breeding season.	8 yrs	USFWS, **PRBO, SFBO**	57.6	7.2	7.2	7.2	7.2	7.2	12 d/yr (8 d surveys+ 4 d reporting)@$600/d
2	3.1.2.5.3	Monitor adult California clapper rail survival and mortality of adults, chicks, and eggs due to predation.	3 yrs	USFWS, **PRBO, SFBO**	21.6	7.2	7.2	7.2	-	-	12 d/yr (8 d surveys+ 4 d reporting) @ $600/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	3.1.2.5.4	Develop and maintain a database to track annual California clapper rail monitoring results.	5 yrs +	**USFWS,** PRBO, SFBO	TBD	20	20	5	5	5	Initial setup 2 yrs, maintenance until recovery
3	3.1.2.5.5	Examine the methodology used for call count surveys in Action 3.1.2.5.2 above, by cross validating surveys (using double observer methods) with movement studies recommended in Action 4.2.2.2.5.2.	5 d	USFWS, **PRBO, SFBO**	3	3	-	-	-	-	At $600/d
2	3.1.2.6	Monitor for salt marsh harvest mouse.	9 yrs	**USFWS, CDFG, DWR, PVT**, UNIV	663.1	73.68	73.68	73.68	73.68	73.68	30 VHAs; Survey one third ea yr on 3 yr cycle. Two 100 trap grids/area=20 grids/yr x 4 nts ea= 80 nts (days)/yr; 15 d DFG+ 63 d PVT+ 2 d USFWS

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
1	3.1.2.7	Conduct surveys/monitoring of salt marsh wandering shrew and Suisun shrew.	3 yrs	UNIV, **PVT**	181	61	60	60	-	-	4 nts x 5 areas/RU x 3 Rus @$1K/day + $1K in FY1 for trap modification materials
1	3.1.2.8	Conduct surveys/monitoring of San Pablo vole.	1 yr	UNIV, **PVT**	20	20	-	-	-	-	4 nts x 10 areas (doing 2 areas concurrently)@$1K/day
3	3.1.2.9	Continue to conduct surveys/monitoring of California black rail.	20 yrs	**PRBO, SFBO**, UNIV, PVT	28.8	7.2	-	-	-	-	2 visits/season/site; 6 sites @$600/d; Survey once every 5 yrs for 20 yrs
3	3.1.2.10	Conduct surveys/monitoring of song sparrow subspecies.	20 yrs	**PRBO, SFBO**, UNIV, PVT	28.8	7.2	-	-	-	-	2 visits/season/site; 6 sites @$600/d; Survey once every 5 yrs for 20 yrs
3	3.1.2.11	Conduct surveys/monitoring of saltmarsh common yellowthroat.	20 yrs	**PRBO, SFBO**, UNIV, PVT	28.8	7.2	-	-	-	-	2 visits/season/site; 6 sites @$600/d; Survey once every 5 yrs for 20 yrs

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
1	3.1.2.12	Conduct surveys/monitoring of *Cicindela senilis senilis.*	1 yr	**USFWS,** UNIV, PVT	33.68	33.68	-	-	-	-	Surveys in Feb, Apr, May, June, Jul, Aug, Sept, & Oct @ 5 d ea (3 field + 2 reporting) at $842/d
3	3.1.2.13	Conduct surveys/monitoring of *Lathyrus jepsonii* var. *jepsonii.*	20 yrs	CNPS, **UNIV,** PVT	16	4	-	-	-	-	
3	3.1.2.14	Conduct surveys/monitoring of *Spartina foliosa.*	20 yrs	CNPS, **UNIV,** PVT	6	6	-	-	-	-	12 d surveying+ 3 days reporting
3	3.1.2.15	Conduct surveys/ monitoring of previously documented *populations* of other species covered in this draft recovery plan.	1 yr	UNIV, PVT	TBD	-	-	-	-	-	
2	3.2.1	Conduct surveys in suitable habitat for new and relict *populations* of species covered in this draft recovery	1 yr	UNIV, PVT	TBD	-	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
		plan.									
2	3.2.2	For *Cirsium hydrophilum* var. *hydrophilum, Cordylanthus maritimus* ssp. *maritimus,* and *Cordylanthus mollis* ssp. *mollis,* probe soil *seed banks* to detect presence and location of dormant *viable* seed. Grow out seed by cultivation or in natural protected habitat or bank seed, per Action 2.2.7.1.	5 yrs	USFWS, CDFG, **UNIV**	20	4	4	4	4	4	10 d/yr
3	3.3	Periodically review and improve methods of species monitoring.	3 yrs	**USFWS,** CDFG	7.58	2.53	2.53	2.53	-	-	3 d/yr
2	3.4	Report survey results to California Natural Diversity Database and otherwise make them publically	Continual	ALL	TBD	1.8	1.8	1.8	1.8	1.8	3 d/yr @ $600/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
		available so that findings can be applied in conservation and recovery efforts.									
3	3.5	Periodically review progress toward listed species recovery and long-term conservation of species of concern and identify those species warranting a change in status (listing, delisting, uplisting, downlisting).	Continual	USFWS	TBD	4.21	4.21	4.21	4.21	4.21	5 d/yr @ $842/yr
3	3.6	Conduct post-delisting monitoring of recovered species.	TBD	ALL	-	-	-	-	-	-	
2	4.1	Designate a research coordinator to coordinate all research sponsored or overseen by USFWS.	1 d	**USFWS**	0.84	0.84	-	-	-	-	
2	4.2.1.1	Continually update current literature base on the basic biology and ecology	10 d	**USFWS,** CDFG	8.42	8.42	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	Action Number	Action Description	Action Duration	Responsible Parties	Cost Estimate (in $1,000 units)						Comments
					Total	FY 1	FY 2	FY 3	FY 4	FY 5	
		of the species covered in this draft recovery plan and develop a prioritized list of research needs for each species.									
2	4.2.1.2.1.1	Study reproductive ecology of *Cirsium hydrophilum* var. *hydrophilum.*	3 yrs	USFWS, SLT, CDFG, UNIV, PVT	100	40	30	30	-	-	
2	4.2.1.2.1.2	Study physiological ecology of *Cirsium hydrophilum* var. *hydrophilum.*	6 yrs	USFWS, SLT, CDFG, UNIV, PVT	125	25	25	25	25	25	
2	4.2.1.2.1.3	Study community ecology of *Cirsium hydrophilum* var. *hydrophilum.*	3 yrs	USFWS, SLT, CDFG, UNIV, PVT	150	75	50	25	-	-	
2	4.2.1.2.2	Conduct biological and ecological studies on *Cordylanthus maritimus* ssp. *maritimus.*	5 yrs	UNIV, PVT, MBNEP	200	40	40	40	40	40	
2	4.2.1.2.3.1	Study reproductive ecology of *Cordylanthus mollis* ssp. *mollis.*	3 yrs	SLT, UNIV, PVT	100	40	30	30	-	-	same as *Cirsium*
2	4.2.1.2.3.2	Study physiological ecology of	6 yrs	SLT, UNIV, PVT	150	25	25	25	25	25	same as *Cirsium*

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		Cordylanthus mollis ssp. *mollis*.									
2	4.2.1.2.3.3	Study community ecology of *Cordylanthus mollis* ssp. *mollis*.	3 yrs	SLT, UNIV, PVT	150	75	50	25	-	-	same as *Cirsium*
2	4.2.1.2.3.4	Study *population* ecology of *Cordylanthus mollis* ssp. *mollis*.	3 yrs	SLT, UNIV, PVT	150	75	50	25	-	-	
2	4.2.1.2.4	Conduct biological and ecological studies on *Suaeda californica.*	5 yrs	UNIV, PVT	200	40	40	40	40	40	
2	4.2.1.2.5.1	Study *population* ecology of the California clapper rail.	5 yrs	PRBO, SFBO, UNIV, PVT	60	12	12	12	12	12	20 d/yr $600/d x 5 yrs
1	4.2.1.2.5.2	Study effects of recent *non-native Spartina* treatment on California clapper rail movement within the ecosystem.	3 yrs	PRBO, SFBO, ISP, UNIV, **USGS**	119.81	41.63	41.63	36.55	-	-	Per 5/06 USGS proposal (SSP grant); inc. salary, transmitters, vehicle, telemetry supp., trapping equip, travel, contingency, & overhd rate of 23.894%

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	4.2.1.2.5.3	Conduct diet analyses on California clapper rail as a tool to understanding habitat use.	1 yr	PRBO, SFBO, ISP, UNIV, **USGS**	12	12	-	-	-	-	Used *population* ecology action costs.
2	4.2.1.2.6.1	Conduct a *population* viability analysis to determine desirable *population* sizes for long-term persistence of extant South Bay salt marsh harvest mouse *populations*.	3 yrs	UNIV, PVT	200	100	50	50	-	-	FY1= development of microsatellite DNA probe. FY2 & 3= analyzing hair samples; If add'l trapping required then extra $50K required in FY2& 3.
1	4.2.1.2.6.2	Study movements of salt marsh harvest mice during high *tides* both laterally (*i.e.,* into high *marsh* areas) and, more importantly, vertically (*i.e.*, up into the higher portions of pickleweed and gumplant plants).	1 yr	UNIV, **PVT**	85	85	-	-	-	-	80 nights @ $1K/day + telemetry equipment ($5K)

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	4.2.1.2.6.3	Study use of adjacent habitat, including *brackish marsh*, by the salt marsh harvest mouse.	1 yr	UNIV, PVT	100	100	-	-	-	-	Can be folded into movement study for salt marsh harvest mouse (Action 4.2.1.2.6.1.).
1	4.2.1.2.6.4	Study the impact of *Spartina alterniflora* and its hybrids, and *Lepidium latifolium* on the salt marsh harvest mouse.	1 yr	UNIV, PVT, SLT	70	70	-	-	-	-	
2	4.2.1.2.6.5	Study predation impacts to the salt marsh harvest mouse.	2 yrs	UNIV, PVT	140	70	70	-	-	-	Trapping before and after predator access is prevented at several marshes
2	4.2.1.2.7	If sufficient numbers of the species are identified under Action 3.1.2.7, conduct biological and ecological studies on the salt marsh wandering shrew and the Suisun shrew.	2 yrs	UNIV, **PVT**	250	200	50	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	4.2.1.2.8	If sufficient numbers of the species are identified under Action 3.1.2.8, conduct biological & ecological studies on the San Pablo vole.	1 yr	UNIV, **PVT**	70	70	-	-	-	-	
3	4.2.1.2.9	Conduct biological & ecological studies on the California black rail.	2 yrs	**PRBO, SFBO**, UNIV, PVT	TBD	-	-	-	-	-	
3	4.2.1.2.10	Conduct biological and ecological studies on the song sparrow subspecies of the San Francisco estuary.	2 yrs	**PRBO, SFBO,** UNIV, PVT	TBD	-	-	-	-	-	
3	4.2.1.2.11	Conduct biological and ecological studies on saltmarsh common yellowthroat.	2 yrs	**PRBO, SFBO**, UNIV, PVT	TBD	-	-	-	-	-	
3	4.2.1.2.12	Conduct biological and ecological studies on *Cicindela senilis senilis.*	1 yr	UNIV, **PVT**	420	105	105	105	105	-	7 mo @ 10 field + 5 reporting d/mo @1K/d
3	4.2.1.2.13	Conduct biological and ecological studies on *Lathyrus*	2 yrs	**UNIV,** PVT, CNPS	TBD	-	-	-	-	-	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		jepsonii var. *jepsonii.*									
3	4.2.1.2.14	Conduct biological and ecological studies on *Spartina foliosa.*	1 yr	**UNIV,** PVT, CNPS	TBD	-	-	-	-	-	
3	4.2.1.2.15	Conduct biological and ecological studies on other species covered in this draft recovery plan.	TBD	ALL	TBD	-	-	-	-	-	
1	4.2.2.1	Conduct a salt marsh harvest mouse *population genetic* analysis.	2 yrs	UNIV, PVT	100	50	50	-	-	-	
2	4.2.2.2	If sufficient numbers of the species are identified under Action 3.1.2.7., conduct research to assess *genetic* diversity within and among *populations* of salt marsh wandering shrew and Suisun shrew.	3 yrs	UNIV, PVT	300	100	100	100	-	-	FY1= development of microsatellite DNA probe. FY2 & 3= analyzing hair samples and conducting add'l trapping

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	4.2.2.3	If sufficient numbers of the species are identified under Action 3.1.2.8, build upon research conducted by Conroy and Neuwald to reassess the *genetic* identity of San Pablo vole, given recent finding of two phylogeographic groups of California vole.	3 yrs	UNIV, PVT	300	100	100	100	-	-	FY1= development of microsatellite DNA probe. FY2 & 3= analyzing hair samples and conducting add'l trapping
3	4.2.2.4	Conduct research to resolve taxonomic uncertainties regarding other species covered in this draft recovery plan.	TBD	ALL	TBD	-	-	-	-	-	
2	4.2.2.5	Conduct *genetic* studies on *Cirsium hydrophilum* var. *hydrophilum.*	2 yrs	**UNIV,** PVT, SLT	50	25	25	-	-	-	This is for *taxon*omy work, not just pop *genetics*/diversity.
3	4.2.2.6	Conduct *genetic* studies on *Cordylanthus mollis* ssp. *mollis*.	2 yrs	**UNIV,** PVT, SLT	50	25	25	-	-	-	62.5 d/yr @ $400/d

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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
3	4.2.2.7	Conduct *genetic* studies on song sparrow subspecies.	3 yrs	**PRBO, SFBO**, UNIV, PVT	150	50	50	50	-	-	50 d/yr @ $1000/d
3	4.2.2.8	Conduct *genetic* studies on salt *marsh* common yellowthroat.	3 yrs	**PRBO, SFBO**, UNIV, PVT	150	50	50	50	-	-	50 d/yr @ $1000/d
3	4.2.2.9	Conduct *genetic* studies on *Spartina foliosa.*	4 yrs	**UNIV,** PVT, CNPS	100	25	25	25	25	-	62.5 d/yr @ $400/d
2	4.2.3.1	Conduct studies on the efficacy of various habitat restoration techniques.	5 yrs	UNIV, **PVT**	125	25	25	25	25	25	Studies to happen much later than FY5; 25 d/yr @ $1K/d
2	4.2.3.2	Study natural sedimentation rates in marshes throughout the bay.	20 yrs	UNIV, **PVT,** USACE	TBD	-	-	-	-	-	Studies to happen much later than FY5
2	4.2.3.3	Study the impacts of large-volume, human-caused *freshwater* discharges into salt marshes.	2 yrs	UNIV, PVT, **RWQCB**	96	48	48	-	-	-	80 d/yr @ $600/d
2	4.2.3.4	Investigate the effects of *salinity* fluctuation and altered *tidal* datum on species covered in this draft	2 yrs	UNIV, PVT, **DWR**	96	48	48	-	-	-	80 d/yr @ $600/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Cost Estimate (in $1,000 units)**						**Comments**
					Total	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	
		recovery plan.									
2	4.2.3.5	Study the time lag between habitat restoration and recolonization by species covered in this draft recovery plan.	20 yrs	ALL	TBD	-	-	-	-	-	Studies to happen much later than FY5
2	4.2.3.6	Conduct research on the physical processes (*geomorphic* and *hydrologic*) that maintain the structure and function of suitable habitats for *tidal marsh* species.	2 yrs	UNIV, **PVT**, USACE	100	50	50	-	-	-	50 d/yr @ $1K/d
2	4.2.3.7	Study the effects of global warming/climate change and resulting sea level rise on *tidal marsh* ecosystems.	20 yrs	UNIV, **PVT**, USGS	TBD	-	-	-	-	-	
2	4.2.3.8	Conduct research on management conflicts between listed species.	20 d	**USFWS**	16.84	16.84	-	-	-	-	20 d@ $842/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
					Cost Estimate (in $1,000 units)						
Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
1	4.2.4.1.1	Determine the effects of *non-native* species on *tidal marsh* ecosystems.	3 yrs	USFWS, CDFG, UNIV, **PVT**	75	25	25	25	-	-	25 d/yr @ $1K/d
1	4.2.4.1.2	Investigate methods for controlling *invasive* species in *tidal marsh* ecosystems.	2 yrs	USFWS, CDFG, UNIV, **PVT**	100	50	50	-	-	-	50 d/yr @ $1K/d
1	4.2.4.1.3	Investigate methods of restoring *tidal marsh* ecosystems that have been degraded by *invasive* species.	2 yrs	USFWS, CDFG, UNIV, **PVT**	150	75	75	-	-	-	75 d/yr @ $1K/d
2	4.2.4.2.1	Conduct research into mercury exposure pathways for California clapper rails and potential means to interrupt those pathways.	Ongoing (3 yrs)	**USFWS**, USGS, SFPBO, RWQCB	500	500	-	-	-	-	Cost does not reflect funds spent during first two years (fieldwork). 2 staff @ 250 d @ $1K/day (USFWS contaminants rate).

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	4.2.4.2.2	Conduct other necessary research on *bioaccumulation* and effects, including reproductive success and development, of toxic estuarine contaminants on *tidal marsh* species. Investigate the toxic effects of pesticides (*e.g.*, pyrethroids) and emerging contaminants (*e.g.,* pharmaceuticals, plasticizers, flame retardants, detergent additives, *etc*).	5 yrs	**USFWS**, SFPBO, RWQCB	1,250	250	250	250	250	250	3 yrs fieldwork + 2 yrs reporting; 5 yrs @ 250 d/yr @ $1K/d (USFWS contaminants rate)
2	4.2.4.2.3	Apply results of research in Actions 4.2.4.2.1 and 4.2.4.2.2 to *sediment* and water quality standards to protect sensitive wildlife of the San Francisco estuary.	40 d	**RWQCB**, CCC	24	-	-	-	-	24	Pending results of Actions 4.2.4.2.1 and 4.2.4.2.2; 40d @ $600/d

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	4.2.4.3.1	Determine if pollination is a limiting factor for any *population* of a plant species covered in this draft recovery plan.	3 yrs	**UNIV**, PVT, SLT, CNPS	48	16	16	16	-	-	40 d/yr @ $400/d @ 3 yrs
2	4.2.4.3.2	If Action 4.2.4.3.1 reveals pollination limitations, identify pollinators, their efficacy, and their ecological needs.	3 yrs	**UNIV**, PVT, SLT, CNPS	72	-	-	-	24	24	Dependant on results of Action 4.2.4.3.1; 60d/yr @ $400/d @ 3 yrs
2	4.2.4.4.1	Conduct research into whether an elevated or unnatural predation level is experienced by salt marsh harvest mice at narrow marshes where the species is concentrated, especially during flooding events. If unacceptable impacts are discovered, develop and implement methods to reduce such predation.	5 yrs	**UNIV,** PVT, SLT, CDFG, USFWS	40	8	8	8	8	8	$400/d @ 5 d/mo @ 4 mo/yr @ 5 yrs

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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
1	4.2.4.4.2	Conduct research into the extent of seed predation by the *non-native* thistle weevil (*Rhinocyllus conicus*). If unacceptable impacts are discovered, develop and implement methods to reduce such seed predation.	3 yrs	**UNIV**, PVT, SLT	18	6	6	6	-	-	$400/d @ 15 d/yr @ 3 yrs
3	4.2.4.4.3	Conduct other research on predator/prey and parasite/host relationships.	TBD	ALL	TBD	TBD	TBD	TBD	TBD	TBD	
3	4.2.5	Establish cultivated *populations* for research purposes, where necessary.	3 yrs	**UNIV,** PVT, SLT, CNPS	48	16	16	16	-	-	Based on 4 species @ 10 d/species/yr
3	4.2.6	Establish research protocols, where necessary, and as determined by the Recovery Implementation Team.	20 d	**USFWS,** CDFG, UNIV, PVT	16.84	16.84	-	-	-	-	20 d @ $842/d
2	4.2.7	Conduct additional research identified	TBD	ALL	TBD	TBD	TBD	TBD	TBD	TBD	

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
		as necessary by the Recovery Implemenation Team that address changing conditions and are supportive of highest priority recovery tasks.									
2	4.2.8	Apply the results of all studies to conservation and recovery efforts.	Ongoing	ALL	TBD	TBD	TBD	TBD	TBD	TBD	
2	5.1.1	Establish the Recovery Implementation Team (RIT).	10 d	**USFWS**	8.42	8.42	-	-	-	-	10 d @$842/d
2	5.1.2	Periodically convene the RIT to guide the implementation of this draft recovery plan.	Continual	**TEAM**	240	4.8	4.8	4.8	4.8	4.8	8 d/yr @$600/d for 50 yrs
2	5.2	Conduct outreach to partners in *tidal marsh* species recovery, including public and private landowners, and appropriate Federal, State, and local agencies.	Continual	**USFWS**	421	8.42	8.42	8.42	8.42	8.42	Calculated at 10 d/yr for 50 yrs

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Action Priority	**Action Number**	**Action Description**	**Action Duration**	**Responsible Parties**	**Total**	**FY 1**	**FY 2**	**FY 3**	**FY 4**	**FY 5**	**Comments**
2	5.3.1	Develop general educational programs for public schools within the geographic scope of this draft recovery plan.	15 d	**USFWS,** UNIV, PVT	12.63	12.63	-	-	-	-	15 d @$842/d
2	5.3.2	Develop, maintain, and distribute updated information and educational materials to target audiences related to recovery and conservation of species covered in this draft recovery plan.	Continual	**USFWS**	70.18	4.21	-	-	4.21	-	Revisions and updates every 5 yrs (5 d every 3 yrs for 50 yrs)
2	5.3.3	Coordinate with local news media to promote local public interest in the recovery and conservation of species covered in this draft recovery plan.	Continual	**USFWS**	210.5	4.21	4.21	4.21	4.21	4.21	Calculated at 5 d/yr @$842 for 50 yrs

Implementation Schedule for Draft Tidal Marsh Ecosystem Recovery Plan											
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					Total	FY 1	FY 2	FY 3	FY 4	FY 5	
Priority 1 actions subtotal: $847,320,390											
Priority 2 actions subtotal: $441,868,550											
Priority 3 actions subtotal: $6,702,020											
Total Estimated Cost of Recovery through 2060: $1,295,890,960 + additional costs that could not be estimated at this time											