

Wildlife

	Goals	1993 CCMP
	Problem Statement	Revised 2007
	Existing Management Structure	Revised 2007
	Recommended Approach	Revised 2007
	Achievements	
	Challenges	
Objective WL-1	Create & restore critical plant & animal habitats	1993 CCMP
Action WL-1.1	Restore tidal salt marsh for clapper rail & salt marsh mouse	1993 CCMP
Action WL-1.2	Complete expansion of S.F. Bay National Wildlife Refuge	Revised 2007
Action WL-1.3	Acquire & restore wetlands	1993 CCMP
Action WL-1.4	Restore tidal marshes	1993 CCMP
Action WL-1.5	Identify, convert, or restore non-wetlands to wetlands or riparian	1993 CCMP
Action WL-1.6	Establish a baylands wildlife refuge in Marin & So Sonoma Co	New 2007
Objective WL-2	Develop a comprehensive wildlife management plan for Estuary	1993 CCMP
Action WL-2.1	Prepare comprehensive plan for S.F. Bay Nat'l Wildlife Refuge	1993 CCMP
Action WL-2.2	Enhance biodiversity of public wetlands	1993 CCMP
Action WL-2.3	Complete & implement wildlife habitat restoration plan	1993 CCMP
Objective WL-3	Develop predator control programs for introduced species	1993 CCMP
Action WL-3.1	Implement predator control program	1993 CCMP
Objective WL-4	Management measures for listed species	1993 CCMP
Action WL-4.1	Prepare recovery plans for listed species	1993 CCMP
Action WL-4.2	Provide colony sites for least tern	Revised 2007
Action WL-4.3	Monitor status of candidate species	1993 CCMP
Action WL-4.4	Hunting closures for Canada goose	1993 CCMP
Action WL-4.5	Captive breeding program for clapper rail	Deleted
Action WL-4.5	Provide secure colony nesting sites	New 2007
Action WL-4.6	Implement monitoring program for migratory diving birds	New 2007
Objective WL-5	Provide Public Access Protecting Resources & Wildlife	New 2007
Action WL-5.1	Provide landside public access minimizing adverse impacts	New 2007
Action WL-5.2	Provide non-motorized small boat access	New 2007
Action WL-5.3	Develop regionally consistent signage, education & outreach	New 2007
Objective WL-6	Develop & implement a Wildlife Monitoring Master Plan	New 2007
Action WL-6.1	Develop & implement monitoring plan for native Estuary wildlife	New 2007
Objective WL-7	Protect native wildlife populations wherever possible	New 2007
Action WL-7.1	Revise CEQA to ensure consideration of adverse impacts	New 2007

Wildlife Goals:

- Stem and reverse the decline of estuarine plants and animals and the habitats on which they depend.
- Ensure the survival and recovery of listed and candidate threatened and endangered species, as well as special status species.
- Optimally manage and monitor the wildlife resources of the Estuary.

Problem Statement

Probably the greatest harm to the wildlife of the Estuary and its watershed has been habitat loss and degradation. Because their populations have declined, a total of ninety taxa of insects, amphibians, reptiles, birds, and mammals within the Estuary alone have been designated by federal and state governments as deserving special protection or monitoring. Of these ninety taxa, sixty-one (or sixty-eight percent) have been depleted through loss of wetland and riparian habitats. At least seven insect species, one reptile species, three bird species, and five mammal species have been extirpated from the Estuary, primarily due to habitat loss. For this same reason, the California tiger salamander, red-legged frog, giant garter snake, western pond turtle, and several butterfly species may also soon be extirpated.

In the early 1900s, destruction or conversion of terrestrial and aquatic habitats within the Estuary watershed began to accelerate. Conversion of land for agriculture and, ultimately, urban development destroyed wetlands of all kinds, riparian forests, native grasslands, coastal scrub, and oak woodlands throughout the watershed (and state). Habitat destruction continues today as the human population continues to sprawl into prime wildlife habitat. Other causes of past and present declines in wildlife populations include overharvesting by humans, competition with and predation by natural or introduced competitors, human use of organochlorine pesticides, and discharge of pollutants, including plastic debris, into the environment, as well as human disturbances of many kinds.

What habitat remains is often fragmented, yet it continues to support wildlife. The remnant tidal salt and brackish marsh and uplands of San Francisco, San Pablo, and Suisun bays harbor many threatened and endangered species, including the endangered California clapper rail and the endangered salt marsh harvest mouse. While rails have colonized several newly restored tidal marshes—and there is much tidal marsh restoration taking place—not all restoration projects have been successful, there is a shortage of available sites, and it can take years for a marsh to support rails. These same problems hold true for the endangered salt marsh harvest mouse. Although mouse surveys are supposed to be conducted when new developments and land use changes occur, they often are not done, and scientists thus do not have enough information about the Estuary's mouse population. However, some recent habitat surveys in the South Bay have shown that there is little cover left for the mouse to escape from both high tides and predators—what was once miles of high marsh has been reduced to a maximum width of

eight or nine feet, or eliminated completely. Black rails, too, have suffered from loss of both tidal marsh and upland areas in which they can take refuge.

In addition to habitat loss and human disturbances, rails and mice are also threatened by predators like the introduced red fox and feral cats. The red fox has nearly eliminated the clapper rail in some portions of its range and seriously impacted its reproductive success, and the rail could yet become extinct. Despite control programs, red foxes have also caused major nesting failures among endangered California least terns and snowy plovers, Caspian terns, and species of herons and egrets. Gulls and ravens also harass least terns and snowy plovers, causing their nests to fail.

Burrowing owls have almost disappeared from around the Bay, as their habitat has been disked and plowed for urban development. In addition, there have been widespread attempts to eradicate ground squirrels, whose burrows the owls use to nest in. Although attempts have been made to relocate these tiny owls, one study found only one relocation in eight to be successful.

Except for some recent signs of recovery, populations of many species of dabbling ducks and geese have generally declined to the lowest levels since monitoring began in the 1950s. This has been attributed primarily to the combined effects of drought, habitat loss, and predation within wintering and nesting grounds. The ability of these populations to recover is uncertain and hinges on the extent of habitat recovery in the Canadian prairies and California and on long-term weather trends—including those induced by global climate change. Contaminants, in the form of trace elements, also occur in Bay diving ducks at levels known to impair reproduction.

Numbers of wintering diving ducks (bay and sea ducks) in the Estuary have declined over the past few decades, with some species showing dramatic declines (e.g., canvasbacks). Continentally, many of these same species are declining. For instance, scaup (combined populations of greater and lesser scaup) have declined precipitously since the 1980s and are now at their lowest levels since population counts began. Similarly, many species of sea ducks are also in continental decline. In San Francisco Bay, the most numerous sea duck species present is the surf scoter. San Francisco Bay is one of the largest wintering areas for migratory birds on the West Coast of the Americas, and it hosts between forty percent and fifty percent of many diving duck populations using the Pacific Flyway. Thus, changes in the quality (i.e., contaminants, habitat loss, disturbance, etc.) of this important wintering site could have broader implications for continental populations of diving ducks.

Intensified agricultural practices, conversion of natural areas to vineyards, and urban sprawl have also had negative effects on numerous species of native songbirds. However, recent riparian restoration efforts along the San Joaquin and Sacramento rivers seem to be boosting songbird numbers (see “Achievements” section below).

Other threats to wildlife require further monitoring, and some could result in dramatic losses or alteration of habitat. These include expansion of the introduced Asian clam and cordgrass species, and conversion of salt marshes to fresh due to the discharge of sewage

effluent. Ironically, the clapper rail seems to be using Atlantic cordgrass (*Spartina alterniflora*) successfully, but there are still concerns about the population's viability in the hybridized habitat. The long-term effects of global climate change and resulting sea level rise could cause dramatic losses and alterations of tidal mudflats and marshes, salt ponds, and farmed wetlands. This could lead to a loss of critical habitat for many species, with some possible long-term benefits for wintering waterfowl.

Existing Management Structure

The existing management structure as it relates to wildlife is the same as it was in 1993, with a few important additions. The CALFED Bay-Delta Program, a cooperative state/federal effort that began in 2000, is charged with balancing water supply reliability, water quality, ecosystem restoration, and sustainable levees. CALFED is currently focusing on problems related to the Delta (see Aquatic Resources Program); however, it has funded many restoration projects that are benefiting wildlife, including riparian restoration projects on the San Joaquin and Mokelumne rivers that have provided habitat for songbirds, ducks, and small mammals, including the endangered riparian brush rabbit.

The San Francisco Bay Joint Venture, established in 1995, is a coalition of non-governmental organizations, utilities, landowners, and resource agencies collaborating to acquire, restore, and enhance wetlands on San Francisco Bay. Working together with other organizations, this group has acquired, restored, and enhanced more than 60,000 acres around the Bay, or twenty-five percent of its goal of 236,000 acres restored, including tidal marsh and flats, seasonal wetlands, creeks, lakes, lagoons, salt ponds, and open and subtidal water habitat. The San Francisco Bay Conservation and Development Commission and the California Coastal Conservancy continue to provide leadership in wildlife restoration and protection through their mandates of permitting and acquisition, while nonprofits like the Marin Audubon Society, Citizens Committee to Complete the Refuge, River Partners, Urban Creeks Council, The Nature Conservancy, and others have made great strides in wetland and other habitat acquisition and restoration.

The U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Navy, the California Department of Fish and Game, the California Department of Parks and Recreation, and the East Bay Regional Park District have significant management and conservation responsibilities for wildlife populations within the Estuary. These agencies manage a significant amount of land within national wildlife refuges, wildlife areas, preserves, parks, and installations.

If adequately implemented, several recent planning and land acquisition efforts by state and federal agencies may help offset some of the habitat losses of the past, primarily wetlands. These include the purchase of the South Bay salt ponds, the Central Valley Habitat Joint Venture of the North American Waterfowl Management Plan, the San Francisco Bay Habitat Joint Venture of the North American Waterfowl Management Plan, the Central Valley and San Francisco Bay Concept Plans for Waterfowl Habitat Protection, and the habitat acquisition program for the San Francisco Bay National Wildlife Refuge.

The primary agencies responsible for wildlife management are authorized under numerous laws to carry out the protection, conservation, and improvement of these resources. Nevertheless, ongoing declines in the quantity and quality of habitats and the wildlife they support clearly demonstrate the critical shortage of funding—including serious underfunding of California Department of Fish and Game wardens—economic incentives, and public resolve necessary to adequately implement these needed protections and restorations.

Recommended Approach

The Wildlife Program will be most effective when combined with actions identified or categorized in the other programs of the CCMP. Many of the recommended actions described in the other sections of this document will also benefit wildlife. These actions should result in increases in critical habitat, decreases in the most harmful pollutants, and beneficial changes in freshwater flow through the Estuary. Therefore, the list of actions in this program area is not intended to be a comprehensive catalog of recommendations (or challenges and successes) for the Estuary's wildlife, but should be viewed in the context of the entire package of actions embodied in the CCMP. The combined goal of all the actions is to restore and protect a diverse, balanced, and healthy community of wildlife and plants, with a focus on indigenous species.

Achievements, 1993–2007

Despite the habitat losses and issues described above, there have been many impressive large- and small-scale efforts to restore habitat that are beginning to show successful wildlife responses.

In 2005, for the first time since the early 1900s, a pair of least Bell's vireos nested at the San Joaquin River National Wildlife Refuge, rearing two broods, after a riparian restoration project was undertaken by the U.S. Fish and Wildlife Service in collaboration with PRBO Conservation Science and River Partners, with funding from CALFED. Similarly, the endangered riparian brush rabbit has begun to recolonize riparian habitat along the San Joaquin River after a captive breeding and release program was begun in 2002. More than 300 rabbits have been released so far, and efforts are underway to improve habitat for the rabbit, as well as for the riparian wood rat. On the Tuolumne River, private wine grape growers are partnering with water and wildlife agencies, with grants from CALFED, to restore riparian habitat and return floodplains (that had been planted in grapes for years) to their natural state. Riparian restoration in urban areas is also helping songbirds, providing winter stopover points and habitat for resident birds.

Funding for habitat restoration has been generous in the past decade, via the many state bonds passed by voters. Funding has enabled nonprofits and agencies like the California Coastal Conservancy and San Francisco Bay Joint Venture to support or conduct restoration and environmental education programs around the Bay, and to eradicate non-native invasive species. Watershed groups have burgeoned, doing important restoration and cleanup projects using volunteers. Coastal Cleanup Days, sponsored by the California Coastal Commission, have also been very successful, attracting thousands of volunteers to clean the Estuary's creeks, rivers, shoreline, and marshes. These efforts

have huge educational value, not to mention removal of a substantial volume of trash from the Estuary. Hundreds of volunteers are growing native plants for restoration projects through nonprofits like Save the Bay, as well as acting as stewards and guides in short-staffed national parks and wildlife refuges around the Estuary.

The Wetlands Goals project, which is being implemented by partners in the San Francisco Bay Joint Venture, aims to triple the amount of tidal marsh around the Bay, currently at about twenty-five percent of what it was in the 1800s. The acquisition of the South Bay salt ponds, which will be restored to tidal marsh and other habitats, is a huge step toward restoring tidal marsh and other wetlands for wildlife. In the North Bay, goaded by citizen activists, the East Bay Regional Park District acquired an important marsh on the north Richmond shoreline—Breuner Marsh—using eminent domain. The marsh and its uplands, which are home to several species of concern, including the white-tailed kite, were in danger of being developed with condominiums.

California sea lions, recovering from past exploitation, are increasing their use of San Francisco Bay. Bay-wide censuses of harbor seals indicate a population of approximately 600 that has remained stable for the past decade. There are approximately twelve known haul-out sites in the Bay, but harbor seals are found in the greatest numbers at Mowry Slough, Yerba Buena Island, and Castro Rocks.

San Francisco Bay remains a major coastal wintering and migrational stopover area for a variety of Pacific Flyway diving ducks and shorebirds. Suisun Marsh and the Delta provide valuable habitat for significant numbers of dabbling and diving ducks, geese, swans, and cranes. Some waterbird populations appear to have increased in response to the creation of artificial habitats, such as salt evaporation ponds. With the acquisition of the South Bay's salt ponds, many of which will be restored to tidal marsh, efforts are being made to balance the needs of a variety of bird species, and to provide a mosaic of habitat types, including retaining some of the ponds for those species that have come to rely on them.

Challenges, 2007–2017

Many of the current causes of wildlife problems will likely continue into the future. Despite the many bonds with funding for environmental restoration and protection passed in recent years, we still do not have any new large-scale, sustainable sources of funding for the environment. New solutions need to be found as the state's bond debt continues to grow. And while there is greater public awareness of many environmental issues, there is a never-ending need for strong environmental advocacy throughout the Estuary's watershed. The entire north Richmond shoreline remains in danger from proposed developments, despite the fact that it is home to many species of concern.

With support from regulatory and other agencies like the California Coastal Conservancy, activists and nonprofits have managed to prevent—or at least scale back—many developments that would have negatively impacted the Bay. Yet in spite of our progress since 1993, the need to “save the Bay” has not diminished. The need to preserve open space and other undeveloped lands throughout the Estuary's watershed is probably

greater now than ever, as the state's population continues to grow. We need to find viable places for people to live that do not sprawl into the wildlife habitat that is left. Urban habitat restoration can help make our cities more livable, as can access to regional parks and the Bay. The Bay Trail has generated much public interest in the Bay and its wildlife; however, we need to make sure public access is done in a careful way that does not disturb wildlife—often easier said than done. We also need to better plan development to preserve wildlife corridors between habitats—too often, this does not happen.

Another continuing challenge for birds and other wildlife that nest in and around and use the Estuary is that of legacy pollutants. Mercury, selenium, and PCBs, among others, have been shown to impair avian reproduction. Emerging contaminants like the fire retardant PBDEs have been found in the tissues of Bay harbor seals, and scientists do not yet completely understand the impacts of PPCPs—pharmaceuticals and personal care products that enter our wastewater treatment system but do not get completely treated—on wildlife. Selenium-laden agricultural discharges from the west side of the San Joaquin Valley continue to be a threat to the Estuary and its watershed and wildlife.

Nonpoint source pollution—the grease, oil, pet waste, and trash, including plastics, that enter the Estuary and its tributaries via storm drains—is another ongoing problem for wildlife that needs a more collaborative and comprehensive effort. The San Francisco Bay Regional Water Quality Control Board proposes to address this in its Municipal Regional Stormwater Permit now being drafted. As California's population grows, these problems will continue to harm wildlife unless we come up with better solutions and the will to implement them.

Wildlife Actions

Objective WL-1

Create and restore habitats critical to the survival of plant and animal populations and enhance the biodiversity of the Estuary.

ACTION WL-1.1 (1993 CCMP)

Preserve, create, restore, and manage large, contiguous expanses of tidal salt marsh and necessary adjacent uplands for the California clapper rail and the salt marsh harvest mouse.

Who: U.S. Fish and Wildlife Service, California Department of Fish and Game, public land management agencies, in coordination with special districts, such as mosquito abatement districts, California Coastal Conservancy, and California Conservation Corps (as appropriate)

What: Habitats for these rapidly dwindling species are extremely fragmented, particularly in the South Bay. Recovery will require the creation of large, contiguous tracts of salt marsh interlaced with tidal sloughs and suitable refuge from high tides. At least 15,000 acres are needed (in addition to the acreage listed in the Wetlands

Management Program and the planned acreage for the San Francisco National Wildlife Refuge listed under WL-1.2 below). Acquisition should be pursued with willing sellers.

When: Immediately

Cost: \$170 million estimated total (\$90 million federal and \$80 million state)

ACTION WL-1.2 (1993 CCMP)

Complete the expansion of the San Francisco Bay National Wildlife Refuge and its satellite refuges and acquire the proposed Stone Lakes National Wildlife Refuge.

Who: U.S. Fish and Wildlife Service

What: Congressional budget augmentation should be provided to acquire the additional 22,000 acres authorized in the legislation for the expansion of the San Francisco Bay National Wildlife Refuge. In addition, the U.S. Fish and Wildlife Service should continue to pursue acquisition of appropriate North Bay parcels for addition to the refuge as part of the normal planning process. Particular emphasis should be placed on the Napa River marshes. The U.S. Fish and Wildlife Service should continue to pursue the acquisition of the proposed Stone Lakes National Wildlife Refuge at no less than 18,200 acres, on a willing seller basis, to be the keystone of a much larger (75,000–100,000 acres) North Delta wetland package that could include Yolo Basin wetlands, the Putah Creek and Cache Creek riparian areas, Natomas wetlands, and the Cosumnes River Preserve. All acquisition strategies, including eminent domain, easements, and other methods addressed in the preceding action, should be employed as needed. Sovereign and public trust land should be managed consistent with the refuge purposes.

When: To be determined

Cost: \$237,520,000 estimated total (\$230 million federal and \$7,520,000 state)

ACTION WL-1.3 (1993 CCMP)

Implement concerted efforts to acquire wetlands already degraded or destroyed and restore them so that wetlands in the Estuary are increased by fifty percent by 2000.

(See Wetlands Management Action WT-4.1 for details.)

ACTION WL-1.4 (1993 CCMP)

Restore tidal marshes in San Francisco Bay.

(See Wetlands Management Action WT-3.1 for details.)

ACTION WL-1.5 (1993 CCMP)

Identify and convert or restore non-wetland areas to wetland or riparian-oriented wildlife habitat.

(See Wetlands Management Action WT-4.1 for details.)

ACTION WL-1.6 (New 2007)

Establish a comprehensively managed baylands wildlife refuge in Marin and southern Sonoma counties.

Who: U.S. Fish and Wildlife Service, California Department of Fish and Game, California Coastal Conservancy, or other government agencies with authority to hold title to and/or cooperatively manage and restore relatively large acreages of wildlife habitat, and non-governmental organizations, including the Marin Audubon Society

What: The potential exists for a comprehensively managed wildlife refuge consisting of approximately 25,000 acres. The foundation for this refuge would be the former Hamilton Airfield, Bel Marin Keys, Bahia, Sears Point, North Parcel, Tolay Creek, and Sonoma Baylands, all of which have been acquired and have moved forward in restoration planning and/or implementation. Particularly at this time, the establishment and comprehensive management of a refuge system in east Marin County and southern Sonoma County (San Pablo Bay area) would be invaluable for endangered species recovery efforts and is consistent with recommendations in the “Baylands Ecosystem Habitat Goals” report.

The San Pablo Bay National Wildlife Refuge is presently conducting an update to its Comprehensive Conservation Plan (CCP) for its North Bay Refuge lands, and this is an opportunity to consider expansion of this refuge. Candidate properties for acquisition and restoration should be identified, aggregated into a list, and put forward for inclusion in this CCP process. The former U.S. Navy facility at Skaggs Island should be included as a candidate property. Expansion of the Marin Islands Refuge, establishment of a Marin Baylands Refuge or a Petaluma River Refuge under the U.S. Fish and Wildlife Service, or expansion of the California Department of Fish and Game’s Ecological Reserve system are also possibilities.

When: Immediately

Cost: \$\$\$

Uncertainty: Dependent on land acquisition and restoration costs, and annual operation, maintenance, and repair costs, which can be substantial

Performance Measures:

- 1) Acres brought into acquisition and/or cooperative wildlife habitat management agreements
- 2) Acres within the refuge restored

Objective WL-2

Develop a comprehensive wildlife management plan for the Estuary.

ACTION WL-2.1 (1993 CCMP)

Prepare a comprehensive management plan for the San Francisco Bay National Wildlife Refuge.

Who: U.S. Fish and Wildlife Service, in coordination with special districts, such as mosquito abatement districts

What: In anticipation of the San Francisco Bay National Wildlife Refuge assuming full land management responsibility over significant salt pond acreage, the U.S. Fish and Wildlife Service should prepare a refuge habitat management plan. A goal of the plan is the maintenance of sufficient acreage of managed and tidal wetlands to support the unique assemblage of wildlife relying on those habitats. Appropriate emphasis should be placed on non-game species, such as shorebirds, colonial waterbirds, seabirds, and raptors. This plan will include the following:

- 1) Identification of an appropriate combination of tidal and managed wetlands to maintain greatest species diversity and population stability;
- 2) Identification of the most suitable tidal marsh restoration areas;
- 3) Identification of the optimal and most economically feasible wetland management techniques;
- 4) Environmental assessment of various management approaches; and
- 5) Coordination with ongoing monitoring and research efforts of PRBO Conservation Science, San Francisco Bay Bird Observatory, etc.

When: Within three years

Cost: \$270,000 estimated total (\$270,000 federal)

ACTION WL-2.2 (1993 CCMP)

Enhance the biodiversity within all publicly owned or managed wetlands and other wildlife habitats as appropriate.

Who: U.S. Fish and Wildlife Service, California Department of Fish and Game, National Park Service, Department of Defense, California Department of Transportation, East Bay Regional Park District, San Francisco Bay Conservation and Development Commission, other public land management agencies (in consultation with the Executive Council on Biological Diversity, National Audubon Society, PRBO Conservation Science, Marine Mammal Center, California Academy of Sciences, and the general public), mosquito abatement districts, California Coastal Conservancy, and California Conservation Corps (as appropriate)

What: Resource agencies will plan and implement enhancement measures that promote biodiversity for the wildlife habitats they own or manage. This could involve the establishment of a Habitat Task Force. The resource agencies will also provide technical assistance to other land management agencies in the planning and implementation of similar measures on those lands to the extent it is consistent with their missions. Cooperative agreements between the resource agencies and other public landowners to improve biodiversity and wildlife habitat values on those lands, consistent with the primary mission of the landowner, should be explored and implemented whenever practicable. Comparable agreements with private landowners should also be explored. All such agreements should be periodically reviewed and renegotiated to improve them whenever the opportunity exists. The technical results of these enhancement measures will be used by the agencies to implement the actions, and summary material will be incorporated into the Public Involvement and Education Program. The measures will address some of the following issues:

- 1) Identification of wildlife groups of concern, with particular emphasis on native species;
- 2) Mosquito abatement districts should provide private and public wetland managers with guidelines for enhancing seasonal wetlands, while addressing vector control;
- 3) To the extent that it is not inconsistent with their primary missions and budgets, flood control and mosquito abatement districts should be encouraged to manage their operations to maximize wildlife and wetland values. Bank erosion control projects should be designed to maximize riparian values; and
- 4) Using the efforts of the Executive Council on Biodiversity, establish bioregions within the Estuary and ensure that these regions are incorporated in the land use and wetlands plans. Educate the public, the agricultural community, landowners, developers, local government officials, and agencies on the value of this concept and how to incorporate it into agency missions, management goals, land use planning, etc.

When: To be determined

Cost: \$4,260,000 estimated total (\$1,260,000 federal and \$3 million state)

ACTION WL-2.3 (1993 CCMP)

Complete and implement a wildlife habitat restoration and management plan for the Estuary.

Who: U.S. Fish and Wildlife Service, California Department of Fish and Game, and landowners, in coordination with special districts, such as mosquito abatement districts, California Coastal Conservancy, and California Conservation Corps (as appropriate)

What: The resource agencies should lead a coordinated effort to develop and implement a wildlife habitat restoration and management plan for the entire Estuary. This plan

would then be appended to the CCMP and should be reviewed and updated as necessary, or at least once every ten years. The plan should include extensive outreach by the resource agencies to ensure full participation by affected landowners and the public. The plan would include the following elements:

- 1) Identification of wildlife groups of concern, with particular emphasis on native species and overwintering and migrating shorebirds and waterfowl;
- 2) Analysis of management alternatives to maintain and restore wetland and riparian communities and biodiversity;
- 3) Assessment of impacts of various management alternatives;
- 4) Implementation and habitat acquisition strategies that incorporate biodiversity and wildlife corridors where possible;
- 5) Coordination of research activities with the Regional Monitoring Program for Water Quality, the Public Involvement and Education Program, and ongoing efforts by PRBO Conservation Science, San Francisco Bay Bird Observatory, etc.; and
- 6) Identification of possible funding sources and lead agencies.

The plan will also need to address private property rights.

When: Complete within three years

Cost: \$2,060,000 estimated total (\$1,560,000 federal and \$500,000 state),

Objective WL-3

Develop predator control programs to decrease the impact of introduced species on listed and candidate species, as well as special status species.

ACTION WL-3.1 (1993 CCMP)

Implement predator control programs in areas where introduced predators are a constraint to maintenance and restoration of native populations.

Who: U.S. Fish and Wildlife Service, California Department of Fish and Game, public land management agencies, Society for the Prevention of Cruelty to Animals, and local governments

What: Implement predator control whenever the effects of predation are determined to be a constraint to the maintenance and restoration of populations of native species. Control on public lands will be implemented by the landowner/manager under a plan approved by the resource agencies. Control on private lands will be implemented by the resource agencies, with permission of the landowner, or by the landowner under a plan developed

by the resource agencies. Red foxes, feral and domestic cats, and rats are some of the target species that are known to have significant impacts on native species.

When: Immediately

Cost: \$6.1 million estimated total (\$6 million federal and \$100,000 state)

Objective WL-4

Implement management measures necessary to ensure survival and recovery of listed and candidate species, as well as special status species.

ACTION WL-4.1 (1993 CCMP)

Update, and, where necessary, prepare recovery plans for all listed wildlife species.

Who: U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and San Francisco Bay Conservation and Development Commission

What: Detailed recovery plans for all listed species will be prepared or updated as necessary. Critical habitat will be identified, unless the identification of that habitat could hamper species recovery. Increased funding to prepare and implement recovery plans should be sought.

Implement recovery actions, including protection and enhancement of critical habitats targeted for acquisition or protection through regulatory processes. U.S. Fish and Wildlife Service and the California Department of Fish and Game will be the lead agencies for their respective listings. Created and restored marshes acquired for this purpose should be sufficiently large (more than 1,000 acres) to support extensive tidal channel systems. Priority sites are outlined in the Joint Clapper Rail and Salt Marsh Harvest Mouse Recovery Plan. Special attention shall be given to non-native invasive species in clapper rail and salt marsh harvest mouse habitat.

When: Within three years for listed species

Cost: \$2,125,000 estimated total (\$2,025,000 federal and \$100,000 state)

ACTION WL-4.2 (Revised 2007)

Provide secure colony sites, allow for population recovery, control predators, and protect adjacent foraging areas for the California least tern.

Who: U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Navy, U.S. Army Corps of Engineers, San Francisco Bay Conservation and Development Commission, Port of Oakland, and Pacific Gas and Electric Company

What: Finalize the proposed Alameda National Wildlife Refuge and establish at least one other Bay Area colony site in order to provide several secure colony nesting sites for the

California least tern. The Alameda National Wildlife Refuge is currently just a proposal. In the event the refuge does not materialize, the colony still needs protection.

The proposed Alameda National Wildlife Refuge provides one of the most productive California least tern nesting sites in California. The official establishment of the Alameda National Wildlife Refuge will protect the only consistent California least tern nesting colony in Northern California. Habitat management efforts for the Alameda National Wildlife Refuge colony and future colonies need to be adequately funded and staffed, as needed.

When: Immediately

Cost: \$\$\$

ACTION WL-4.3 (1993 CCMP)

Monitor status of all candidate species and list them if warranted.

Who: U.S. Fish and Wildlife Service and California Department of Fish and Game

What: Develop and implement programs to monitor the status of all Class I and Class II candidate species. Agencies should take steps to list any species that warrant such listing to afford them the full protection of the law. Any listing package should include designation of critical habitat, unless the identification of that habitat could hamper species recovery.

When: Within five years

Cost: \$25,200,000 estimated total (\$7.2 million federal and \$18 million state)

ACTION WL-4.4 (1993 CCMP)

Continue hunting closures to protect the Aleutian Canada goose. Investigate the need for hunting closures for other waterfowl species as necessary.

Who: U.S. Fish and Wildlife Service, California Department of Fish and Game, and Pacific Flyway Council Technical Committees

What: Hunting closures to protect wintering populations of the Aleutian Canada goose in the Central Valley must be continued by the resource agencies until the subspecies is delisted.

Strengthen programs to educate hunters on proper identification of waterfowl species and male versus female (to minimize unlawful take).

Use educational programs to encourage anglers, hunters, and recreational boaters to avoid using critical areas where ducks, such as canvasbacks, white-winged scoters, and greater

scaup, congregate. Use these same programs to encourage the public to purchase federal duck stamps at the post office.

When: Immediately

Cost: No direct costs

ACTION WL- 4.5 (New 2007)

Provide secure colony nest sites for Caspian and Forrester's terns; double-crested, pelagic, and Brandt's cormorants; great and snowy egrets; great blue heron; pigeon guillemot; common murre; and other colonial nesting water birds as might nest on the Bay or in the watersheds.

Who: U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Navy, U.S. Army Corps of Engineers, U.S. Air Force, San Francisco Bay Conservation and Development Commission, California Department of Transportation, Federal Highway Administration, ports, Pacific Gas and Electric Company, and others

What: Colonial nesting water birds use a variety of nest sites, from riparian habitats to bridges and bridge pilings, power line towers, navigational buoys, airstrips, salt pond levees, catwalks, etc.

Develop and implement a comprehensive plan that identifies the location of existing colonies and the location of likely future sites for nesting colonies and that identifies management programs necessary to sustain those colonies. Management programs may include the protection of sites from predators and human intrusion and also the protection of nearby foraging areas.

When: Immediately

Cost: \$

Uncertainty: Applicable on a site-by-site basis

Performance Measures:

- 1) Completion of a nesting colony master plan
- 2) Percentage of nesting sites protected
- 3) Percentage increase in target colonial nesting water birds species

ACTION WL-4.6 (New 2007)

Implement a monitoring and research program to better understand the role of wintering habitat in population declines of those migratory diving waterbird species that overwinter on Bay waters and that rest and feed in large groups (rafts). Develop management strategies to address these population declines if the research shows that this is needed.

Who: U.S. Fish and Wildlife Service, U.S. Geological Survey, California Department of Fish and Game, San Francisco Bay Conservation and Development Commission, San Francisco Bay Joint Venture, San Francisco Bay Area Water Transit Authority, PRBO Conservation Science, and Audubon California and local chapters

What: Resource agencies, the Water Transit Authority, and interested nonprofits will monitor populations of rafting ducks, such as scaup and scoter, western and Clark's grebes, and other waterbird species with declining populations, to determine causes for their sharp population declines.

Studies of the impacts of recreational and commercial water use (e.g., boating, ferries), contaminant uptake, and other potential impacts will be undertaken.

Upon determination of significant causative agents, management actions should be taken to attempt to reverse the declines.

When: Immediately

Cost: \$

Performance Measures:

- 1) Establish a research and monitoring program.
- 2) Number and variety of species of migratory diving waterbird species that overwinter on Bay waters
- 3) Web site hits accessing report/other information on the monitoring program

Objective WL-5

Provide public access opportunities to, along, and on the Estuary that avoid or minimize adverse impacts to Bay resources and wildlife while facilitating Bay-related education and recreation.

ACTION WL-5.1 (New 2007)

Provide landside public access along the shoreline and nearshore areas of the Estuary that avoids to the extent feasible or minimizes adverse impacts to sensitive habitats and wildlife while accommodating education, biking, hiking, wildlife viewing, and other Bay-oriented recreational activities.

Who: Association of Bay Area Governments, San Francisco Bay Conservation and Development Commission, California Coastal Conservancy, California Department of Fish and Game, U.S. Fish and Wildlife Service, National Marine Fisheries Service, local governments of cities and counties, and park districts

What: The Estuary and its shoreline are important refuge, foraging, and nesting habitat for wildlife and also provide opportunities for unique recreational experiences. Participating in recreational activities along the shoreline allows the public to discover, experience, and appreciate the Bay's natural resources. These activities can also foster public support for Bay resource protection, including habitat acquisition and restoration. However, public access to the shoreline may have adverse effects on wildlife (including disturbance, increased stress, increased predation, interrupted foraging, or nest abandonment) and may result in adverse long-term population and species effects. The type and severity of effects, if any, on wildlife depend on many factors, including site planning, the type and number of species present, and the intensity and nature of human activity.

Recreational areas should be located, designed, and managed to prevent significant adverse impacts from human intrusion on sensitive habitats and on wildlife species. Avoiding adverse effects on wildlife may include siting and design strategies, such as locating parking and staging areas away from sensitive habitat areas, viewing platforms, fencing, open space, or vegetation to buffer wildlife from human use. Managing human use of an area may include periodic closure of access areas, pet restrictions, such as leash requirements, and prohibition of public access in areas where other strategies are insufficient to avoid adverse effects. Visitors should be provided with diverse and satisfying recreational opportunities to focus activities in designated areas, thus avoiding habitat fragmentation, vegetation trampling, and erosion. Interpretive centers, educational signage, docent-led tours, and community events educate visitors about local natural resources and wildlife, their ecological and historical importance, and appropriate visitor behavior, and can motivate people to participate in the responsible stewardship and protection of the Bay.

Consultation with wildlife agencies, such as the California Department of Fish and Game and the U.S. Fish and Wildlife Service, may be necessary to determine suitable locations for public access. Effects of recreational activities on wildlife should be monitored over time to determine whether revisions of management strategies are needed.

When: Ongoing

Cost: \$\$

Uncertainty: Cost of siting and providing landside public access will be incurred by project applicants and will be dependent on project size.

Performance Measures:

- 1) Guidance document that identifies conditions under which public access does not adversely impact wildlife

- 2) Percentage of shoreline access protected and/or increased that is available for public recreation that does not adversely impact wildlife

ACTION WL-5.2 (New 2007)

Provide non-motorized small boat access, establish routes, and install associated infrastructure at carefully selected locations along the shoreline and nearshore areas of the Estuary that avoid to the extent feasible or minimize adverse impacts to resources and wildlife while providing opportunities for education and boating activities.

Who: California Coastal Conservancy, Association of Bay Area Governments, San Francisco Bay Conservation and Development Commission, U.S. Fish and Wildlife Service, California Department of Fish and Game, California Department of Boating and Waterways, National Marine Fisheries Service, U.S. Coast Guard, local governments of cities and counties, local and state park districts, marinas, harbor districts, and ports

What: The Estuary and its shoreline are important refuge, foraging, and nesting habitat for wildlife and also provide opportunities for unique recreational experiences. Water access within the Estuary (including landing and launching sites for human-powered boats and beachable sailcraft) provides the public a direct experience with the Estuary, fostering appreciation and promoting habitat preservation, restoration, and stewardship. However, development of water access and boat traffic within the Estuary may have adverse impacts on wildlife and their habitats.

Water access and associated facilities should be sited, designed, and managed to avoid or reduce adverse impacts from human intrusion on sensitive wildlife species. Sensitive shoreline and tideland habitat areas should be avoided. Water access should occur at existing and planned public access points. Signage and other educational methods, such as docent programs, should be employed to promote stewardship, inform the public of the importance and sensitivity of certain habitats and wildlife, and encourage safe, environmentally responsible recreation. Efforts toward increasing enforcement of sensitive habitat area restrictions should be pursued. Consultation with wildlife agencies, such as the California Department of Fish and Game and the U.S. Fish and Wildlife Service, may be necessary to determine suitable locations for water access. Where appropriate, effects of water access on wildlife should be monitored over time to determine whether revisions of management strategies are needed.

When: Water Trail Plan to be completed by 2008. Implementation to begin thereafter.

Cost: \$\$\$\$\$

Performance Measure:

Percentage of shoreline of public access (as identified in Water Trail Plan) that is accommodated while not adversely impacting wildlife

ACTION WL-5.3 (New 2007)

Develop a regional program, either through partnerships between existing agencies and organizations or the creation of a new agency or organization, to establish coordinated, consistent, and uniform signage, education, and outreach throughout the Bay.

Who: California Coastal Conservancy, San Francisco Bay Conservation and Development Commission, Association of Bay Area Governments, U.S. Fish and Wildlife Service, California Department of Fish and Game, National Marine Fisheries Service, local and state park districts, and Save the Bay

What: Interpretive centers, educational signage, docent-led tours, and community events educate visitors about local natural resources and wildlife and also inform them of appropriate visitor behavior. These tools not only educate the public about the value of Bay resources but can also inspire protection and stewardship of the Bay. Throughout the Bay, nonprofit, educational, local, state, and federal agencies and organizations have required or have provided directional and interpretive signage along public access areas on the shoreline of the Bay. Additionally, some of these organizations provide Bay-related educational tours and school curriculums. While tours, classes, and signage are effective methods for educating the public on the importance of the Bay and its resources, a consistent theme or “branding” that provides a uniform message throughout the Bay is lacking. Development of a regional program with coordinated signage, graphics, text, and educational materials and information would provide a uniform message that would be recognizable to the public and would establish connectivity between the many public access experiences throughout the Bay Area.

When: An analysis to examine the feasibility of developing this program should be initiated immediately.

Cost: \$\$\$

Performance Measures:

- 1) Develop regional program to coordinate and build on current public access, signage, educational, and interpretive materials throughout the Bay.
- 2) Number of signs or materials developed

Objective WL-6 (New 2007)

Develop and implement a Wildlife Monitoring Master Plan.

ACTION WL-6.1 (New 2007)

Develop and implement a monitoring plan that will track the status of native wildlife species in the Estuary.

Who: U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Fish and Game, National Audubon Society, PRBO Conservation Science, San Francisco Bay National Estuarine Research Reserve, San Francisco Bay National Wildlife Refuge, and other nonprofits

What: A comprehensive regional monitoring plan tracking the numbers and status of native wildlife species needs to be developed. The plan should identify measures to ensure the recovery of any species identified by the monitoring plan as declining in population.

When: Immediately

Cost: \$\$

Performance Measures:

- 1) Develop a regional monitoring master plan documenting monitoring protocols and recommending recovery strategies for impacted species.
- 2) Percentage change in populations of key native wildlife species (especially those determined to be severely impacted)

Objective WL-7 (New 2007)

Protect native wildlife populations wherever possible.

ACTION WL-7.1 (New 2007)

Revise California Environmental Quality Act (CEQA) Checklist and Guidelines to ensure consideration of adverse impacts to native and migratory wildlife populations, including impacts of habitat loss or degradation and effects of global climate change and sea level rise.

Who: California Resources Agency and Governor's Office of Planning and Research

What: Current guidelines need to be modified to specifically consider adverse impacts to native wildlife populations.

When: Immediately

Cost: \$ (Part of agency budget)

Performance Measure:

Revised CEQA Checklist and Guidelines

ACTION WL-7.2 (New 2007)

Include policies and actions in General Plans to ensure that protection of native wildlife populations is considered.

Who: Local municipal and county governments

What: Current General Plans need to be modified to specifically consider adverse impacts to native wildlife populations.

When: Immediately

Cost: \$

Performance Measure:

Number of revised General Plans adopted including wildlife protection (via annual survey)