

Appendix K

Compatibility Determinations

Compatibility Determinations (Draft)

Appendix K includes the following draft compatibility determinations:

Sweetwater Marsh Unit

Wildlife Observation and Photography
Environmental Education and Interpretation
Mosquito Management
Fishing
Water Trail

South San Diego Bay Unit

Wildlife Observation and Photography
Environmental Education and Interpretation
Mosquito Management
Regional Trail

Compatibility Determination

-DRAFT-

Use: Wildlife Observation and Photography

Refuge Name: Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge
(San Diego County, Cities of Chula Vista and National City, California)

Establishing and Acquisition Authorities:

The authorities for the establishment of the Sweetwater Marsh Unit are the Endangered Species Act of 1973, as amended (16 U.S.C. §§1531-1543); Fish and Wildlife Act of 1956, as amended (16 U.S.C. §§742a-742j, not including 742d-742l); and the Fish and Wildlife Coordination Act of 1934, as amended (16 U.S.C. §§661-667e).

Refuge Purposes:

The Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge (NWR) was established:

“...to conserve (A) fish or wildlife which are listed as endangered species or threatened species...or (B) plants” (Endangered Species Act of 1973); and

”...for the development, advancement, management, conservation, and protection of fish and wildlife resources...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude...” (Fish and Wildlife Act of 1956).

[This refuge] “shall be administered by him [Secretary of the Interior] directly or in accordance with cooperative agreements...and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon...” (Fish and Wildlife Coordination Act of 1934).

National Wildlife Refuge System Mission:

The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use:

At the scoping meetings for the Sweetwater Marsh and South San Diego Bay Units of the San Diego Bay NWR Comprehensive Conservation Plan (CCP), the public expressed a desire to see the existing opportunities for wildlife observation and photography on Gunpowder Point continued. There was also an interest in developing additional wildlife observation opportunities provided in the vicinity of Paradise Marsh. Wildlife observation and photography represent two of the six priority public uses of the National Wildlife Refuge System that if determined to be compatible uses should be facilitated on National Wildlife Refuges.

As described in the Public Use Program discussion in Section 2.2.2.1 of the draft CCP/ Environmental Impact Statement (EIS) (USFWS 2004), existing opportunities for wildlife observation and photography on the Sweetwater Marsh Unit are currently provided on Gunpowder Point. From the Chula Vista Nature Center, an observation pavilion located near the edge of the bay, and portions of the existing interpretive trail system (refer to Figure 2-1 of the draft CCP/EIS), Refuge visitors can observe migratory birds foraging within the salt marshes and tidal mudflats located adjacent to Gunpowder Point. Also available from the observation pavilion and portions of the trail system, are the sights and sounds of birds, such as black brant (*Branta bernicla nigricans*) and elegant tern (*Sterna elegant*), foraging and loafing in the bay. Although no new opportunities for wildlife observation and photography are proposed on Gunpowder Point, the CCP does include a proposal to redesign the existing interpretive trail system (refer to the Compatibility Determination prepared for environmental education and interpretation on the Sweetwater Marsh Unit, as well as Section 2.2.2.3 of the draft CCP/EIS). It is anticipated that this redesign would improve opportunities for wildlife observation.

Public access onto Gunpowder Point is only available via a bus that transports visitors from a satellite parking area (located to the east of the Refuge) to the Chula Vista Nature Center. The City of Chula Vista, which operates this shuttle bus, does not collect a fee to use the bus; however, an admission fee is collected to enter the facilities operated by the Chula Vista Nature Center. No fee is collected from visitors interested only in observing wildlife from the existing trail system and observation pavilion on Gunpowder Point. Public access onto the Refuge is permitted during those hours in which the Chula Vista Nature Center is open (Tuesday through Sunday, 10:00 AM - 5:00 PM, except major holidays). Approximately 35,000 people visited the Nature Center during 2003 and many of these visitors spend time on the interpretive trails located on the Refuge.

Appropriate upland sites are not available on Refuge property in the vicinity of Paradise Marsh or F&G Street Marsh to accommodate new opportunities for wildlife observation. Therefore, to address the public's request for wildlife observation sites in these areas, the CCP recommends that the Refuge Manager coordinate with adjacent local agencies (National City and Chula Vista) to develop wildlife observation sites within the public rights-of-way that abut Paradise Marsh and the F&G Street Marsh (refer to Figure 1-3 of the draft CCP/EIS).

Availability of Resources:

Direct costs to administer opportunities for wildlife observation and photography, including monitoring of trail user activities, are primarily in the form of staff time. Adequate staff positions and financial resources are currently available and committed to manage the continuation of existing opportunities for wildlife observation and interpretation on Gunpowder Point. To adhere to the stipulation regarding additional regulatory signage on the Refuge, approximately \$5,000 would be required to fabricate and install up to five signs on the Refuge. There is adequate funding in the current budget to cover this expense. The development of observation areas in the vicinity of Paradise Marsh and F&G Street Marsh would require participation by the adjoining property owners, which in this case are the Cities of National City and Chula Vista, respectively. Funding is not currently available in the Refuge budget to assist in the construction of observation areas in these locations, however, potential future funding sources could include Federal cost share grants, other state or local grants, private donations, and/or contributions from the Refuge's Friends Group.

Anticipated Impacts of the Use:

Activities related to wildlife observation and photography can result in negative impacts to wildlife by altering wildlife behavior, reproduction, distribution, and habitat (DeLong and Schmidt 2000). In addition, birds frequently approached by humans engaged in these activities may reduce foraging times in the affected area or avoid the area entirely (Huffman 1999). During studies conducted in south San Diego Bay, Huffman observed that human activity along the shoreline and in the mudflats would flush all birds within a 50 to 100 meter radius. To minimize these types of impacts within the Sweetwater Marsh Unit, various measures have been implemented in an attempt to keep individuals within designated observation areas and out of sensitive habitats. These measures include post and cable fencing, regulatory signage, and periodic monitoring of trail user activities.

Endangered and Threatened Species: Human activity can have adverse impacts to listed species, particularly when avian nesting or foraging activities are disrupted. Of particular concern are potential disturbances to the endangered light-footed clapper rail (*Rallus longirostris levipes*), which is supported by the salt marsh habitat that occurs on the Refuge. Maintaining designated trails to accommodate wildlife observation and photography, as well as regulatory and interpretive signage to keep authorized users out of sensitive areas, has minimized disturbance to this species. Another Federally-listed endangered species that is susceptible to harm as a result of off-trail activity is the salt marsh bird's beak (*Cordylanthus maritimus maritimus*), an annual plant found in the high marsh. The measures described above also minimize the potential for impacts to this species as a result of authorized wildlife observation and photography activities on the Refuge. However, to further minimize the potential for disturbance to these species, as well as to reduce the amount of unauthorized access onto the Refuge from adjoining parcels, additional signage would be installed to keep the public out of sensitive habitat areas.

Public uses such as wildlife observation and photography are only permitted on Gunpowder Point, the remainder of the Refuge is closed to public access in an effort protect sensitive habitat and the endangered and threatened species and migratory birds supported by that habitat. As a result, no impacts to the endangered California least tern (*Sterna antillarum browni*) or threatened western snowy plover (*Charadrius alexandrinus nivosus*) are anticipated.

Sensitive Habitats: Opportunities for wildlife observation and photography are generally limited to the area in and around the Chula Vista Nature Center and on the existing trail system, therefore, impacts to sensitive habitats as a result of these uses would be minimal (refer to the discussion provided under Endangered and Threatened Species).

Migratory Birds: The existing trail system provides access to the edge of the Refuge where expansive mudflats provide foraging habitat during low tides. To minimize off-trail activity in this area, post and cable fencing has been installed along the trails. Additional signage is recommended in areas where these trails abut sensitive habitat to further potential impacts.

Public Review and Comment:

Wildlife observation and photography have been discussed a several occasions at public workshops held in conjunction with the Comprehensive Conservation Plan (CCP) process. To initiate the CCP process, a Notice of Intent was published in the Federal Register on June 23, 2000 (65 FR 39172). At that time, written comments were solicited. In July 2000, two initial scoping meetings were held, one in Imperial Beach and one in Chula Vista, to receive input from the public on issues related to the South San Diego Bay and Sweetwater Marsh Units. Due to the public's level of interest in these refuges, focused public workshops were held in September 2000 and June 2001 to specifically address the issue of public use. Three additional workshops were held between November 2000 and May 2001 to receive input from the public on wildlife management and restoration proposals for these refuges. All of the public meetings were well attended with at least 40 people present at each meeting. Approximately 50 to 60 people attended those meetings related to public use.

At each workshop, the public was encouraged to provide verbal comments or to send us written comments following the workshop. A CCP web page (www.sandiegorefuges.fws.gov) was established to provide the public with specific information regarding the topics addressed at the various workshops and to present information regarding when and where to provide comments. A number of Planning Updates have also been prepared to summarize the progress of the CCP and to discuss specific issues related to the planning process. One of these updates was devoted entirely to the topic of public use. These Planning Updates have been distributed to more than 1,000 individuals and organizations representing interested members of the public, conservation organizations, hunting, fishing and boating organizations, public agencies, municipalities, special districts, Tribes, and adjoining property owners. We received more than 50 letters, emails, and phone calls related to public use between June and November 2001 and numerous other communications relevant to public uses on the Refuge were received in 2002 and 2003.

During the scoping meetings and public use workshops for the CCP, a number of individuals expressed a general desire to see additional opportunities for wildlife observation and photography within the south bay, however, most of the site specific suggestions related to the South San Diego Bay Unit. The one recommendation that related to the Sweetwater Marsh Unit involved a request to see opportunities for wildlife observation and interpretation in the vicinity of Paradise Marsh in the northern end of the Refuge.

This draft Compatibility Determination is being presented for public review and comment in conjunction with the draft CCP/EIS.

Determination:

Use is Not Compatible

Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

The following measures will be taken to minimize impacts to wildlife:

1. To discourage off-trail activity “Closed Area” or “Sensitive Habitat” signs will be installed in areas where trails or observation areas abut sensitive habitat.
2. Periodic monitoring of trail user activities will continue to determine if unauthorized off-trail activity is occurring in or around sensitive areas of the Refuge. If during monitoring it is determined that off-trail activity could result in impacts to Refuge resources, the Refuge Manager shall implement measures, such as additional signage, fencing, and/or barrier plantings, to further discourage this activity.

Justification:

The continuation of wildlife observation and photography on Gunpowder Point and the possible expansion of wildlife observation opportunities in the vicinity of Paradise Marsh and F&G Street Marsh would not adversely affect the Refuge’s wildlife or its habitat. In addition, as the public engages in these types of activities on the Refuge, many will go away with a greater understanding of the importance of protecting native habitats and their associated wildlife species. The overall benefits of facilitating these uses would support the purposes of the Refuge by improving opportunities for managing, conserving, and protecting fish and wildlife resources.

In the same manner, allowing the public to observe the wildlife that is being protected within the Refuge without materially interfering with their daily activities supports the fulfillment the National Wildlife Refuge System (System) mission’s of wildlife first. The National Wildlife Refuge System Improvement Act (the Act) states that “compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System, directly related to the mission of the System...and through which the American public can develop an appreciation for fish and

wildlife...” Wildlife observation and photography are two of the six priority public uses of the System, as defined by the Act, that when found to be compatible, should be facilitated. The continuation of these programs would implement the Refuge goal of fostering a broader understanding of the value of, and need for, wildlife conservation.

Mandatory Re-Evaluation Date:

Mandatory 15-year Re-Evaluation Date (for priority public uses)

Mandatory 10-year Re-Evaluation Date (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision:

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

References Cited:

DeLong, Anita and Janet Schmidt. 2000. Literature Review: Effects of Human Disturbance on Wildlife with Emphasis on Wildlife-Dependent Recreation Relevant to Stillwater National Wildlife Refuge (Draft).

Huffman, Kathy. 1999. San Diego South Bay Survey Report – Effects of Human Activity and Water Craft on Wintering Birds in the South San Diego Bay.

U.S. Fish and Wildlife Service. 2004. Draft Sweetwater Marsh National Wildlife Refuge/South San Diego Bay Unit of the San Diego National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement.

Refuge Determination:

Prepared by: _____ Date: _____

Refuge Manager/
Project Leader
Approval: _____ Date: _____

Concurrence:

Refuge Supervisor: _____ Date: _____

Regional Chief
National Wildlife
Refuge System: _____ Date: _____

California/Nevada
Operations Manager
(for CA and NV): _____ Date: _____

Compatibility Determination

-DRAFT-

Use: Environmental Education and Interpretation

Refuge Name: Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge
(San Diego County, Cities of Chula Vista and National City, California)

Establishing and Acquisition Authorities:

The authorities for the establishment of the Sweetwater Marsh Unit are the Endangered Species Act of 1973, as amended (16 U.S.C. §§1531-1543); Fish and Wildlife Act of 1956, as amended (16 U.S.C. §§742a-742j, not including 742d-742l); and the Fish and Wildlife Coordination Act of 1934, as amended (16 U.S.C. §§661-667e).

Refuge Purposes:

The Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge (NWR) was established:

“...to conserve (A) fish or wildlife which are listed as endangered species or threatened species...or (B) plants” (Endangered Species Act of 1973); and

”...for the development, advancement, management, conservation, and protection of fish and wildlife resources...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude...” (Fish and Wildlife Act of 1956).

[This refuge] “shall be administered by him [Secretary of the Interior] directly or in accordance with cooperative agreements...and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon...” (Fish and Wildlife Coordination Act of 1934).

National Wildlife Refuge System Mission:

The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use:

Environmental Education: As described in Chapter 2 of the San Diego Bay NWR draft Comprehensive Conservation Plan/Environmental Impact Statement (CCP/EIS), the Sweetwater Marsh Unit is currently the setting for several environmental education programs involving students from Chula Vista and National City, as well as from the greater San Diego region. These programs represent a collaborative effort between the Service, the Chula Vista Nature Center, National City, several school districts, and nonprofit organizations. One program, implemented by the Chula Vista Elementary School District, focuses on a science and social studies curriculum. The program serves some 12,000 kindergarten through 12th grade students annually. The Refuge, specifically Gunpowder Point (refer to Figure 2-1 of the draft CCP/EIS), provides the outdoor classroom for this program where students study topics such as the tides, water quality, native vegetation, and birds.

Another program, created by the San Diego Zoological Society, Chula Vista Nature Center, and the San Diego NWR Complex through a grant to the Zoo's Habitat Conservation Education Department, is Sweetwater Safari. This program, which meets the State of California's science standards for fourth grade, was created for students to learn about science and the local environment through a hands-on experience. The program includes on-site curriculum that is conducted on the refuge and a post-visit curriculum that is conducted in the classroom. The on-site curriculum is taught by the teachers. To lead the self-guided on-site program, which takes place on Gunpowder Point, the teacher must first participate in a training session conducted by Refuge staff, Chula Vista Nature Center staff, and other volunteer teachers. These training sessions, which are provided free of charge, are conducted quarterly at the Chula Vista Nature Center. Once a teacher has completed this training, he or she can arrange a time with the Nature Center to guide his/her class through the program. Equipped with backpacks containing relevant educational materials, the class travels along the 0.5 mile trail system on Gunpowder Point gathering information regarding the many resources supported by the Refuge. The Refuge trails are flat, wide and wheelchair accessible. Transportation grants to bring student onto the refuge are available for this program.

Another program supported by the Refuge is conducted by Kimball Elementary School in National City. This program, which generally occurs just upstream of the Refuge, presents a science and mathematics-based curriculum focused on the protection of watersheds, the function of wetland systems, and water quality testing.

The Refuge also partners with the Chula Vista Nature Center, San Diego Zoo, Kimball Elementary, Paradise Creek Educational Park, Aquatic Adventures, and others to facilitate occasional field trips to the Refuge to support the organizations' desire to introduce students to the biological and cultural resources of the region, including those resources supported on the refuge. The majority of these programs incorporate language arts, math, and social sciences into their curriculum in accordance with California State Education Standards. Several of these

programs have been developed to reach the underserved youth of the region whose opportunities to experience the natural environment first hand may be limited.

Environmental education programs are conducted on the Refuge once or twice a week throughout the year, with field trip opportunities open to only one classroom of approximately 32 students per day. Participants are generally transported to the site by bus or van. In some cases, the students use the existing shuttle bus that provides access to the Refuge from a satellite parking facility located off Refuge property.

The environmental education community has also expressed a desire to have the various environmental programs available within the south bay coordinated by a single point of contact, a South Bay environmental education facilitator. The Refuge Complex proposes to partner with other agencies and institutions in the region to support the creation of and identify funding for such a position. This environmental education facilitator would be responsible for contacting school districts about the many field experience curricula available in the South Bay, including those on the Sweetwater Marsh Unit, developing a region-wide strategy for filling teacher workshops, soliciting transportation grants to be used by each program, and developing teacher in-service agreements with local school districts to more efficiently reach the greatest number of educators.

Environmental Interpretation: Interpretation of the many resources found on the Sweetwater Marsh Unit is currently provided through a series of interpretive panels installed along an existing half-mile trail system located on Gunpowder Point (refer to Figure 2-4 of the draft CCP/EIS). These panels provide general information about the coastal resources protected within the Refuge. Additional interpretation of the historic resources on Gunpowder Point is also provided along the trail system. Several of the existing interpretive elements along these trails are in need of refurbishment and/or replacement.

Public access onto the Refuge is only available via a bus that transports visitors from a satellite parking area (located east of the Refuge) to the Chula Vista Nature Center. The City of Chula Vista, which operates this shuttle bus, does not collect a fee to use the bus; however, an admission fee is collected at the Nature Center, should visitors wish to enter the facilities operated by the Chula Vista Nature Center. No fee is collected from visitors interested only in walking along the existing trail system. Public access onto the Refuge is permitted during those hours in which the Chula Vista Nature Center is open (Tuesday through Sunday, 10:00 AM - 5:00 PM, except major holidays). Approximately 35,000 people visited the Nature Center during 2003 and many of these visitors spend time on the interpretive trails located on the Refuge.

The Chula Vista Nature Center, which is located on Refuge lands that are leased to the City of Chula Vista, includes exhibits and signs that interpret Refuge resources, as well as the many

biological resources of San Diego Bay. Included within the Nature Center are several live animal exhibits, including an aviary that includes various shorebirds commonly found in the area and a breeding pair of light-footed clapper rails. Several times a week, Nature Center docents lead small groups of people on interpretive walks along the Refuge's trail system.

The public has expressed a desire to not only see uses related to environmental interpretation continued on the Refuge, but also to see the existing opportunities expanded to reach a larger segment of the surrounding community. To improve opportunities for environmental interpretation, a step-down interpretive trail plan is proposed for Gunpowder Point. This plan would address the need to replace outdated interpretive panels and would include designs for new interpretive elements. The plan would also include an evaluation of the existing trail system on Gunpowder Point and where necessary propose a realignment of current trails to provide better coordination with the educational and interpretive programs occurring on the Refuge. This trail system, to be referred to as The Discovery Trail, would be provided primarily for the purpose of facilitating the Refuge's environmental education and interpretation programs. The redesigned trail system would also improve opportunities for wildlife observation and photography.

To address the public's desire to expand opportunities for environmental interpretation in other portions of the Refuge, the Refuge Manager would coordinate with adjacent local agencies (National City and Chula Vista) to develop interpretive elements within the public rights-of-way that abut Paradise Marsh and the F&G Street Marsh (refer to Figure 2-4 of the draft CCP/EIS).

Availability of Resources:

Direct costs to administer the current environmental education and interpretation programs are in the form of staff time. One environmental education program that includes all fourth grade students in the City of Chula Vista is administered and funded by the City of Chula Vista. The development and implementation of another program, Sweetwater Safari, was initially funded by a grant, while the responsibility for training is shared by Refuge staff and the Nature Center.

Additional funding would be required to prepare and implement a step-down interpretive trail plan for Gunpowder Point to expand and improve interpretive opportunities on the Refuge. Major construction expenses would involve replacing existing interpretative signage and creating new trail segments, while also closing and restoring other segments. The estimated cost to the Complex for current refuge education programs is under \$500 per year. This includes material costs and some staff time for occasional oversight of the programs, periodic updates to the current curriculum, and participation in teacher training sessions.

To implement and administer the proposed environmental education and interpretive programs described, the following staffing and materials/facilities would be required:

Staffing			
Position	Involvement	FTE	Cost
Project Leader/Deputy Project Leader	General oversight of programs	0.2/0.2	\$25,700/\$22,000
Refuge Manager	Periodic on-site oversight	0.4	\$36,400
Refuge Operations Specialist	Periodic on-site oversight, occasional monitoring of program activities	0.3	\$26,000
Wildlife Biologist	Monitoring, reporting, assistance in program development, oversight of biological technician	0.3	\$26,000
Information and Education Specialist	Coordinate and provide oversight of environmental education programs and assist in interpretive plan design	0.3	\$23,400
Outdoor Recreation Planner	Evaluate and redesign as required the existing interpretive trail system, assist in the design and siting of new interpretive signage, supervise trail construction	0.5	\$22,750
Law Enforcement Officer	Law enforcement	0.3	\$20,800
Park Ranger	Assist in trail realignment and installation of interpretive signage, facilities maintenance	0.3	\$13,000
Biological Technician	Field data collection, assistance with monitoring, analysis, and report writing	0.3	\$15,170
TOTAL FTES AND COSTS FOR STAFFING		3.1	\$231,220

Facilities		
Material/Facility Required	Explanation of Need	Cost
Education materials and supplies	Various materials are required annually to implement existing environmental education programs	\$500
Prepare a step-down interpretive trail plan for Gunpowder Point	Design new interpretive signs and redesign the existing trail system to better facilitate the Refuge's environmental education and interpretation programs	\$35,000
Refurbished and/or new interpretive elements	Updated existing interpretative signs to better facilitate education and interpretation programs.	\$50,000
Realign/refurbish existing trail system	New trail construction would be required to implement the step-down interpretative trail plan	\$25,000
Interpretive elements to be installed along public right-of-ways	Contribute funds to assist in the installation of interpretive elements along designated public rights-of-way near Paradise Marsh and F&G Street Marsh.	\$10,000
TOTAL COST FOR FACILITIES		\$120,200

Adequate staff positions and financial resources are currently available and committed to manage the continuation of existing opportunities for environmental education and interpretation. However, the current Refuge budget is not adequate to fund the development and implementation of a step-down interpretive trail plan. The plan itself would be developed to

address the current status of the existing trail system and the identification of appropriate realignments of some trails and the closure and revegetation of others. Also included in the plan would be designs for updated interpretive elements that would better coordinate with the environmental education programs conducted on the Refuge. In light of budget shortfall, project could be broken into phases funding sources are identified. Potential sources for additional funding include Federal cost share grants, state grants that focus on environmental education, private funding sources, and contribution from the Refuge's Friends group.

Anticipated Impacts of the Use:

Potential impacts associated with the continued and expanded implementation of environmental education and interpretation programs would be similar to those described in the Compatibility Determination prepared for wildlife observation and interpretation on the Sweetwater Marsh Unit. Such impacts can include disturbance to wildlife and trampling or damage to native habitats and sensitive plant species. These types of impacts would be minimized through appropriate program design, adequate Refuge oversight and supervision of educational activities, and ongoing coordination among partners.

Endangered and Threatened Species: Human activity can have adverse impacts to endangered and threatened species, particularly when avian nesting or foraging activities are disrupted. Of particular concern are potential disturbances to the Federally-listed endangered light-footed clapper rail (*Rallus longirostris levipes*), which is supported by the salt marsh habitat that occurs on the Refuge. Maintaining designated trails to accommodate environmental education and interpretation activities has minimized disturbance to this species. Another Federally-listed endangered species that is susceptible to harm as a result of off-trail activity is the salt marsh bird's beak (*Cordylanthus maritimus maritimus*), an annual plant found in the high marsh. Through appropriate supervision of students and the use of post and cable fencing along the trail, the potential for impacts to this species has been minimized.

Activities related to environmental education and interpretation occur almost exclusively on Gunpowder Point, as a result, no adverse impacts to the endangered California least tern (*Sterna antillarum browni*) or threatened western snowy plover (*Charadrius alexandrinus nivosus*) are anticipated due to the continuation of these uses on the Refuge.

Interpretive elements proposed adjacent to Paradise Creek and F&G Street Marsh would occur within existing public access rights-of-way outside the boundaries of the marsh, therefore, there is little potential for impacts to the light-footed clapper rail and salt marsh bird's beak.

Sensitive Habitats: The environmental education programs conducted on the Refuge utilize an existing trail system on Gunpowder Point to explore the resources present on the Refuge. This trail system is clearly delineated with post and cable fencing and students are supervised at all times. As a result, the potential for intentional and unintentional intrusion into sensitive habitat from this use is minimal.

Interpretive programs conducted on Gunpowder Point could be self-guided or lead by Chula Vista Nature Center docents. These activities would be confined to a designated system of trails on Gunpowder Point, therefore, the potential for off trail activity is low. Despite these measures, there would still be the potential for self-guided visitors to leave the trail and enter sensitive areas. The highest potential for such activities is at the end points of the existing trail system, where the trail brings users to the edge of sensitive habitat and then stops. In these areas, users may be tempted to travel beyond the existing post and cable fencing to gain better views of the adjacent mudflats or salt marsh habitats. As described in the Compatibility Determination for wildlife observation and photography for the Sweetwater Marsh Unit, realigning the trail to provide a loop system, thereby avoiding dead-end trails, would minimize the potential for such off-trail activity.

New interpretive elements proposed adjacent to Paradise Marsh and F&G Street Marsh would be placed within existing public access rights-of-way where no impacts to sensitive resources are anticipated.

Migratory Birds: The existing trail system provides access to the edge of the Refuge where expansive mudflats provide foraging habitat during low tides. Off-trail human activity in this area could result in disturbances to foraging migratory birds. Various studies have shown that frequent human disturbance can negatively impact wildlife by altering wildlife behavior, reproduction, distribution, and habitat (DeLong and Schmidt 2000). In addition, birds frequently approached by humans engaged in these activities may reduce foraging times in the affected area or avoid the area entirely (Huffman 1999). During studies conducted in south San Diego Bay, Huffman observed that human activity along the shoreline and in the mudflats would flush all birds within a 50 to 100 meter radius. To minimize these types of impacts within the Sweetwater Marsh NWR, various measures have been implemented in an attempt to keep individuals on the designated trail and out of sensitive habitats. These measures include post and cable fencing along the trail, regulatory signage at trail ends, and periodic monitoring of trail user activities.

Public Review and Comment:

Environmental education and interpretation have been discussed on several occasions at public workshops held in conjunction with the Comprehensive Conservation Plan (CCP) process. To initiate the CCP process, a Notice of Intent was published in the Federal Register on June 23, 2000 (65 FR 39172). At that time, written comments were solicited. In July 2000, two initial scoping meetings were held, one in Imperial Beach and one in Chula Vista, to receive input from the public on issues related to the South San Diego Bay and Sweetwater Marsh Units. Due to the public's level of interest in these refuges, focused public workshops were held in September 2000 and June 2001 to specifically address the issue of public use. Three additional workshops were held between November 2000 and May 2001 to receive input from the public on wildlife management and restoration proposals for these refuges. All of the public meetings were well

attended with at least 40 people present at each meeting. Approximately 50 to 60 people attended those meetings related to public use.

At each workshop, the public was encouraged to provide verbal comments or to send us written comments following the workshop. A CCP web page (www.sandiegorefuges.fws.gov) was established to provide the public with specific information regarding the topics addressed at the various workshops and to present information regarding when and where to provide comments. A number of Planning Updates have also been prepared to summarize the progress of the CCP and to discuss specific issues related to the planning process. One of these updates was devoted entirely to the topic of public use. These Planning Updates have been distributed to more than 1,000 individuals and organizations representing interested members of the public, conservation organizations, hunting, fishing and boating organizations, public agencies, municipalities, special districts, Tribes, and adjoining property owners. We received more than 50 letters, emails, and phone calls related to public use between June and November 2001 and numerous other communications relevant to public uses on the Refuge were received in 2002 and 2003.

At the scoping meetings and public workshops for the CCP, the public expressed a desire to see the existing opportunities for environmental education and interpretation on the Sweetwater Marsh Unit continued. There were several recommendations to expand the current educational program. One individual suggested that opportunities for high school students be expanded. Another person recommended that additional interpretive opportunities be provided in the vicinity of Paradise Marsh and the F&G Street Marsh. Several community members commented that the Refuge's education and interpretive programs could reach a broader audience if the programs included multi-lingual outreach materials.

This draft Compatibility Determination is being presented for public review and comment in conjunction with the draft CCP/EIS.

Determination:

Use is Not Compatible

Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

The following measures will be taken to ensure compatibility for environmental education and interpretation:

Prior to implementing a new environmental education program on the Refuge, the various parties developing the program shall coordinate with the Refuge Manager to agree upon appropriate

times of the year to conduct the program, access routes, maximum number of participants per visit, and appropriate activities to be conducted. All individuals who will be conducting these programs shall be made aware of these conditions.

The Refuge's Information and Education Specialist will review all materials and programs to ensure consistency with Refuge goals and the mission of the National Wildlife Refuge System.

"Closed Area" signs will be installed at the end of all trails leading to the edge of the bay.

Prior to installing any new interpretive elements at Paradise Marsh and F&G Street Marsh, the Refuge Manager shall review the sites to verify that no impacts to Refuge resources would occur as a result of anticipated human activity around the interpretive elements.

Justification:

The continuation and expansion of environmental education and interpretation uses on the Sweetwater Marsh Unit would not adversely affect the Refuge's wildlife or its habitat. In addition, as the public engages in these types of activities on the Refuge, many will go away with a greater understanding of the importance of protecting native habitats and their associated wildlife species. The overall benefits of facilitating these uses would support the purposes of the Refuge by improving opportunities for managing, conserving, and protecting fish and wildlife resources. In the same manner, presenting the public with information about the importance of the resources supported on the Refuge without materially interfering with their daily activities supports the fulfillment the National Wildlife Refuge System (System) mission's conservation mission. The National Wildlife Refuge System Improvement Act (the Act) states that "compatible wildlife-dependent recreation is a legitimate and appropriate general public use of the System, directly related to the mission of the System...and through which the American public can develop an appreciation for fish and wildlife..." Environmental education and interpretation are two of the six priority public uses of the System, as defined by the Act, that when found to be compatible, should be facilitated. The continuation of these programs would implement the Refuge goal of fostering a broader understanding of the value of, and need for, wildlife conservation.

Mandatory Re-Evaluation Date:

Mandatory 15-year Re-Evaluation Date (for priority public uses)

Mandatory 10-year Re-Evaluation Date (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision:

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

References Cited:

DeLong, Anita and Janet Schmidt. 2000. Literature Review: Effects of Human Disturbance on Wildlife with Emphasis on Wildlife-Dependent Recreation Relevant to Stillwater National Wildlife Refuge (Draft).

Huffman, Kathy. 1999. San Diego South Bay Survey Report – Effects of Human Activity and Water Craft on Wintering Birds in the South San Diego Bay.

U.S. Fish and Wildlife Service. 1985. Salt Marsh Bird's Beak (*Cordylanthus maritimus* subsp. *maritimus*) Recovery Plan.

U.S. Fish and Wildlife Service. 2004. Draft Sweetwater Marsh National Wildlife Refuge/South San Diego Bay Unit of the San Diego National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement.

Refuge Determination:

Prepared by: _____ Date: _____

Refuge Manager/
Project Leader
Approval: _____ Date: _____

Concurrence:

Refuge Supervisor: _____ Date: _____

Regional Chief
National Wildlife
Refuge System: _____ Date: _____

California/Nevada
Operations Manager
(for CA and NV): _____ Date: _____

Compatibility Determination

-DRAFT-

Use: Mosquito Management

Refuge Name: Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge
(San Diego County, Cities of Chula Vista and National City, California)

Establishing and Acquisition Authorities:

The authorities for the establishment of the Sweetwater Marsh Unit are the Endangered Species Act of 1973, as amended (16 U.S.C. §§1531-1543); Fish and Wildlife Act of 1956, as amended (16 U.S.C. §§742a-742j, not including 742d-742l); and the Fish and Wildlife Coordination Act of 1934, as amended (16 U.S.C. §§661-667e).

Refuge Purposes:

The Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge (NWR) was established:

“...to conserve (A) fish or wildlife which are listed as endangered species or threatened species...or (B) plants” (Endangered Species Act of 1973); and

”...for the development, advancement, management, conservation, and protection of fish and wildlife resources...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude...” (Fish and Wildlife Act of 1956).

[This refuge] “shall be administered by him [Secretary of the Interior] directly or in accordance with cooperative agreements...and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon...” (Fish and Wildlife Coordination Act of 1934).

National Wildlife Refuge System Mission:

The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use:

Mosquito management throughout the coastal refuges of San Diego County is conducted under

the auspices of a Refuge Special Use Permit (SUP) in coordination with the San Diego County Department of Environmental Health, Vector Control Division. The SUP is issued annually. The primary purpose for implementing mosquito management on this Refuge is to avoid threats to public or wildlife health from specific mosquito-borne disease. Mosquito management is implemented on the Sweetwater Marsh Unit through a phased approach that emphasizes early detection and treatment, if warranted, with larvicides. The use of adulticides is to be reserved for addressing human health emergencies.

Several mosquito species are expected to occur in the vicinity of the Refuge that are capable of transmitting microbial organisms that cause human diseases such as malaria and encephalitis. The mosquitoes of major concern in California belong to the genera *Culex*, *Ochlerotatus*, and *Anopheles*. The species of greatest public health concern include *Culex tarsalis*, *Culex pipiens*, *Culex quinquefasciatus* and *Anopheles hermsi*. Of lesser importance are the salt marsh mosquitoes: *Ochlerotatus squamiger* and *Ochlerotatus taeniorhynchus*.

The closest mosquito traps to the Sweetwater Marsh Unit are located at the Otay River and Hollister Street. These traps are monitored by the County of San Diego, Department of Environmental Health, Vector Control Division. The data collected from these traps in 2003 indicates that eight species of mosquito are commonly found in the general area, however, to date, the degree to which each of these species occurs within the Sweetwater Marsh Unit has not determined. The most common species found in the Otay traps include:

Anopheles hermsi – This species, which is very commonly found in the Otay traps, is a highly competent vector of malaria, although this disease is not prevalent in this region.

Culex erythrothorax – This species, which is the most common mosquito in San Diego, is typically considered a nuisance. It is commonly found in the Otay traps and occurs in densely vegetated freshwater marshes and heavily vegetated backwater zones. It is not considered to be a major disease carrier, although its ability to potentially harbor West Nile Virus (WNV) is currently unknown.

Culex tarsalis – A highly competent vector mosquito, this species is quite common in the Otay traps. Viewed generally as a nuisance mosquito, this species can also be an effective carrier of disease.

Culiseta incidens and *Culiseta particeps* – These two species are regularly captured in the Otay traps in small to moderate numbers. Neither species is considered to be a disease vector, but can be a biting nuisance. Their ability to harbor WNV is unknown.

Ochlerotatus increpitus – Primarily a nuisance mosquito, this species, which bites during the day, is common in the Otay traps. Its ability to vector WNV is unknown.

Ochlerotatus taeniorhynchus and *Ochlerotatus squamiger* – These mosquito species are prevalent in salt marsh habitat. *Ochlerotatus taeniorhynchus* is primarily a day-biting nuisance, and neither species is currently considered to be a disease carrier; however their ability to transmit WNV is unknown.

Mosquito management on the Sweetwater Marsh Unit is addressed through an integrated pest management approach in which Refuge and County vector control officials coordinate efforts to manage the overall environmental health of adjacent communities while minimizing impacts to Refuge trust resources. County and Refuge staff work together to agree upon issues related to access, methods of operation, and timing of access, as well as to exchange information related to listed species occurrences, permitting, and relevant agency policy.

The current procedures for implementing mosquito management on this Refuge involve an annual meeting between County and Refuge staff to coordinate all necessary permitting and implementation planning required to conduct mosquito monitoring and control on the Refuge for the upcoming year. Issues such as access points and pathways to be used by County personnel, appropriate hours of operation, and requirements for field coordination are discussed, agreed upon, and incorporated into the SUP. As part of this coordination process, County vector control personnel are provided with data generated by the Refuge biologist on listed species and other trust resources. County personnel share relevant data related to mosquito and disease monitoring in the vicinity of the Refuge. In addition, periodic meetings are conducted in the field with County field staff and the Refuge biologist to further coordinate activities. These meetings are scheduled throughout the season when warranted to ensure protection of endangered and threatened migratory birds and to avoid disturbance to nesting birds.

Following the conditions included in the SUP, County vector control personnel conduct periodic mosquito larvae surveys in many discrete areas throughout the Refuge. Because the primary means of mosquito management is the use of larvicides, it is essential that larvae be observed prior to pupation so that they may be treated appropriately by the least environmentally damaging means. As a result, the frequency of larvae surveys increases throughout the mosquito breeding season. Currently, treatment areas are determined based on the season, the species and density of the mosquitoes detected, the proximity of the vectors to surrounding urban areas, and the life stage the mosquitoes are found in. Control of adult or pupal mosquitoes is not currently conducted on the Refuge.

Public concern over human health issues related to mosquito-borne disease has intensified on the west coast with the advance of WNV across the United States. To address mosquito management, a phased response strategy has been developed for implementation on refuges in the Pacific Region. This strategy encourages an integrated pest management approach that incorporates habitat and best management practices to reduce the need for and use of insecticides on refuges, while also ensuring that legitimate human, fish, and wildlife health concerns are addressed. To implement this phased response strategy, the current procedures for managing mosquitoes on this Refuge will be augmented to better identify thresholds for mosquito treatment and presents specific responses to various conditions encountered in the field. Under this new program, if mosquito population monitoring and disease surveillance (implemented by County vector control personnel) indicate that human health thresholds are exceeded, the use of larvicides, pupicides, and/or adulticides may become necessary. In some cases, emergency actions may be required that are not addressed by this Compatibility Determination.

Two larvicide compounds that could be used to manage mosquitoes on the Refuge include: Bti (*Bacillus thuringiensis israelensis*) and Altosid (methoprene). Both are larvicides intended to control mosquitoes in wetlands prior to their emergence as adults. Bti is used primarily to control early stage larvae and is available in liquid and granular formulations. Altosid is used on later stage mosquito larvae and is available in liquid, briquet and pellet formulations. Both compounds are highly specific to mosquito larvae. The use of Golden Bear 1111, which is effective at preventing adult mosquito emergence from wetlands but toxic to fish and other aquatic organisms, is not permitted within the Sweetwater Marsh Unit.

Availability of Resources:

To implement and administer mosquito management on the Sweetwater Marsh Unit, the following staffing and facilities are required:

Staffing			
Position	Involvement	FTE	Cost
Project Leader/Deputy Project Leader	General oversight	0.2/0.2	\$25,700/\$22,000
Refuge Manager	Periodic on-site oversight	0.3	\$30,300
Refuge Operations Specialist	On-site oversight when necessary	0.3	\$26,000
Wildlife Biologist	Monitoring, reporting, plan development, and oversight of vector control activities	0.3	\$26,000
TOTAL FTES AND COSTS FOR STAFFING		1.3	\$130,000
TOTAL COST FOR FACILITIES	none		\$0

Adequate staff positions and financial resources are currently available and committed to implement mosquito management on the Sweetwater Marsh Unit.

Anticipated Impacts of the Use:

The purpose of this section is to critically and objectively evaluate the potential direct, indirect and cumulative effects mosquito management could have on the Refuge's endangered and threatened species and other fish and wildlife resources.

Habitat and Wildlife Disturbance: Vegetation trampling resulting from mosquito monitoring and mosquito control, as well as the possible creation of channels to drain stagnant water areas, could adversely impact native vegetation and wildlife habitat. In addition, these activities could result in disturbances to the existing wildlife that utilizes this area. At present, the marsh complex within the Refuge supports a variety of coastal wetland habitats including subtidal, intertidal mudflat, and salt marsh habitats. These wetland areas provide foraging, resting, and nesting habitat for a variety of birds, including migratory shorebirds, waterfowl, and songbirds. To minimize impacts related to disturbance, the Refuge biologist would coordinate with County vector control personnel at least annually to review appropriate conduct within these sensitive habitat areas. Specific field implementation protocols for working in sensitive habitat areas would be included in the Refuge SUP.

No impacts to upland habitat are anticipated as a result of mosquito management activities.

Endangered and Threatened Species: One of the purposes for the establishment of the Sweetwater Marsh NWR is to protect Federally- listed endangered or threatened species. Human activity can have adverse impacts on endangered and threatened species, particularly when this activity disrupts bird nesting or foraging. The California least tern (*Sterna antillarum browni*) and California brown pelican (*Pelecanus occidentalis californicus*), both federally listed endangered species, forage within the main tidal channel within the Sweetwater Marsh, while the threatened western snowy plover (*Charadrius alexandrinus nivosus*) forages year round along the channel banks. The D Street Fill portion of the Refuge also supports least tern and western snowy plover nesting. Human activity within the Refuge's main marsh complex could disrupt the foraging activity of all of these species.

The Federal endangered light-footed clapper rail also occurs within Sweetwater Marsh Unit in the Refuge's salt marsh and brackish marsh habitats. Threats to the light-footed clapper rail consist primarily of direct habitat or nest losses through trampling of cordgrass or pickleweed. The State endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) occupies the high salt marsh vegetation throughout Sweetwater Marsh. Human intrusion into these areas could disrupt foraging activities, as well as result in direct habitat or nest losses through trampling of pickleweed. Impacts to these salt marsh species would be minimized through adherence to the field implementation protocols established for mosquito management in the Refuge SUP.

In addition to endangered and threatened bird species, the Sweetwater Marsh Unit also supports the federally listed endangered annual plant species, salt marsh bird's beak (*Cordylanthus maritimus maritimus*). Salt marsh bird's beak is distributed in various locations throughout the marsh, primarily in upper marsh elevations that are inundated by tides on a regular basis, but above areas that receive daily salt water flooding. Such areas are more likely to be impacted by human activity in the marsh, because they are drier than other portions of the marsh. Yearly population numbers depend directly on seed dispersal and successful plant establishment. Field observations indicate that even a moderate amount of foot traffic can damage the fragile seedlings (USFWS 1985), resulting in decreased population numbers. To reduce the potential for impacts to this species, periodic meetings would be conducted in the field with County field staff and the Refuge biologist to identify sensitive areas that should be avoided during monitoring and control activities and designate other areas that can be accessed without concern for habitat damage.

Nesting Season Disturbance: The nesting season varies with species but can generally be described as occurring between mid-February and mid-September. Disturbance to nesting bird species may occur if vector control personnel are present in the vicinity of avian nesting colonies or individual nests.

Several species, four of which are state and/or federally listed as endangered or threatened, nest within the Sweetwater Marsh Unit. As described above, the habitats present within the marsh complex support light-footed clapper rail and Belding's savannah sparrow nesting. Cordgrass stands within the marsh support clapper rail nesting, while high salt marsh vegetation supports savannah sparrow nesting. In addition, the California least tern and western snowy plover nest on the D Street Fill portion of the Refuge. To avoid impacts to nesting species, periodic meetings would be conducted in the field with County field staff and the Refuge biologist to coordinate activities and delineate sensitive nesting areas that should be avoided.

Public Review and Comment:

Two public scoping meetings and a series of public workshops to discuss habitat management, restoration, and public use were held in conjunction with the CCP process. To initiate the CCP process, a Notice of Intent was published in the Federal Register on June 23, 2000 (65 FR 39172). At that time, written comments were solicited. In July 2000, two initial scoping meetings were held, one in Imperial Beach and one in Chula Vista, to receive input from the public on issues related to the Sweetwater Marsh and South San Diego Bay Units. Due to the public's level of interest in these refuges, focused public workshops were held in September 2000 and June 2001 to specifically address the issue of public use. Three additional workshops were held between November 2000 and May 2001 to receive input from the public on wildlife management and restoration proposals for these refuges. All of the public meetings were well attended with at least 40 people present at each meeting.

At each workshop, the public was encouraged to provide verbal comments or to send us written comments following the workshop. A CCP web page (www.sandiegorefuges.fws.gov) was established to provide the public with specific information regarding the topics addressed at the various workshops and to present information regarding when and where to provide comments. A number of Planning Updates have also been prepared to summarize the progress of the CCP and to discuss specific issues related to the planning process. These Planning Updates have been distributed to more than 1,000 individuals and organizations representing interested members of the public, conservation organizations, hunting, fishing and boating organizations, public agencies, municipalities, special districts, Tribes, and adjoining property owners. We received more than 50 letters, emails, and phone calls related to the CCP between June and November 2001 and numerous other communications relevant to public uses on the Refuge were received in 2002 and 2003. No public comments related to mosquito management have been received to date.

This draft Compatibility Determination is being presented for public review and comment in conjunction with the draft CCP/EIS.

Determination:

Use is Not Compatible

Use is Compatible With the Following Stipulations

Stipulations:

1. The County of San Diego, Department of Environmental Health, Vector Control Division shall operate on Refuge lands under the terms and conditions outlined in a USFWS Refuge Special Use Permit, which shall be reviewed annually.
2. Special Use Permit conditions will stipulate that all control work will be carried out in conformance with pre-approved USFWS Pesticide Use Proposals, Section 7 Endangered Species Act consultations, and existing and future USFWS policies on mosquito management.

Justification:

Mosquito management would be implemented on this Refuge in accordance with the guidance provided for the Pacific Region by the Regional Office in March 2003. This guidance for mosquito management incorporates a phased-response strategy developed to manage mosquitoes in a manner that is compatible with refuge purposes and uses the best available science while minimizing impacts to fish and wildlife, which is consistent with the mission of the National Wildlife Refuge System. Mosquito management proposed for this Refuge would also address legitimate human, fish, and wildlife health concerns. Implementing mosquito control in

accordance with the stipulations presented above would therefore not materially interfere with the ability to achieve the wildlife management goals established for this Refuge.

NEPA Compliance for Refuge Use Decision:

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

References Cited:

U.S. Fish and Wildlife Service. 1985. Light-footed Clapper Rail Recovery Plan.

U.S. Fish and Wildlife Service. 2004. Draft Sweetwater Marsh National Wildlife Refuge/South San Diego Bay Unit of the San Diego National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement.

Refuge Determination:

Prepared by: _____ Date: _____

Refuge Manager/
Project Leader
Approval: _____ Date: _____

Concurrence:

Refuge Supervisor: _____ Date: _____

Regional Chief
National Wildlife
Refuge System: _____ Date: _____

California/Nevada
Operations Manager
(for CA and NV): _____ Date: _____

Compatibility Determination

-DRAFT-

Use: Recreational Fishing

Refuge Name: Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge
(San Diego County, Cities of Chula Vista and National City, California)

Establishing and Acquisition Authorities:

The authorities for the establishment of the Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge (NWR) are the Endangered Species Act of 1973, as amended (16 U.S.C. §§1531-1543); Fish and Wildlife Act of 1956, as amended (16 U.S.C. §§742a-742j, not including 742d-742l); and the Fish and Wildlife Coordination Act of 1934, as amended (16 U.S.C. §§661-667e).

Refuge Purposes:

The Sweetwater Marsh Unit was established:

“...to conserve (A) fish or wildlife which are listed as endangered species or threatened species...or (B) plants” [Endangered Species Act of 1973]; and

”...for the development, advancement, management, conservation, and protection of fish and wildlife resources...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude...” [Fish and Wildlife Act of 1956].

[This refuge] “shall be administered by him [Secretary of the Interior] directly or in accordance with cooperative agreements...and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon...” (Fish and Wildlife Coordination Act of 1934).

National Wildlife Refuge System Mission:

The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use:

Recreational fishing is one of the six wildlife-dependent recreational uses that should be facilitated on a Refuge when determined to be compatible with the Refuge purposes and the mission of the National Wildlife Refuge System (System). During the public scoping for the San Diego Bay NWR Comprehensive Conservation Plan, the public expressed some interest in opening the Sweetwater Marsh Unit to fishing. Fishing is currently permitted in San Diego Bay, including portions of the South San Diego Bay Unit.

As illustrated in Figure 1-3 of the draft Comprehensive Conservation Plan/Environmental Impact Statement (CCP/EIS), the areas available for fishing within the Sweetwater Marsh Unit are limited to the tidal channels that meander through the Refuge's coastal salt marsh habitat. With the exception of the southwestern end of the Unit, where the Sweetwater Marsh abuts the tidal mudflats of San Diego Bay, the Refuge boundary does not extend to the shoreline of the bay. This Unit is currently closed to fishing and public access is restricted to Gunpowder Point, which is separated from the Bay by land managed by the San Diego Unified Port District. In order to facilitate fishing within this Unit, it would be necessary to allow small boats to enter the relatively shallow tidal channels that extend through the marsh or permit pedestrian access through coastal salt marsh or the D Street Fill to the edge of these shallow tidal channels. Because the Service does not own the land that would provide access onto D Street Fill from any public right-of-way, access for shoreline fishing along the D Street Fill is not feasible. Access to the tidal channels from the south would require constructing access through existing salt marsh habitat that supports two federally listed endangered species, the light-footed clapper rail and salt marsh bird's beak. Based on these constraints, shoreline fishing within the Sweetwater Marsh Unit is not considered feasible.

Consideration was given to permitting fishing from non-motorized boats and float tubes within the main tidal channel that extends along the south end of the D Street Fill (refer to Figure 1-3 of the draft CCP/EIS). The use of motorized vessels was not considered due to the shallow depths generally present in the tidal channel (less than a few feet in depth during high tide). If fishing in this area were to be implemented, it would be permitted only during daylight hours and only between mid-September and the end of January to avoid the nesting season. This proposal assumes no launching or landing of boats or float tubes within the Refuge. Existing boat ramps in National City and Chula Vista would be available to accommodate visitors (refer to Figure 3-21 in the draft CCP/EIS for specific locations of these facilities).

Prior to opening the Refuge to this use, regulatory signage would have to be installed at the main tidal channel entrances to the Refuge, an information brochure describing fishing regulations and sensitive Refuge resources would have to be prepared, and a monitoring and periodic fishing line clean-up program would have to be in place. The effects of this activity on shorebird foraging and loafing would be monitored twice a month for a period of three years. If shorebird activity on the tidal mudflats that border the main tidal channels decreases as a result of the introduction of human activity in this area, measures to reduce disturbance would have to be implemented.

Availability of Resources:

To regulate fishing activities on the Sweetwater Marsh Unit, the following staffing and equipment would be required:

Staffing			
Position	Involvement	FTE	Cost
Project Leader/Deputy Project Leader	General oversight	0.2/0.2	\$25,700/\$22,000
Refuge Manager	Periodic on-site oversight	0.4	\$36,400
Refuge Operations Specialist	Periodic on-site oversight, monitoring of fishing and law enforcement activities	0.5	\$39,000
Wildlife Biologist	Monitoring, reporting, oversight of technician	0.5	\$39,000
Biological Technician	Field data collection, assistance with monitoring, analysis, and report writing	0.5	\$22,750
Outdoor Recreation Planner	Coordinate the development of a brochure describing the fishing opportunities and regulations within Sweetwater Marsh	0.4	\$18,200
Information and Education Specialist	Assist in design of the brochure and the development and implementation of the fishing line clean-up program	0.2	\$15,600
Law Enforcement Officer	Law enforcement	0.5	\$31,200
Park Ranger	Assist in Refuge patrol, maintenance, and fishing line clean-up program	0.3	\$13,000
Maintenance Worker	Install and maintain signs and buoys	0.3	\$12,870
TOTAL FTES AND COSTS FOR STAFFING		4.0	\$275,720

Equipment		
Type of Equipment	Explanation of Need	Cost
Patrol boat/trailer	Needed to patrol refuge waters to ensure adherence to Refuge regulations, and to monitoring fishing activity	\$50,000
Signs/Boundary Buoys	Needed to delineate the Refuge boundary, post regulations, and establish closed areas	\$10,000
Create and Print an Informational Brochure	Needed to provide additional information about fishing opportunities, rules and regulations, wildlife friendly conduct, etc.	\$5,000
TOTAL COST FOR EQUIPMENT		\$65,000

Based on the Refuge’s current staffing level, adequate staff to patrol and monitor fishing activity on the Refuge is not available to support the proposed use. The coastal refuges including Sweetwater Marsh and South San Diego Bay Units and the Tijuana Slough NWR currently share one Park Ranger, a Wildlife Biologist, and a Law Enforcement Officer. Additional staff time and personnel (including a biological technician, maintenance worker, and outdoor recreation planner) would be needed to implement and monitor a fishing program on the Refuge. In addition, access to potential fishing areas for monitoring and law enforcement patrol would be

difficult and time consuming. To provide adequate staff to support this use based on the current Refuge budget, the priorities within the current work program would have to be reevaluated or staffing levels and the Refuge budget would have to be increased.

Implementation of this use would also require approximately \$65,000 to purchase a patrol boat and trailer, design and print an informational brochure, and produce and install signs and buoys in the area proposed for fishing. Adequate funding is available to implement periodic clean ups of the area to control trash and discarded fishing line accumulation.

Anticipated Impacts of the Use:

DeLong and Schmidt (2000) in their literature review of the effects of human disturbance on wildlife summarized the results of a number of studies related to fishing. The majority of these studies concluded that fishing activities could influence the composition, distribution, abundance, and productivity of waterbirds. Such effects include bird fatalities resulting from entanglement with fishing line, trampling of vegetation, degraded habitat due to litter accumulation, and reduced water quality due to the deposition of sewage and other chemicals. The anticipated impacts of developing a recreational fishing program for this Refuge are presented below.

Endangered and Threatened Species: Human activity associated with fishing and boating can have adverse impacts to endangered and threatened species, particularly when this activity disrupts nesting or foraging activities. The California least tern (*Sterna antillarum browni*) and California brown pelican (*Pelecanus occidentalis californicus*), both federally listed endangered species, forage within the Refuge's main tidal channel. In addition, the threatened western snowy plover (*Charadrius alexandrinus nivosus*) forages along the channel banks. Potential threats to these species from fishing include disturbance during foraging, displacement from preferred feeding areas for prolonged periods, and death from entanglement in discarded fishing line. Observations of up to several dead or dying terns entangled in one length of fishing line are not unusual within the more dense nesting colonies at the South Bay Salt Works. Similar incidents could occur here. The potential for birds to become entangled in discarded fishing line could be reduced through public outreach to discourage improper disposal of fishing line and periodic cleanup in and along the banks of the channel.

The D Street Fill also supports least tern and western snowy plover nesting. Disturbance impacts would be reduced by closing the Refuge to fishing during the nesting season, although it is likely that some unauthorized fishing activity may continue to occur during the nesting season, potentially resulting in direct impacts to nesting least terns and western snowy plovers.

The endangered light-footed clapper rail (*Rallus longirostris levipes*) occurs year-round in salt marsh and brackish marsh habitats within the Refuge. Threats to this species consist primarily of direct habitat or nest losses through trampling of cordgrass or pickleweed that could occur if fishing boats are landed along the shoreline or during clean up of trash and discarded fishing line. Although clapper rails are not as prone to reacting to the presence of humans in the vicinity

of their habitat as are other species, fishing boats that remain in one area for too long could disrupt clapper rail foraging activities. Of equal concern to the health and safety of the Refuge's clapper rail population is the accumulation of discarded fishing line along the marsh's narrow channels. Rails could become entangled in the line and die. Trash accumulation resulting from fishing activity in the area could pose a similar threat in that predators such as coyotes could be attracted into clapper rail habitat.

The State endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) occupies the salt marsh associated vegetation throughout Sweetwater Marsh. Human disturbance in these areas could disrupt foraging activities, as well as result in direct habitat or nest losses through trampling of pickleweed. This species would also be most directly impacted by unauthorized shoreline fishing or landing of fishing boats, permitting access into the marsh. Such activity would likely result in vegetation trampling and habitat degradation.

In addition to endangered and threatened bird species, the Sweetwater Marsh Unit also supports the federally listed endangered annual plant species, salt marsh bird's beak (*Cordylanthus maritimus maritimus*). The salt marsh bird's beak is distributed in various locations throughout the marsh, primarily in upper marsh elevations that are inundated by tides on a regular basis, but above areas that receive daily salt water flooding. Such areas are more likely to be impacted by unauthorized pedestrian access, because they are drier than other portions of the marsh. Yearly population numbers depend directly on seed dispersal and successful plant establishment. Field observations indicate that even a moderate amount of foot traffic can damage the fragile seedlings (USFWS 1985), resulting in decreased population numbers. Therefore, unauthorized shoreline fishing or landing of fishing boats along the shoreline could result in direct impacts to this species. Fishing line cleanups could also result in impacts to this species.

Sensitive Habitats: Recreational fishing within the Sweetwater Marsh Unit would introduce human activity into the center of the Refuge and permit boating activity in proximity to sensitive wetland habitat, creating the potential for direct and indirect impacts to sensitive habitat. These impacts could involve trampling of vegetation, disturbance to tidal mudflats, possible damage to cordgrass habitat, and increased erosion along the shore.

Migratory Birds: The Sweetwater Marsh Unit provides essential habitat for avian species migrating along the Pacific Flyway. The coastal salt marsh within the Refuge, with its many interconnecting channels, provides important resting and feeding areas for many migratory birds. Common wintering and migrating birds include long-billed curlew (*Numenius americanus*), whimbrel (*Numenius phaeopus*) and willet (*Catoptrophorus semipalmatus*). The extensive mudflats that occur immediately to the west of the D Street Fill, outside the Refuge boundary, also provide important habitat for these and other migratory birds.

A study of the effects of watercraft on foraging and resting birds in San Diego Bay reported that all watercraft, including motorized boats and non-motorized boats, result in some level of

disturbance to waterbirds (Huffman 1999). Observations made during the study indicate that when a boat approaches the shoreline, waterfowl located between the boat and shore and any shorebirds along the shoreline are flushed regardless of the speed of the watercraft. Huffman noted that when non-motorized vessels, including rowboats, kayaks, canoes, and longboats, came within 30 meters of the shoreline all waterfowl between the craft and the shore would flush. At the widest point, the channels within the Sweetwater Marsh are approximately 20 meters in width. Therefore, as a fishing boat moves through the channel, any birds foraging or resting on the tidal mudflats adjacent to the channel would be flushed. These birds would then be forced to move to another location in the general vicinity. Frequent disturbance to foraging and loafing shorebirds could occur depending upon the number of boats using the channel on a given day. Such disturbance would reduce an individual bird's ability to meet its energy requirements, while also causing the bird to expend energy in the process of flying away from the disturbance. If disturbance becomes too frequent, those birds that do not habituate could permanently leave the area (West et al. 2002). Increasing the intensity of boating activity in the vicinity of the mudflats immediately to the west of Gunpowder Point could also result in cumulative impacts to the migratory shorebirds that forage in proximity to the Refuge.

Huffman also documented disturbance to migratory birds as a result of pedestrian activity along the shoreline. This disturbance was greatest during low tides when pedestrians left designated accessways to explore the mudflats. This activity affected both shorebirds and waterfowl. Huffman observed that human activity along the shoreline and in the mudflats would flush all birds within a 50 to 100 meter radius. Based on these observations, it is assumed that if fishing were to be permitted along the shoreline on Refuge lands, the availability of habitat for migratory birds could be reduced. This is because the presence of anglers along the shoreline would cause most birds to avoid those habitats located as much as 100 meters away from the fishermen.

Migratory birds could also experience injury or death as a result of discarded fishing line. Once a bird becomes entangled in fishing line, it generally dies. Many bird deaths have been attributed to fishing line entanglement within the south bay.

Nesting Season Disturbance: The nesting season varies with individual species, but can generally be described as occurring between mid-February and mid-September. Nesting occurs within the Refuge's salt marsh habitat, as well as on D Street Fill. Several ground nesting avian species utilize the bare areas of the D Street Fill including the endangered California least tern and the threatened western snowy plover. Forster's terns (*Sterna forsteri*) also periodically nest in this area. Nesting activity on D Street Fill generally occurs from mid-April through mid-September.

Disturbance to nesting bird species may occur if persons are present in the vicinity of avian nesting colonies or individual nests. Biologists performing nesting surveys on the South San Diego Bay Unit report that nesting seabirds responded to human activity occurring at some

distance from the colony. Similar disturbance patterns would be expected at D Street Fill. In general, avian responses to disturbance can include flocking, alarm calling, nest abandonment, colony abandonment, and inter-colony antagonistic behaviors leading to crushed eggs and killed chicks. Predatory species, particularly avian species such as northern harrier, ravens, and crow, may also use disturbance episodes to depredate eggs and chicks while the adults are flocking or otherwise distracted. Disturbance to nesting birds from activities associated with fishing and boating can occur in several ways: disturbance from vessels located too close to the shoreline and disturbance from human encroachment into nesting areas when watercraft are landed along the shore. Human disturbance near nesting grounds has been identified as a primary limiting factor for seabird reproductive productivity in nesting areas with urban interfaces. By closing the Refuge to fishing during the nesting season, such impacts could be reduced. However, occasional monitoring and enforcement actions would likely be required during the closure, which could result in disturbance to nesting birds.

The Federal endangered light-footed clapper rail and State endangered Belding's savannah sparrow nest in Refuge's salt marsh vegetation, which abuts the main tidal channel. Nesting generally occurs from mid-February to mid-September. The primary threats to nesting these species from recreational fishing would occur if unauthorized fishing occurs from the shoreline or fishing boats are landed and fishermen enter sensitive nesting habitat along the edges of the marsh. As described above, such impacts could be minimized, although probably not avoided, by closing the Refuge to fishing during the nesting season. Clapper rail chicks could also be directly or indirectly impacted by the accumulation of trash and discarded fishing line in the marsh.

Public Review and Comment:

Recreational fishing has been discussed on several occasions at public workshops held in conjunction with the CCP process. To initiate this process, a Notice of Intent was published in the Federal Register on June 23, 2000 (65 FR 39172). At that time, written comments were solicited. In July 2000, two initial scoping meetings were held, one in Imperial Beach and one in Chula Vista, to receive input from the public on issues related to the San Diego Bay NWR. Due to the public's level of interest in these refuges, focused public workshops were held in September 2000 and June 2001 to specifically address the issue of public use. Three additional workshops were held between November 2000 and May 2001 to receive input from the public on wildlife management and restoration proposals for these refuges. All of the public meetings were well attended with at least 40 people present at each meeting. Approximately 50 to 60 people attended those meetings related to public use.

At each workshop, the public was encouraged to provide verbal comments or to send us written comments following the workshop. A CCP web page (www.sandiegorefuges.fws.gov) was established to provide the public with specific information regarding the topics addressed at the various workshops and to present information regarding when and where to provide comments. A number of Planning Updates have also been prepared to summarize the progress of the CCP and to discuss specific issues related to the planning process. One of these updates was devoted

entirely to the topic of public use. These Planning Updates have been distributed to more than 1,000 individuals and organizations representing interested members of the public, conservation organizations, hunting, fishing and boating organizations, public agencies, municipalities, special districts, Tribes, and adjoining property owners. We received more than 50 letters, emails, and phone calls related to public use between June and November 2001 and numerous other communications relevant to public uses on the Refuge were received in 2002 and 2003.

The public provided a range of written and verbal comments related to fishing. These comments included requests to permit fishing within the Sweetwater Marsh and South San Diego Bay Units and manage the refuge ecosystems for fish, prohibit fishing within both refuges, permit the use of low power motorized boats to accommodate fishing, and clearly define fishing and non-fishing areas if fishing is permitted on each refuge. Although most fishing comments related to fishing from boats, there was a request to provide access along the shoreline to accommodate fishing for non-boat owners. Several individuals also expressed concerns regarding the adverse affects that discarded fishing line can have on seabirds.

This draft Compatibility Determination is being presented for public review and comment in conjunction with the draft CCP/EIS for the Sweetwater Marsh and South San Diego Bay Units of the San Diego Bay NWR.

Determination:

Use is Not Compatible

Use is Compatible With the Following Stipulations

Justification:

The salt marsh complex within the Sweetwater Marsh Unit is the largest remaining coastal salt marsh within San Diego Bay, and as such it provides regionally significant habitat for numerous migratory shorebirds. Further, this is one of only a few places in San Diego County that provides suitable habitat for the Federally-listed endangered light-footed clapper rail. It is for these reasons that the Sweetwater Marsh Unit was established. The Refuge purposes include conserving fish and wildlife which are federally listed as endangered or threatened species and managing, conserving, and protecting fish and wildlife resources.

After evaluating the anticipated impacts of implementing a recreational fishing program on the Sweetwater Marsh Unit, the Refuge Manager has determined that opening a portion of the Refuge to recreational fishing would materially interfere with one of the primary Refuge purposes, “to conserve endangered and threatened species.” The only areas available within the Refuge for fishing are the relatively narrow channels that flow through the existing coastal marsh habitat. The edges of these marsh channels provide important foraging and resting habitat for migratory birds and several listed species, including the light-footed clapper rail, one of the

rarest avian species in California, and the western snowy plover. If fishing were permitted in these channels, direct and indirect impacts to clapper rails and their habitat could occur, which would be in direct conflict with Refuge's current endangered species management efforts. In addition to potential impacts to listed species, introducing this use into the center of the Refuge would result in disturbance impacts to migratory birds potentially displacing those shorebirds and seabirds that forage along the main tidal channel within the marsh. These effects would materially interfere with the mission of the National Wildlife Refuge System.

Due to the sensitivity of the area available to accommodate the recreational fishing on this Refuge, it is not possible to facilitate a recreational fishing program and still achieve the Refuge's endangered species and coastal wetland protection goals. In addition, to implement this proposal would require the identification of additional funds to cover the cost of materials and staff to monitor this activity. The reallocation of staffing priorities to implement this use would necessarily interfere with the Refuge's ability to implement wildlife dependent recreational uses such as environmental education and interpretation that are currently occurring on the Refuge. The affects of implementing this proposal would therefore be contrary to the Refuge goal of providing opportunities for wildlife-dependent recreational uses that are compatible with refuge purposes and foster a broader understanding the value of, and need for, wildlife conservation.

NEPA Compliance for Refuge Use Decision:

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

References Cited:

DeLong, Anita and Janet Schmidt. 2000. Literature Review: Effects of Human Disturbance on Wildlife with Emphasis on Wildlife-Dependent Recreation Relevant to Stillwater National Wildlife Refuge (Draft).

Huffman, Kathy. 1999. San Diego South Bay Survey Report – Effects of Human Activity and Water Craft on Wintering Birds in the South San Diego Bay.

U.S. Fish and Wildlife Service. 1985. Salt Marsh Bird's Beak (*Cordylanthus maritimus maritimus*) Recovery Plan.

U.S. Fish and Wildlife Service. 2004. Draft Sweetwater Marsh National Wildlife Refuge/South

San Diego Bay Unit of the San Diego National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement.

West, A. D., J. D. Goss-Custard, R. A. Stillman, R. W. G. Caldow, S. E. A. le V. dit Durell and S. McGrorty. 2002. Predicting the impacts of disturbance on shorebird mortality using a behaviour-based model. Biological Conservation 106:319-328.

Refuge Determination:

Prepared by: _____ Date: _____

Refuge Manager/
Project Leader
Approval: _____ Date: _____

Concurrence:

Refuge Supervisor: _____ Date: _____

Regional Chief
National Wildlife
Refuge System: _____ Date: _____

California/Nevada
Operations Manager
(for CA and NV): _____ Date: _____

Compatibility Determination

-DRAFT-

Use: Interpretive Water Trail (Recreational Boating)

Refuge Name: Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge
(San Diego County, Cities of Chula Vista and National City, California)

Establishing and Acquisition Authorities:

The authorities for the establishment of the Sweetwater Marsh Unit are the Endangered Species Act of 1973, as amended (16 U.S.C. §§1531-1543); Fish and Wildlife Act of 1956, as amended (16 U.S.C. §§742a-742j, not including 742d-742l); and the Fish and Wildlife Coordination Act of 1934, as amended (16 U.S.C. §§661-667e).

Refuge Purposes:

The Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge (NWR) was established:

“...to conserve (A) fish or wildlife which are listed as endangered species or threatened species...or (B) plants” (Endangered Species Act of 1973); and

”...for the development, advancement, management, conservation, and protection of fish and wildlife resources...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude...” (Fish and Wildlife Act of 1956).

[This refuge] “shall be administered by him [Secretary of the Interior] directly or in accordance with cooperative agreements...and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon...” (Fish and Wildlife Coordination Act of 1934).

National Wildlife Refuge System Mission:

The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use:

Currently the waters of the Sweetwater Marsh Unit are closed to public access including any form of boating. During the September 2000 public workshop for the Sweetwater Marsh and South San Diego Bay Units of the San Diego Bay NWR Comprehensive Conservation Plan (CCP), the public expressed a desire to see an interpretive water trail developed through the Sweetwater Marsh for kayaks and canoes. As a result, such a proposal was considered during the development of alternatives for the CCP. Water trails and boating are not identified as wildlife dependent recreational uses, however, these uses would facilitate wildlife observation and photography and environmental interpretation, three of the six priority public uses that should be facilitated on a Refuge when determined to be compatible with the purpose of the Refuge and the mission of the System.

The development of an interpretive water trail on this Refuge would require that a portion of tidal channels within the Refuge be opened to boating. Due to the limited width and depth of the water channels within Sweetwater Marsh, only non-motorized, paddle-type vessels, such as kayaks and canoes, would be permitted to use the water trail. All other types of boats would be prohibited. This analysis assumes that non-motorized vessels would only be permitted to travel along a specific designated trail route; all other water areas of the Refuge would continue to be closed to public access. The trail route, which would be illustrated on signs placed at the two water entrances to the Refuge and delineated through small buoys, water markers, and/or signs, would begin in the Sweetwater flood control channel to the south of the point where the Paradise Marsh tidal channel enters the flood control channel (refer to Figure 2-1 in the draft CCP/ Environmental Impact Report (EIS) (draft CCP/EIS)). From here, the trail would travel south through the connector marsh to its convergence with the historic Sweetwater River channel, then the trail would turn to the west. The trail would then continue west along the old river channel to the point where the channel reenters the Bay.

It is assumed that use of the interpretive water trail would be permitted daily from sunrise to sunset, although users would be encouraged to avoid periods of low tide when the water levels would be too shallow to permit easy navigation through the tidal channel. The trail would be closed during the nesting season (between mid-February through mid-September) to minimize disturbance to birds nesting on the D Street Fill. Prior to opening the Refuge to this use, regulatory signage would have to be installed at the water entrances to the Refuge and a monitoring program would have to be in place. Periodic monitoring of the effects of human activity on the shorebirds that forage and rest on the tidal mudflats along the edges of the channel would be necessary to ensure that no adverse effects to migratory birds were occurring.

Even if non-motorized boat use were to be permitted in the Refuge, the launching and landing of watercraft within the Refuge would be prohibited at all times. Watercraft would have to be launched from one of the existing boat launches to the north or south of the Refuge. Because this trail would travel through sensitive habitat that supports the Federal endangered light-footed clapper rail (*Rallus longirostris levipes*), as well as numerous species of shorebirds, it would

likely be necessary to implement a reservation system to limit the number of boats or groups of boats traveling through the area per week. The number of disturbances that could occur within this area without adversely affecting the rails and other birds supported by the surrounding tidal mudflats and salt marsh habitat would have to be determined through a monitoring program.

To implement this use, the general route of the trail would have to be delineated with buoys and/or water markers and the tidal channels branching off from the main channel would have to be marked as closed. In addition, an interpretive pamphlet or brochure would be developed that would include a map of the trail route, rules and regulations to be followed while using the trail, and a description of the reservation system and how to reserve a time to use the trail. This information would be made available at the Chula Vista Nature Center, Refuge offices within the San Diego NWR Complex, and other appropriate locations. The information would also be provided on the Complex's website.

Availability of Resources:

To implement an interpretive water trail and regulate and monitor the activities associated with the use of the trail, the following staffing and equipment would be required:

Staffing			
Position	Involvement	FTE	Cost
Project Leader/Deputy Project Leader	General oversight	0.2/0.2	\$25,700/\$22,000
Refuge Manager	Periodic on-site oversight	0.4	\$36,400
Refuge Operations Specialist	Periodic on-site oversight, assist in the development of a reservation system, monitor law enforcement activities	0.5	\$39,000
Wildlife Biologist	Assist in design of the trail, prepare and implement a monitoring plan to evaluate disturbance impacts, supervise bio tech	0.5	\$39,000
Biological Technician	Field data collection, assistance with monitoring, analysis, and report writing	0.5	\$22,750
Information and Education Specialist	Coordinate design of informational pamphlet and update website, assist in the development of a reservation system	0.3	\$23,400
Outdoor Recreation Planner	Design the water trail and assist in siting of buoys and regulatory signs	0.5	\$22,750
Park Ranger	Implement the reservation system, install and maintain buoys, water markers, and signs along the trail, monitor trail use	0.3	\$13,000
Law Enforcement Officer	Law enforcement	0.5	\$31,200
TOTAL FTES AND COSTS FOR STAFFING		3.9	\$275,200

Equipment		
Type of Equipment	Explanation of Need	Cost
Buoys, water trail markers, and signs	Buoys or water trail markers are needed to mark the alignment of the water trail; signs would illustrate the trail route, inform uses of closed areas, and provide general information about rules and regulations	\$20,000
Patrol Boat/Trailer	Needed to patrol refuge waters for enforcement of Refuge regulations, monitoring, and safety related issues	\$50,000
Information Pamphlet	Design, layout, and printing of an information pamphlet or brochure to illustrate the trail route, present rules and regulations, and provide interpretive information about the resources along the trail	\$5,000
TOTAL COST FOR EQUIPMENT		\$75,000

Refuge staff availability is critical to the implementation and administration of a seasonal interpretive water trail within the Sweetwater Marsh Unit due to the biological significance of the area in which the use is proposed. Based on the Refuge’s current staffing level, adequate staff is not available to support the proposed use. The coastal refuges including Sweetwater Marsh and South San Diego Bay Units and the Tijuana Slough NWR currently share one Park Ranger, a Wildlife Biologist, and a Law Enforcement Officer. Additional staff time would be needed to monitor and patrol the proposed interpretive trail, requiring either a reassessment of the current work program to change priorities or an increase in current staffing levels to support the use. Implementation of this use would also require approximately \$20,000 to purchase buoys, water markers, and signs needed to delineate the water trail and post closed areas and to design and print an informational pamphlet for the trail. An additional \$50,000 would be required to purchase a patrol boat and trailer to facilitate patrol and monitoring of boating activity within the Refuge.

Although funding may be identified through Federal cost share grants, local or state grants, or contributions to the Refuge’s Friends Group to purchase required materials, the lack of adequate staffing to implement the program could only be resolved through an increase in the current Refuge budget.

The proposal to open a portion of the Refuge waters to accommodate an interpretive water trail would not require any funds to develop boat ramps or other boating-related facilities as they would not be constructed within the Refuge. Adequate accommodations for such facilities are provided just outside the Refuge boundary in Chula Vista and Coronado.

Anticipated Impacts of the Use:

The effects of human disturbance on waterfowl and wintering birds have been the subject of numerous studies (DeLong and Schmidt 2000). These studies indicate that the degree of disturbance varies depending upon the use (Korschgen and Dahlgren 1992) and that boating activity can cause foraging and loafing shorebirds to flush if the activity occurs too close to the shoreline (Huffman 1999). The potential affects of introducing human activity into the marsh to accommodate an interpretive water trail are summarized below.

Migratory Birds: The Sweetwater Marsh Unit provides important habitat for avian species migrating along the Pacific Flyway. The Refuge's coastal salt marsh, with its many interconnecting channels and adjacent tidal mudflats, provide important foraging and resting areas for many wintering and migrating shorebirds and waterfowl. Some of the most common of these species include the long-billed curlew (*Numenius americanus*), whimbrel (*Numenius phaeopus*) and willet (*Catoptrophorus semipalmatus*).

In an effort to characterize species richness, relative abundance, and spatial distribution of the waterbird community in central and south San Diego Bay, waterbird surveys were conducted in South San Diego Bay between April 15, 1993 and April 14, 1994 (USFWS 1995). According to the report, "a mean of 6,981 birds were observed each visit during peak winter months (November through February)." In describing the locations of waterbird occurrences throughout central and south San Diego Bay, the report states that, "areas with relatively low water recreational intensity supported a greater abundance of waterbirds."

Between January and March 1998, a study was conducted to observe the effects of watercraft on wintering birds in the southern end of San Diego Bay (Huffman 1999). The study, which was prepared for the Fish and Wildlife Service, was designed to observe and record the effects of human disturbance, particularly disturbances related to watercraft, on wintering birds in the bay. During the study, Huffman observed that operating any watercraft, including motorized boats, non-motorized boats, jet skis, wind surfers, and parasails, within the Bay resulted in some level of disturbance to waterbirds. The degree of disturbance depended upon the vessel's speed, proximity to rafting birds, proximity to the shoreline, and amount of noise produced during operation. Of all the types of watercraft used in the bay, Huffman observed that powerboats resulted in the greatest disturbances to the avian community. Huffman also noted that disturbance to birds was greatly reduced when boats traveled at the posted "No Wake" speed (5 mph).

Other observations made by Huffman included the effect that watercraft had on shorebirds foraging along the edge of the bay. Huffman reports that in cases in which motorized watercraft were within 100 meters off the shore, all waterfowl between the boat and shore and any shorebirds along the shoreline would flush regardless of the speed of the watercraft. Similarly, when non-motorized vessels, including kayaks, canoes, and longboats, came within 30 meters of the shoreline all waterfowl between the craft and the shore would flush to another portion of the

bay. The approximate width of the tidal channels that would be included within the water trail route is 20 meters, therefore, based on the results of Huffman's observations; frequent disturbance to foraging and loafing shorebirds would be expected as a result of the proposed boating. Such disturbance can reduce an individual bird's ability to meet its energy requirements by causing the bird to expend energy in the process of flying away from the disturbance. If disturbance becomes too frequent, those birds that do not habituate could permanently leave the area (West et al. 2002). Increasing the intensity of boating activity in the vicinity of the mudflats immediately to the west of Gunpowder Point could also result in cumulative impacts to the migratory shorebirds that forage in proximity to the Refuge.

Endangered and Threatened Species: One of the purposes for the establishment of the Sweetwater Marsh Unit is to protect Federally-listed endangered or threatened species. Human activity can have adverse impacts on endangered and threatened species, particularly when this activity disrupts bird nesting or foraging. The California least tern (*Sterna antillarum browni*) and California brown pelican (*Pelecanus occidentalis californicus*), both Federally-listed endangered species, forage within the main tidal channel within the Sweetwater Marsh, while the threatened western snowy plover (*Charadrius alexandrinus nivosus*) forages year round along the channel banks. The D Street Fill portion of the Refuge also supports least tern and western snowy plover nesting. Increasing human activity within the Refuge's main tidal channel could disrupt current foraging patterns for these species, and possibly displace these species to other less productive portions of the Refuge.

The Federal endangered light-footed clapper rail also occurs within Sweetwater Marsh Unit in the Refuge's salt marsh and brackish marsh habitats. Threats to the light-footed clapper rail consist primarily of direct habitat or nest losses through trampling of cordgrass or pickleweed. Such impacts would occur if boats were landed along the channel banks and unauthorized intrusion into the marsh was to occur. Clapper rails are also at risk because they are slower to react to the presence of humans in the vicinity of their habitat as are other bird species; therefore, they are more vulnerable to injury and death from human intrusion. The introduction of human activity along the Refuge's primary tidal channel could indirectly impact the Refuge's rail population by forcing the birds to relocate away from the main areas of disturbance. Because the main tidal channel is located near the center of the Refuge, the rails would actually be relocating closer to the edges of the Refuge where the chances for predation would be greater. The potential effects to clapper rails of introducing human activity into the marsh would be contrary to the objectives of the Light-footed Clapper Rail Recovery Plan (USFWS 1985a). Specifically, the Plan's primary objective is to increase the rail breeding population by providing adequately protected, suitably managed, secure wetland habitat. Some of the recommendations included in the Recovery Plan include protecting existing habitat, controlling human disturbance in clapper rail areas, and increasing the carrying capacity and stability of existing habitat.

The State endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) occupies the high salt marsh vegetation throughout Sweetwater Marsh. Human intrusion into

these areas could disrupt foraging activities, as well as result in direct habitat or nest losses through trampling of pickleweed. This species would also be most directly impacted by unauthorized access into the marsh from boats that have landed on the shoreline. Such activity would likely result in vegetation trampling and habitat degradation.

In addition to endangered and threatened bird species, the Sweetwater Marsh Unit also supports the Federally-listed endangered annual plant species, salt marsh bird's beak (*Cordylanthus maritimus maritimus*). Salt marsh bird's beak is distributed in various locations throughout the marsh, primarily in upper marsh elevations that are inundated by tides on a regular basis, but above areas that receive daily salt water flooding. Such areas are more likely to be impacted by unauthorized pedestrian access, because they are drier than other portions of the marsh. Yearly population numbers depend directly on seed dispersal and successful plant establishment. Field observations indicate that even a moderate amount of foot traffic can damage the fragile seedlings (USFWS 1985b), resulting in decreased population numbers. Therefore, the unauthorized landing of boats along the edges of the marsh's main channel could result in direct impacts to this species.

Nesting Season Disturbance: Human disturbance to nesting birds from activities associated with watercraft can occur in several ways: disturbance from the vessel itself due to encroachment on the shoreline and disturbance from human encroachment into nesting areas when watercraft are landed along the shore. Huffman (1999) observed bird flushing when motorized watercraft came within 100 meters of the shoreline and non-motorized vessels came within 30 meters of the shoreline. Similar effects to nesting seabirds would be expected. When a kayaker landed along the shore of the Chula Vista Wildlife Reserve (refer to Figure 1-6 in the draft CCP/EIS), a habitat mitigation area created by the Unified Port of San Diego that is located just to the north of the salt works in the southern end of San Diego Bay, Huffman noted that the remaining shorebirds and other upland birds in the area flushed. Such human disturbance on the nesting grounds has been identified as a primary limiting factor for seabird reproductive productivity in nesting areas with urban interfaces.

Disturbance to nesting migratory bird species may occur if a watercraft is present in the vicinity of a nesting colony or individual nests. Several species, many of which are rare, sensitive or state and/or federally listed, nest on the relatively bare ground at D Street Fill, as well as in vegetated habitats within Sweetwater Marsh. The Belding's savannah sparrow nests in salt marsh associated vegetation throughout Sweetwater Marsh, while the endangered California least tern and threatened western snowy plover nest at D Street Fill.

Biologists performing nesting surveys at the salt works on the South San Diego Bay Unit report that seabird colonies will respond to pedestrian traffic. These responses vary with date, nature of disturbance and other unknown factors. Avian responses to disturbance can include flocking, alarm calling, nest abandonment, colony abandonment and inter-colony antagonistic behaviors leading to crushed eggs and killed chicks. Predatory species, particularly avian predators such as

northern harrier, common raven, American crow, and some gull species, may also use disturbance episodes to depredate eggs and chicks while the adults are flocking or otherwise distracted. Closing the water trail during the nesting season would reduce these types of disturbance impacts, however, enforcement of the nesting season closure could be difficult once the public becomes accustomed to the trail being open during much of the year. Opening the water trail only to those with a reservation could help in the process of informing the public about when and how the proposed trail can be used.

Public Review and Comment:

The development of water trails to facilitate wildlife dependent recreational uses was discussed on several occasions at public workshops held in conjunction with the Comprehensive Conservation Plan (CCP) process. To initiate the CCP process, a Notice of Intent was published in the Federal Register on June 23, 2000 (65 FR 39172). At that time, written comments were solicited. In July 2000, two initial scoping meetings were held, one in Imperial Beach and one in Chula Vista, to receive input from the public on issues related to the Sweetwater Marsh and South San Diego Bay Units. Due to the public's level of interest in these refuges, focused public workshops were held in September 2000 and June 2001 to specifically address the issue of public use. Three additional workshops were held between November 2000 and May 2001 to receive input from the public on wildlife management and restoration proposals for these refuges. All of the public meetings were well attended with at least 40 people present at each meeting. Approximately 50 to 60 people attended those meetings related to public use.

At each workshop, the public was encouraged to provide verbal comments or to send us written comments following the workshop. A CCP web page (www.sandiegorefuges.fws.gov) was established to provide the public with specific information regarding the topics addressed at the various workshops and to present information regarding when and where to provide comments. A number of Planning Updates have also been prepared to summarize the progress of the CCP and to discuss specific issues related to the planning process. One of these updates was devoted entirely to the topic of public use. These Planning Updates have been distributed to more than 1,000 individuals and organizations representing interested members of the public, conservation organizations, hunting, fishing and boating organizations, public agencies, municipalities, special districts, Tribes, and adjoining property owners. We received more than 50 letters, emails, and phone calls related to public use between June and November 2001 and numerous other communications relevant to public uses on the Refuge were received in 2002 and 2003.

This draft Compatibility Determination is being presented for public review and comment in conjunction with the draft CCP/EIS.

Determination:

X Use is Not Compatible

Use is Compatible With the Following Stipulations

Justification:

After evaluating the anticipated impacts of implementing an interpretive water trail on the Sweetwater Marsh Unit, the Refuge Manager has determined that allowing this use would materially interfere with one of the primary purposes of this Refuge, which is “to conserve endangered and threatened species.” The introduction of human activity within the main portion of the marsh would impede the foraging and nesting activities of the light-footed clapper rail and could potentially disrupt foraging activity of the western snowy plover. The proposed activity would also result in frequent disturbance to shorebirds that forage and rest on the tidal mudflats along the main tidal channel in the marsh. These impacts would be contrary to the wildlife conservation mission of the National Wildlife Refuge System. The affects of implementing this proposal would therefore be contrary to the Refuge goal of providing opportunities for wildlife-dependent recreational uses that are compatible with refuge purposes and foster a broader understanding the value of, and need for, wildlife conservation.

NEPA Compliance for Refuge Use Decision:

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

References Cited:

DeLong, Anita and Janet Schmidt. 2000. Literature Review: Effects of Human Disturbance on Wildlife with Emphasis on Wildlife-Dependent Recreation Relevant to Stillwater National Wildlife Refuge (Draft).

Huffman, Kathy. 1999. San Diego South Bay Survey Report – Effects of Human Activity and Water Craft on Wintering Birds in the South San Diego Bay.

Korschgen, Carl and Robert Dahlgren. 1992. Human Disturbances of Waterfowl: Causes, Effects, and Management.

U.S. Fish and Wildlife Service. 1985a. Light-footed Clapper Rail Recovery Plan.

U.S. Fish and Wildlife Service. 1985b. Salt Marsh Bird’s Beak (*Cordylanthus maritimus* subsp. *maritimus*) Recovery Plan.

U. S. Fish and Wildlife Service. 1995. Waterbirds of Central and South San Diego Bay 1993-1994.

U.S. Fish and Wildlife Service. 2004. Draft Sweetwater Marsh National Wildlife Refuge/South San Diego Bay Unit of the San Diego National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement.

West, A. D., J. D. Goss-Custard, R. A. Stillman, R. W. G. Caldow, S. E. A. le V. dit Durell and S. McGrorty. 2002. Predicting the impacts of disturbance on shorebird mortality using a behaviour-based model. Biological Conservation 106:319-328.

Refuge Determination:

Prepared by: _____ Date: _____

Refuge Manager/
Project Leader
Approval: _____

Date: _____

Concurrence:

Refuge Supervisor: _____ Date: _____

Regional Chief
National Wildlife
Refuge System: _____

Date: _____

California/Nevada
Operations Manager
(for CA and NV): _____

Date: _____

Compatibility Determination

-DRAFT-

Use: Wildlife Observation and Photography

Refuge Name: South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge (San Diego County, Cities of Coronado, Chula Vista, Imperial Beach, National City, and San Diego, California)

Establishing and Acquisition Authorities:

The authorities for the establishment of the San Diego National Wildlife Refuge are the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a-742j, not including 742d-742l), and the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543).

Refuge Purposes:

The South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge (South San Diego Bay Unit) was established:

“...to protect, manage, and restore habitats for federally listed endangered and threatened species and migratory birds, and to maintain and enhance the biological diversity of native plants and animals...” 16 U.S.C. § 1531-1543 (Endangered Species Act of 1973, as amended) and 70 Stat. 1119 (Fish and Wildlife Act of 1956, as amended).

National Wildlife Refuge System Mission:

The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Descriptions of Use:

At present, the primary opportunities for wildlife observation and photography from within the Refuge boundary are available via watercraft in the open waters of the Refuge or immediately adjacent to the Refuge along the Bayshore Bikeway. Occasional opportunities for the public to observe wildlife from within the salt works are also available via guided tours.

At the scoping meetings for the Comprehensive Conservation Plan (CCP), as well as at subsequent public use workshops held in September 2000 and June 2001, the public expressed an interest in expanding opportunities for wildlife observation and photography within the South San Diego Bay Unit. As described in the Public Use Program discussion in Section 2.3.2.4 of the draft CCP/Environmental Impact Statement (EIS) for the South San Diego Bay Unit

(USFWS 2004), the CCP includes several proposals for expanding opportunities for these uses including:

1. Increasing the number of guided tours provided of the salt works between mid-September and early February of each year to about two per month;
2. Establishing two observation points on the north side of the Bayshore Bikeway: one at the northern terminus of 10th Street and one at the northern terminus of 8th Street in Imperial Beach. From these areas, the wildlife activities occurring in the river channel and Ponds 22, 23, and 10 can be observed (refer to Figure 2-15 of the draft CCP/EIS);
3. Constructing an observation platform near the end of 13th Street in Imperial Beach to provide observation opportunities of avian activities in Ponds 22 and 23 (refer to Figure 2-15 of the draft CCP/EIS); and
4. Establishing an observation area along the eastern edge of Pond 29 in the City of Chula Vista, where views of the northeastern pond system could be provided (refer to Figure 2-15 of the draft CCP/EIS).

The observation areas proposed around the perimeter of the Refuge would be accessible from the Bayshore Bikeway and several public streets in northern Imperial Beach. A parking area that serves users of the Bayshore Bikeway is available at the northern terminus of 13th Street and on-street parking is available along Florence Street, 8th Street, and Boulevard Avenue. Based on preliminary concepts for the observation areas, the design would be relatively informal, consisting of a leveled area with an accessible surface of stabilized soil or decomposed granite. A post and cable fence or other appropriate barrier would be provided at the northern edge of the observation areas to minimize disturbance to adjacent vegetation. An elevated observation platform is contemplated for the area north of the Bayshore Bikeway between 13th Street and Florence Street. Although a specific design for this facility has not yet been prepared, the observation platform would be designed to meet the accepted standards for accessibility as outlined in the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 – 12213, 47 U.S.C. 225 and 611, and 49 U.S.C. 322). One or more of these observation areas would also include interpretive elements as described in the Compatibility Determination for environmental education and interpretation in the South San Diego Bay Unit.

A reservation system would be established in association with the expansion of the salt works guided tour program, as these tours would be limited to approximately 15 people per tour. About two tours per month would be conducted between mid-September and mid-February. No tours would be provided during the breeding season to avoid disturbance to nesting birds.

Availability of Resources:

To implement and administer opportunities for wildlife observation and photography, the following staffing and materials/facilities would be required:

Staffing			
Position	Involvement	FTE	Cost
Project Leader/Deputy Project Leader	General oversight	0.2/0.2	\$25,700/\$22,000
Refuge Manager	Periodic on-site oversight	0.3	\$27,300
Refuge Operations Specialist	Periodic on-site oversight, monitoring of law enforcement activities	0.4	\$31,200
Wildlife Biologist	Monitoring, reporting, assistance in the design and siting of overlook areas and oversight in their implementation, oversight of bio tech; assist in conducting tours	0.5	\$39,000
Biological Technician	Field data collection, assistance with analysis and report writing	0.3	\$22,750
Information and Education Specialist	Assist in the development of the step down wildlife observation plan	0.3	\$23,400
Outdoor Recreation Planner	Develop, design, and coordination the step down wildlife observation plan and develop and assist with the guided tour program	0.5	\$22,750
Law Enforcement Officer	Law enforcement	0.3	\$20,800
Park Ranger	Facilities maintenance; take reservations for and assist in conducting guided tours	0.4	\$15,600
TOTAL FTES AND COSTS FOR STAFFING		3.4	\$250,500

Facilities		
Material/Facility Required	Explanation of Need	Cost
Step-down Plan	Needed to develop construction plans and specifications for observation areas, including the elevated platform at Florence Street, and to describe and provide cost estimates for necessary amenities (i.e. benches, signage, fencing, viewing scopes, etc.)	\$35,000
Observation Areas (with benches/fencing, scopes)	Level sites with surfaces prepared to meet accessibility standards; amenities to aid in observing wildlife	\$45,000
Regulatory signage and fencing	Signs and appropriate fencing are required to delineate areas open to public access and those that are closed	\$30,000
Elevated Observation Platform	For observing wildlife at the observation area proposed between 13 th Street and Florence Street	\$100,000
8 – 10 passenger van	An accessible van with good visibility needed to accommodate seasonal guide tours	\$45,000
TOTAL COST FOR FACILITIES		\$255,000

The current Refuge budget is not adequate to fund all of the wildlife observation proposals included in the CCP, therefore, additional funding must be identified before these proposals can be implemented. It is possible to implement these proposals in phases as funding sources are identified. Potential sources for funding include Federal cost share grants, interagency partnerships, state and private grants, and contributions from Friends groups.

Increasing the number of guided tours conducted on the salt works could be facilitated through the Refuge's current partnership with the City of Chula Vista's Nature Center. Additional funding, estimated at approximately \$45,000, would be needed to acquire an additional van for the Refuge Complex and another \$35,000 would be required to prepare the step-down wildlife observation plan and specific construction plans. The actual cost of developing the observation areas cannot be determined until more specific plans are development.

Anticipated Impacts of the Use:

A number of studies have been conducted to evaluate the effects of wildlife observation and photography on wildlife. The studies are summarized in a literature review prepared for the Stillwater National Wildlife Refuge (DeLong and Schmidt 2000). In summarizing the findings of these studies, DeLong and Schmidt state that wildlife observation and photography can "negatively impact wildlife by altering wildlife behavior, reproduction, distribution, and habitat." In addition, these studies show that birds frequently approached by humans may reduce foraging times in the area or avoid the area entirely. Huffman (1999) in observing waterbird disturbance in South San Diego Bay documented disturbance to migratory birds as a result of pedestrian activity along the shoreline. This disturbance was greatest during low tides when pedestrians left designated accessways to explore the mudflats. This activity affected both shorebirds and waterfowl. Huffman observed that human activity along the shoreline and in the mudflats would flush all birds within a 50 to 100 meter radius.

To reduce the potential for disturbance to wildlife, the majority of the new opportunities for wildlife observation and wildlife photography on the South San Diego Bay Unit would be provided along the perimeter of the Refuge rather than dispersed throughout the Refuge. For a discussion of the potential impacts to Refuge resources associated with wildlife observation and photography uses conducted in bay from water vessels, refer to the Compatibility Determination for recreational boating on the South San Diego Bay Unit.

Endangered and Threatened Species: Human activity can have adverse impacts on endangered and threatened species, particularly when it disrupts bird nesting or foraging activities. Requests from the public to consider opening the levees around Ponds 10 and 11 (refer to Figure 2-6 of the CCP/EIS) to public access were evaluated in the CCP/EIS, where it was determined that such access could result in disturbances to nesting tern colonies located across the river channel (refer to the discussion of Nesting Season Disturbance below), as well as disturbances to an established California brown pelican (*Pelecanus occidentalis californicus*) roosting area located on the levee separating Ponds 10 and 11. Opening these levees to public access could also adversely affect

the federally listed endangered light-footed clapper rail (*Rallus longirostris levipes*), which has been observed within the South Bay Biological Study Area, located immediately to the north of Pond 11. Potential threats to clapper rails from human activity on these levees consist primarily of direct habitat or nest losses resulting from human intrusion in the adjacent salt marsh areas. The effects of such disturbance would become even more significant following the restoration of Ponds 10 and 11, which are proposed for restoration to support the clapper rail. Repeated intrusion into clapper rail occupied salt marsh habitat could disrupt foraging and intrusion into restored habitat could discourage the use of restored areas by this species.

No adverse effects to listed species are anticipated from the current proposals to provide wildlife observation points around the perimeter of the Refuge. In addition, closing the salt works to guided tours during the nesting season would avoid any potential impacts to the federally listed endangered California least tern (*Sterna antillarum browni*) or threatened western snowy plover (*Charadrius alexandrinus nivosus*).

Nesting Season Disturbance: The nesting season varies for each species, but can generally be described as occurring between mid-February and mid-September of a given year. Disturbance to nesting bird species may occur if persons are present in the vicinity of avian nesting colonies or individual nests. A variety of ground nesting avian species utilize the levees around the salt ponds for nesting, including colonies of Caspian terns (*Sterna caspia*), elegant terns (*Sterna elegans*), royal terns (*Sterna maxima*), gull-billed terns (*Sterna nilotica vanrossemei*), Forster's terns (*Sterna forsteri*), endangered California least terns and black skimmers (*Rynchops niger*). Loud noises from activities on adjacent areas could result in disturbances to those nesting colonies located closest to activity areas. Avian responses to disturbance can include flocking, alarm calling, nest abandonment, colony abandonment, and inter-colony antagonistic behaviors leading to crushed eggs and killed chicks. Predatory species, particularly avian predators such as northern harriers, ravens, crows, and other gulls, may also use disturbance episodes to depredate eggs and chicks while the adults are flocking or otherwise distracted by the initial source of the disturbance.

The observation areas to be located along the southern edge of the Refuge would be situated approximately 150 meters or more from known nesting sites and physically separated from these sensitive areas by the Otay River channel (refer to Figure 2-17 in the CCP/EIS). As a result, activities occurring at the observation areas would not be expected to result in disturbance to nesting seabirds.

No guided tours of the salt works would be conducted during the nesting season; therefore, no nesting season disturbance from this use would occur.

Sensitive Habitats: Although the proposed wildlife observation sites would be located around the perimeter of the Refuge, they would still occur in proximity to sensitive wetland habitat. Therefore, to avoid disturbance related impacts to sensitive habitat, such as trampling of

vegetation, observation areas would be located along existing public trails and/or in areas where topographic relief or existing or future fencing would make it difficult for the public to gain access to sensitive areas.

The potential for impacts to sensitive habitats as a result of guided tours would be negligible due to the level of supervision that would occur during such tours.

Migratory Birds: Proposed observation areas have been sited away from locations that support an abundance of migratory bird foraging and loafing, therefore, disturbance from human activity in the vicinity of these areas is expected to be minimal.

Disturbance and possible displacement of migratory shorebirds could occur around the salt works if guided tours result in excessive out-of-vehicle activity. According to DeLong and Schmidt (2000), Klein (1993) tested the behavioral response of waterbirds to human disturbance, including vehicular travel at Ding Darling NWR and found that as the intensity of disturbance increased, avoidance response by waterbirds tended to increase. Out-of-vehicle activity was also observed to be more disruptive than vehicular movement through the area. Although the degree of disturbance may vary for the species and local populations of waterbirds occurring within the South San Diego Bay Unit, similar differences between out-of-vehicle activity and vehicle travel related to guide tours through the salt works would be expected.

Public Review and Comment:

This draft Compatibility Determination is being presented for public review and comment in conjunction with the draft Comprehensive Conservation Plan (CCP)/EIS for the South San Diego Bay Unit. Prior to the preparation of the draft CCP/EIS, opportunities for wildlife observation and photography on the Refuge were addressed on several occasions at public workshops.

To initiate the CCP process, a Notice of Intent was published in the Federal Register on June 23, 2000 (65 FR 39172). At that time, written comments were solicited. In July 2000, two initial scoping meetings were held, one in Imperial Beach and one in Chula Vista, to receive input from the public on issues related to the South San Diego Bay and Sweetwater Marsh Units. Due to the public's level of interest in these refuges, focused public workshops were held in September 2000 and June 2001 to specifically address the issue of public use. Three additional workshops were held between November 2000 and May 2001 to receive input from the public on wildlife management and restoration proposals for these refuges. All of the public meetings were well attended with at least 40 people present at each meeting. Approximately 50 to 60 people attended those meetings related to public use.

At each workshop, the public was encouraged to provide verbal comments or to send us written comments following the workshop. A CCP web page (www.sandiegorefuges.fws.gov) was established to provide the public with specific information regarding the topics addressed at the

various workshops and to present information regarding when and where to provide comments. A number of Planning Updates have also been prepared to summarize the progress of the CCP and to discuss specific issues related to the planning process. One of these updates was devoted entirely to the topic of public use. These Planning Updates have been distributed to more than 1,000 individuals and organizations representing interested members of the public, conservation organizations, hunting, fishing and boating organizations, public agencies, municipalities, special districts, Tribes, and adjoining property owners. We received more than 50 letters, emails, and phone calls related to public use between June and November 2001 and numerous other communications relevant to public uses on the Refuge were received in 2002 and 2003.

During the CCP scoping meetings and public use workshops, a number of individuals expressed their desire to see the needs of the Refuge's wildlife met before any consideration is given to the provision of public uses on the Refuge. Others stated that the Refuge should be managed as a place for people as well as wildlife. With respect to wildlife observation, one individual requested that the ability to observe the sounds of wildlife on the Refuge, particularly during seabird nesting season, be preserved. The San Diego Audubon Society expressed an interest in having viewing platforms provided near the salt ponds to permit viewing into the Refuge. A number of potential observation areas were suggested, including those described above.

Determination:

Use is Not Compatible

Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Prior to constructing any observation areas within the Refuge, a step-down wildlife observation plan that includes specific designs for the various observation areas will be developed and approved by the Refuge Manager. During the development of this plan, concepts, particularly concepts for the elevated platform, will be reviewed with the adjacent community to receive comments and recommendations regarding its design.
2. To reduce the potential for off-trail activity on Refuge lands and waters, regulatory signage and fencing or other appropriate barriers will be installed prior to opening an observation area.
3. For three years following the completion of an observation area, monitoring shall be conducted during the nesting season to determine the effects, if any, of increased human activity at the site on nearby nesting seabirds. Additionally, weekly monitoring during peak migration periods shall also be conducted to observe any effects to bird foraging and resting behavior as a result of increases in activity at the observation site. If adverse effects are observed, additional measures shall be implemented to reduce disturbance.

4. Guided tours of the salt works shall not be conducted during the nesting season (February 15 through September 15). From February 1 to February 14 and September 16 to September 30 of each season, the Refuge Biologist shall confirm one day prior to a scheduled tour that no nesting or fledgling activity is occurring on or within 150 meters of the tour route.
5. To avoid excess disturbance during migration, the Refuge Manager shall establish guidelines for when and how often visitors on a guided tour are permitted to exit the vehicle for observation purposes.

Justification:

Expanding the opportunities for wildlife observation and photography on the South San Diego Bay Unit will enhance the public's appreciation of the wildlife resources supported within this Refuge. Although adequate funding is not currently available to implement all of the proposals, implementation can be phased over several years. As new opportunities are provided, the public's appreciation for the species and habitats found within the Refuge will increase, and in turn conditions will improve for ensuring the protection and management of the Refuge's listed species and other wildlife. This outcome is consistent with the Refuge purposes of protecting, managing, and restoring habitats for federally listed endangered and threatened species and migratory birds and maintaining and enhancing the biological diversity of native plants and animals. A review of the environmental consequences of implementing these uses, as provided in the draft CCP/EIS (USFWS 2004), demonstrates that these uses would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission, provided the stipulations to ensure compatibility are followed. Further, wildlife observation and photography are two of the six priority public uses of the System, as defined by the Act. Therefore, implementation of these programs would contribute to the fulfillment of the Refuge System mission, and the achievement of the goals established for the Refuge, particularly the goal to provide opportunities for compatible wildlife-dependent recreational uses that foster public appreciation of the unique natural and cultural heritage of South San Diego Bay.

Mandatory Re-Evaluation Date:

Mandatory 15-year Re-Evaluation Date (for priority public uses)

Mandatory 10-year Re-Evaluation Date (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision:

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

 X Environmental Impact Statement and Record of Decision

References Cited:

DeLong, Anita and Janet Schmidt. 2000. Literature Review: Effects of Human Disturbance on Wildlife with Emphasis on Wildlife-Dependent Recreation Relevant to Stillwater National Wildlife Refuge (Draft).

Huffman, Kathy. 1999. San Diego South Bay Survey Report – Effects of Human Activity and Water Craft on Wintering Birds in the South San Diego Bay.

Klein, M. L. 1993. Waterbird Behavioral Responses to Human Disturbances. Wildlife Society Bulletin 21:31-39.

U.S. Fish and Wildlife Service. 2004. Draft Sweetwater Marsh National Wildlife Refuge/South San Diego Bay Unit of the San Diego National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement.

Refuge Determination:

Prepared by: _____ Date: _____

Refuge Manager/ Project Leader
Approval: _____ Date: _____

Concurrence:

Refuge Supervisor: _____ Date: _____

Regional Chief
National Wildlife
Refuge System: _____ Date: _____

California/Nevada
Operations Manager
(for CA and NV): _____ Date: _____

Compatibility Determination

-DRAFT-

Use: Environmental Education and Interpretation

Refuge Name: South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge (San Diego County, Cities of Coronado, Chula Vista, Imperial Beach, National City, and San Diego, California)

Establishing and Acquisition Authorities:

The authorities for the establishment of the San Diego National Wildlife Refuge are the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a-742j, not including 742d-742l), and the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543).

Refuge Purposes:

The South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge (South San Diego Bay Unit) was established:

“...to protect, manage, and restore habitats for federally listed endangered and threatened species and migratory birds, and to maintain and enhance the biological diversity of native plants and animals...” 16 U.S.C. § 1531-1543 (Endangered Species Act of 1973, as amended) and 70 Stat. 1119 (Fish and Wildlife Act of 1956, as amended).

National Wildlife Refuge System Mission:

The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Descriptions of Use:

Various community members identified the development of environmental education and interpretation programs for the South San Diego Bay Unit as a key element of the Comprehensive Conservation Plan (CCP) for this Refuge. As a result, existing environmental education and interpretation programs are proposed for expansion. Environmental education, particularly the Habitat Heroes program, would be expanded to focus on new partnerships with area elementary, middle school, high school, and community college districts. In addition, a variety of interpretive concepts are proposed in response to comments received during the public workshop process. Many of these concepts would be implemented in conjunction with expanded opportunities for wildlife observation. New and expanded environmental education and

interpretation programs are intended to provide the community and visitors to the region with an opportunity to better understand the wildlife and habitats found within the Refuge, increase public awareness for the need to protect these resources, and experience through interpretation the traditional wildlife-dependent recreational uses of the National Wildlife Refuge System.

Environmental Education: As described in Chapter 2 of the draft CCP/Environmental Impact Statement (EIS) for the South San Diego Bay Unit, continuation of the Refuge's Habitat Heroes program would provide second graders through community college students with the opportunity to participate in an innovative program that incorporates the use of GIS technology, traditional and internet-based instruction, cross-age student mentoring, and habitat-based investigations for the purpose of developing an appreciation for the importance of the coastal wetlands protected within the Refuge. This program would continue to focus on two significant threats to the habitat quality of these coastal wetlands: invasive plant species and stormwater pollution. Working on an upland area along the southern perimeter of the Refuge, in the vicinity of Bayside Elementary School, students will have the opportunity to map native and nonnative plants, remove invasive plant species, and cultivate and plant native plants. The continued implementation of the program, which involves partnering with elementary, secondary, and post secondary students and teachers, volunteer groups, trained environmental educators, the City of Imperial Beach, and interested individuals from the surrounding community, will require the identification of additional funding sources.

A significant activity of "Habitat Heroes" will be the inclusion of students' work on a national web site with links to other such education programs in which the Complex participates called, "Hands on the Land." Hands on the Land is sponsored by numerous federal agencies including the U.S. Fish and Wildlife Service and is funded by Congress through the National Environmental Education and Training Foundation.

Environmental Interpretation: The interpretive program proposed for the South San Diego Bay Unit, as described in Chapter 2 of the draft CCP/ EIS, would include several components. The first is a proposal to design a variety of interpretive elements that would provide the public with an overview of the many resources present on the Refuge, including coastal wetland and upland habitats, migratory birds, colonial nesting seabirds, and endangered and threatened species. These interpretive elements would be installed around the southern perimeter of the bay, where visual and other sensory access into the Refuge is readily available. The second component involves a proposal to interpret one of the traditional wildlife-dependent recreational uses of the National Wildlife Refuge System, hunting.

Opportunities for interpreting the various resources protected within the Refuge would be provided along the strip of upland terrace that defines the Refuge's southern boundary, generally the area immediately to the north of the Bayshore Bikeway. Interpretive sites are proposed to generally correspond to the proposed wildlife observation areas, described in the Compatibility Determination prepared for wildlife observation and photography. These interpretive sites

would be developed at the following locations: 1) between the northern terminus of 13th Street and the northern terminus of Florence Street; 2) at the northern terminus of 10th Street, near the City of Imperial Beach's Public Works facility; and 3) at the northern terminus of 8th Street. All of these locations are located within the City of Imperial Beach. An observation area would be collocated at the interpretive site proposed for the end 10th Street. The City of Imperial Beach is currently seeking grant funds to provide a bike path connection from the adjacent community onto the Bayshore Bikeway at this location, to develop a parking lot just to the south of the Refuge boundary, and to assist in the development of the proposed observation and interpretive site. The specific design for this site and the other proposed interpretive sites would be developed as part of a step-down interpretive plan.

All of the proposed sites would be accessible from the Bayshore Bikeway and several public streets in northern Imperial Beach. A parking area that serves users of the Bayshore Bikeway is available at the northern terminus of 13th Street and on-street parking is available along Florence Street, 8th Street, and Boulevard Avenue. The interpretative areas would be accessible during daylight hours and several would be sited to correspond with the locations of the various observation areas described in the Compatibility Determination prepared for wildlife observation and photography on the South San Diego Bay Unit. The interpretive theme for each of these sites, the types of interpretive elements to be installed, and the detailed cost estimates for each interpretive site would be developed as part of the step-down plan. Opportunities for additional interpretation at existing public use locations where interpretive elements such as kiosks, signs, remote video cameras and other cutting edge approaches to public interpretation could be provided would also be examined in this step-down plan.

Several members of the public expressed a desire to see hunting recognized on this Refuge as one of the traditional wildlife-dependent recreational uses of the National Wildlife Refuge System. To address this suggestion, the interpretive program for the Refuge would include the seasonal interpretation of a waterfowl hunting program along the northern levee of the salt ponds. This "virtual hunt," which would be conducted approximately four times a year between November and January, would involve up to 12 participants per session and each session would take place during the hours of sunrise to 9:00 a.m. One or two temporary hunting blind would be installed along the northern levee and as part of the interpretive program waterfowl historically hunted in the south bay would be called in to simulate the traditional hunting method. A docent would be present to describe historic hunting activities within the south bay, answer questions about waterfowl hunting programs in general, and discuss various hunting opportunities throughout the National Wildlife Refuge System. Participants would be transported from an off refuge locations to the salt works in vans and reservations would be required to participate. No fee would be required to participate in this program.

The CCP also recommends the development of a coordinated interpretive program for San Diego Bay that would involve collaboration among all of the agencies surrounding the Bay including the Cities of Coronado, Imperial Beach, National City, Chula Vista, and San Diego, County of

San Diego, U.S. Navy, and Port of San Diego. The Refuge is interested in working with these agencies to interpret bay habitats and refuge resources in a coordinated style so that a member of the public traveling along the Bayshore Bikeway will be able to experience different yet harmonious interpretive elements that serve to enhance an understanding of the bay ecosystem as a whole, while allowing for individual interpretation of various discrete characteristics of bay habitats, endangered species, watershed issues, and cultural and historic values.

Availability of Resources:

To implement and administer the environmental education and interpretation programs described, the following staffing and materials/facilities would be required:

Staffing			
Position	Involvement	FTE	Cost
Project Leader//Deputy Project Leader	General oversight	0.2/0.2	\$25,700/\$22,000
Refuge Manager	Periodic on-site oversight	0.3	\$27,300
Refuge Operations Specialist	Periodic on-site oversight, monitoring of law enforcement activities	0.3	\$26,000
Wildlife Biologist	Monitoring, reporting, review interpretive plan, and provide oversight of bio tech	0.3	\$26,000
Information and Education (I&E) Specialist	Coordinate the development of curriculum for the environmental education program and assist in the design of the interpretive plan, build partnerships with other agencies and organizations, and outreach to schools	0.3	\$23,400
Outdoor Recreation Planner	Design and coordinate the interpretive plan, develop the virtual hunt program	0.3	\$15,170
Law Enforcement Officer	Law enforcement	0.3	\$20,800
Park Ranger	Facilities maintenance, participate in the educational and interpretation programs, and assist with virtual hunting program	0.3	\$13,000
Maintenance Worker	Maintain interpretive areas and amenities	0.3	\$12,870
Biological Technician	Field data collection, assistance with analysis and report writing	0.3	\$15,170
TOTAL FTES AND COSTS FOR STAFFING		3.1	\$227,410

Facilities		
Material/Facility Required	Explanation of Need	Cost
Step-down Plan	Needed to design and prepare specifications for the interpretive sites proposed at the northern terminus of 8 th , 10 th , and 13 th Streets and to identify the interpretive theme for each area, the types of interpretive elements to be provided, and fabrication and installation specifications for the interpretive elements.	\$45,000
Construct an accessible Interpretive Trail w/ associated upland restoration on Refuge land near the northern terminus of 10 th Street	To interpret the importance of coastal uplands to the function and value of coastal wetlands on an upland area; would involve the removal of nonnative vegetation and the installation of native plants and the construction of an accessible pathway through the restored area with access from the Bayshore Bikeway	\$35,000
Interpretive elements for the interpretive trail	Fabricate and install 20 small interpretive plant signs and three larger interpretive panels	\$15,000
Temporary hunting blind	To accommodate the “virtual hunt” interpretive program	\$500
Development of educational curriculum for a middle school program	Curriculum for the elementary school program has been developed, but a middle school curriculum for the Habitat Heroes program is still needed.	\$5,000
Materials/Instructors to Implement the Habitat Heroes Program	Annual costs associated with implementing the program including instructors, miscellaneous materials, and native plants	\$25,000
TOTAL COST FOR FACILITIES		\$125,500

The current Refuge budget is not adequate to fund all of the environmental and interpretive programs proposed, therefore, additional funding must be identified before these proposals can be fully implemented. The first year of the Habitat Heroes program was funded through a challenge cost share grant. To fully implement this program, which would involve expanding the program to reach elementary, middle, and high school students would require funding of approximately \$25,000 annually. Funding could come from a combination of sources including the Refuge operating budget, funds from individual schools involved in the program and one-time or on-going public and private grant funds awarded to the Refuge’s Friends Group. Additional assistance would be provided by volunteers, teachers, and student mentors.

Implementation of the interpretation proposals could be phased to coincide with the identification of appropriate funding sources. Potential sources for interpretive funding include Federal cost share grants, state grants that focus on education and/or the environment, local partnerships, private funding sources, and contributions from the Refuge’s Friends group. Funding for the “virtual hunt” program could be provided by local hunting groups and/or state and national organizations interested in traditional hunting activities.

Anticipated Impacts of the Use:

As described in Chapter 4 of the draft CCP/ EIS, potential impacts associated with the implementation of the proposed environmental education and interpretation programs could include disturbance to wildlife, destruction of native habitats, and intrusion onto sensitive refuge lands by members of the public. Such impacts would be minimized through appropriate program design, adequate Refuge oversight and supervision of educational activities, and ongoing coordination among partners.

Endangered and Threatened Species: Human activity can have adverse impacts to endangered and threatened species, particularly when this activity disrupts nesting or foraging activities. Through adherence to the stipulations outlined below, the potential for adverse impacts to the endangered light-footed clapper rail (*Rallus longirostris levipes*) that could occur as a result of increased human activity in the vicinity of the northern terminus of 8th Street and between Ponds 10 and 10A would be minimized. As part of the design of future interpretive areas, issues such as location, size, orientation, construction timing and access, as well as specific activities to be permitted and physical improvements to be completed, would be reviewed by the Refuge Biologist to ensure that there would be no direct, indirect, or cumulative impacts to clapper rails or their habitat. It may be necessary to construct physical barriers such as post and cable fencing between the interpretive element and the wetlands to reduce the potential for habitat damage. These types of measures would be incorporated into the design of the interpretive areas as part of the future step-down interpretive plan.

The interpretive elements proposed along the Bayshore Bikeway would be topographically separated from the more sensitive habitat areas within the Refuge making access into these areas difficult. The combination of natural barriers and the installation of additional post and cable fencing and signage would minimize the potential for impacts to clapper rails and other sensitive coastal wetland species. No adverse effects to the federally listed endangered California least tern (*Sterna antillarum browni*), the endangered California brown pelican (*Pelecanus occidentalis californicus*), or the threatened western snowy plover (*Charadrius alexandrinus nivosus*) are anticipated as a result of the current environmental education and interpretation proposals.

The “virtual hunt” program would be confined to the salt works and would occur during the non-breeding season; therefore, no adverse effects to endangered or threatened species are anticipated.

Sensitive Habitats: The Habitat Heroes program would utilize an isolated, degraded upland area located on Refuge land. This upland, which is separated from nearby wetlands to the north by the Bayshore Bikeway, is located adjacent to a remnant of a much larger historic marsh area that was filled many decades ago to accommodate urban development. The playground of the Bayside Elementary School abuts the marsh to the south. Although the marsh supports several

native coastal salt marsh plant species, it also includes various exotic, invasive plants and currently provides little benefit to native wildlife. The educational use of the adjacent upland could result in some trampling of native marsh vegetation; however, such impacts would be minimized through adequate teacher participation and monitoring of student activity. The proximity of this degraded marsh land provides opportunities to increase the students' understanding of the importance of protecting wetland and native upland areas and adjacent watersheds. These benefits would outweigh the limited impacts to wetland plants from occasionally trampling.

Locating interpretive areas around the perimeter of the Refuge, taking advantage of topographic barriers to separate public uses from sensitive resources, and installing appropriate signage and fencing where required would minimize the potential for impacts to sensitive habitats as a result of increased human activity. Public access onto the salt works during the nesting season is not proposed, therefore, no impacts to sensitive tern nesting habitat are anticipated.

Migratory Birds: The salt ponds and mudflats along the edges of the Otay River support a diverse array of migratory birds including shorebirds, ducks, and seabirds. Various studies have shown that frequent human disturbance can negatively impact wildlife by altering wildlife behavior, reproduction, distribution, and habitat. Such disturbances may also cause birds to reduce their foraging times in these areas or avoid the areas entirely (DeLong and Schmidt 2000). Human activity in the vicinity of the proposed interpretive areas, particularly the areas to be located at the end of 10th Street and 8th Street, could result in some disturbance to resting and foraging migratory birds. These areas are already impacted to some degree by existing activities occurring along the Bayshore Bikeway. The addition of interpretive areas along the bikeway would likely increase the intensity of use resulting in an increase in the frequency of disturbance. Because the proposed interpretive elements and the environmental education program site are located along the perimeter of the Refuge, the birds that are flushed would likely move further into the Refuge and resume foraging or resting. Therefore, the effects of these uses on migratory birds are expected to be minimal.

Disturbance and possible displacement of migratory shorebirds could occur around the salt works if guided tours result in excessive out-of-vehicle activity. According to DeLong and Schmidt (2000), Klein (1993) tested the behavioral response of waterbirds to human disturbance, including vehicular travel at Ding Darling NWR and found that as the intensity of disturbance increased, avoidance response by waterbirds tended to increase. Out-of-vehicle activity was also observed to be more disruptive than vehicular movement through the area. Although the degree of disturbance may vary for the species and local populations of waterbirds occurring within the South San Diego Bay Unit, similar differences between out-of-vehicle activity and vehicle travel could occur at the salt works. To avoid excessive disturbance, guides would reduce the number of stops in areas where high concentrations of foraging birds are located in proximity to the access road.

Because the activity associated with the “virtual hunt” would be confined to one or two areas along the northern levees of Ponds 12, 14, and 15, disturbance along the mudflats would also be limited. In addition, this activity would be scheduled to occur during period of high tide when shorebirds are less likely to be present in large numbers. Based on the timing of the activity, which would coincide with the high tide, the small size of the groups, and the limited number of times that participants in this activity would be present along the levee during the year, disturbance impacts as a result of this activity would be minimal.

Public Review and Comment:

Environmental education and interpretation have been discussed on several occasions at public workshops held in conjunction with the Comprehensive Conservation Plan (CCP) process. To initiate the CCP process, a Notice of Intent was published in the Federal Register on June 23, 2000 (65 FR 39172). At that time, written comments were solicited. In July 2000, two initial scoping meetings were held, one in Imperial Beach and one in Chula Vista, to receive input from the public on issues related to the Sweetwater Marsh and South San Diego Bay Units. Due to the public’s level of interest in these refuges, focused public workshops were held in September 2000 and June 2001 to specifically address the issue of public use. Three additional workshops were held between November 2000 and May 2001 to receive input from the public on wildlife management and restoration proposals for these refuges. All of the public meetings were well attended with at least 40 people present at each meeting. Approximately 50 to 60 people attended those meetings related to public use.

At each workshop, the public was encouraged to provide verbal comments or to send us written comments following the workshop. A CCP web page (www.sandiegorefuges.fws.gov) was established to provide the public with specific information regarding the topics addressed at the various workshops and to present information regarding when and where to provide comments. A number of Planning Updates have also been prepared to summarize the progress of the CCP and to discuss specific issues related to the planning process. One of these updates was devoted entirely to the topic of public use. These Planning Updates have been distributed to more than 1,000 individuals and organizations representing interested members of the public, conservation organizations, hunting, fishing and boating organizations, public agencies, municipalities, special districts, Tribes, and adjoining property owners. We received more than 50 letters, emails, and phone calls related to public use between June and November 2001 and numerous other communications relevant to public uses on the Refuge were received in 2002 and 2003.

Opportunities for environmental education and interpretation were addressed at the initial scoping meetings for the CCP, as well as at the June 21, 2001 Public Use Workshop. Several members of the public expressed the desire to see the Refuge used as a setting for environmental education and others suggested the development of an interpretive area in proximity to the Bayside Elementary School. Creating partnerships with other agencies, school districts, and the adjacent community to implement educational programs was also emphasized.

This draft compatibility determination is now being presented for public review and comment in conjunction with the draft CCP/EIS for the South San Diego Bay Unit.

Determination:

Use is Not Compatible

Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Each year, prior to initiating the Habitat Heroes program, all participating teachers, outside instructors, and other facilitators shall coordinate with the Refuge Manager to review the area-specific guidelines for implementing the program in a manner that will minimize impacts to wildlife and its habitat. These guidelines will specify the maximum number of participants per visit to the site, appropriate access routes into and through the site, the activities that can be conducted, and any times during the year when activities should be suspended or minimized.
2. The Refuge's Information and Education Specialist shall review all materials and programs to ensure consistency with Refuge goals and the mission of the National Wildlife Refuge System.
3. All required regulatory signage and fencing or other appropriate barriers shall be installed prior to the opening of interpretive sites at the northern terminus of 10th Street and 8th Street to reduce the potential for off-trail activity on Refuge lands and waters.
4. All "virtual hunt" programs will be scheduled to coincide with the high tide to reduce disturbance to migratory birds.
5. Monitoring of the effects of increased human activity on migratory birds and nesting seabirds shall be implemented weekly during the first three years of the environmental education program and the first three years following the completion of an interpretive area. This monitoring should be conducted during peak migration periods, as well as during the nesting season, to determine what, if any, effect increases in activity as a result of these programs are having on bird foraging, resting, and/or nesting behavior. If excessive disturbance is observed, additional measures should be implemented to reduce these effects.

Justification:

The development of environmental education and interpretation programs for the South San Diego Bay Unit would provide various opportunities to inform community members and visitors to the region of the importance of the resources protected within the Refuge. In addition, the Habitat Heroes program is designed to encourage stewardship of the many resources protected in the Refuge. Although adequate funding is not currently available to implement all of the elements proposed within these programs, the phasing of program implementation over several years would have no adverse effects. Rather, the benefits of these programs would simply take longer to be realized.

An informed and involved public, cultivated as a result of these programs, will benefit the wildlife and habitats protected and managed within the Refuge consistent with the Refuge purposes of protecting, managing, and restoring habitats for federally listed endangered and threatened species and migratory birds and maintaining and enhancing the biological diversity of native plants and animals. A review of the environmental consequences of implementing these uses, as provided in the draft CCP/EIS (USFWS 2004), demonstrates that these uses would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission, provided the stipulations to ensure compatibility are followed. Further, environmental education and interpretation are two of the six priority public uses of the System, as defined by the National Wildlife Refuge System Improvement Act of 1997. Therefore, implementation of these programs would contribute to the fulfillment of the Refuge System mission, as well as the achievement of the goals established for the South San Diego Bay Unit, particularly the goal to provide opportunities for compatible wildlife-dependent recreational uses that foster public appreciation of the unique natural heritage of South San Diego Bay.

Mandatory Re-Evaluation Date:

Mandatory 15-year Re-Evaluation Date (for priority public uses)

Mandatory 10-year Re-Evaluation Date (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision:

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

References Cited:

DeLong, Anita and Janet Schmidt. 2000. Literature Review: Effects of Human Disturbance on Wildlife with Emphasis on Wildlife-Dependent Recreation Relevant to Stillwater National Wildlife Refuge (Draft).

U.S. Fish and Wildlife Service. 2004. Draft Sweetwater Marsh National Wildlife Refuge/South San Diego Bay Unit of the San Diego National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement.

Refuge Determination:

Prepared by: _____ Date: _____

Refuge Manager/
Project Leader
Approval:

_____ Date: _____

Concurrence:

Refuge Supervisor: _____ Date: _____

Regional Chief
National Wildlife
Refuge System:

_____ Date: _____

California/Nevada
Operations Manager
(for CA and NV):

_____ Date: _____

Compatibility Determination

-DRAFT-

Use: Mosquito Management

Refuge Name: South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge (San Diego County, Cities of Coronado, Chula Vista, Imperial Beach, National City, and San Diego, California)

Establishing and Acquisition Authorities:

The authorities for the establishment of the San Diego National Wildlife Refuge are the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a-742j, not including 742d-742l) and the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543).

Refuge Purposes:

The South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge (South San Diego Bay Unit) was established:

“...to protect, manage, and restore habitats for federally listed endangered and threatened species and migratory birds, and to maintain and enhance the biological diversity of native plants and animals...” 16 U.S.C. § 1531-1543 (Endangered Species Act of 1973, as amended) and 70 Stat. 1119 (Fish and Wildlife Act of 1956, as amended).

National Wildlife Refuge System Mission:

The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use:

Mosquito management throughout the coastal refuges of San Diego County is conducted under the auspices of a Refuge Special Use Permit (SUP) in coordination with the San Diego County Department of Environmental Health, Vector Control Division. The SUP is issued annually. The primary purpose for implementing mosquito management on this Refuge is to avoid threats to public or wildlife health from specific mosquito-borne diseases. Mosquito management is implemented on the South San Diego Bay Unit through a phased approach that emphasizes early detection and treatment, if warranted, with larvicides. The use of adulticides is to be reserved for addressing human health emergencies.

Several mosquito species occur in and around the South San Diego Bay Unit that are capable of transmitting microbial organisms that cause human diseases such as malaria and encephalitis. The mosquitoes of major concern in California belong to the genera *Culex*, *Ochlerotatus*, and *Anopheles*. The species of greatest public health concern include *Culex tarsalis*, *Culex pipiens*, *Culex quinquefasciatus* and *Anopheles hermsi*. Of lesser importance are the salt marsh mosquitoes: *Ochlerotatus squamiger* and *Ochlerotatus taeniorhynchus*.

Specific data regarding the species presence in the vicinity of the Refuge was collected in 2003 at the Otay River and Hollister Street mosquito trap array by the County of San Diego, Department of Environmental Health, Vector Control Division. This data indicates that eight species of mosquito are commonly found in this area. These species include:

Anopheles hermsi – This species, which is very commonly found in the Otay traps, is a highly competent vector of malaria, although this disease is not prevalent in this region.

Culex erythrothorax – This species, which is the most common mosquito in San Diego, is typically considered a nuisance. It is commonly found in the Otay traps and occurs in densely vegetated freshwater marshes and heavily vegetated backwater zones. It is not considered to be a major disease carrier, although its ability to potentially harbor West Nile Virus (WNV) is currently unknown.

Culex tarsalis – A highly competent vector mosquito, this species is quite common in the Otay traps. Viewed generally as a nuisance mosquito, this species can also be an effective carrier of disease.

Culiseta incidens and *Culiseta particeps* – These two species are regularly captured in the Otay traps in small to moderate numbers. Neither species is considered to be a disease vector, but can be a biting nuisance. Their ability to harbor WNV is unknown.

Ochlerotatus increpitus – Primarily a nuisance mosquito, this species, which bites during the day, is common in the Otay traps. Its ability to vector WNV is unknown.

Ochlerotatus taeniorhynchus and *Ochlerotatus squamiger* – These mosquito species are prevalent in salt marsh habitat. *Ochlerotatus taeniorhynchus* is primarily a day-biting nuisance, and neither species is currently considered to be a disease carrier; however their ability to transmit WNV is unknown.

Mosquito management on the South San Diego Bay Unit is addressed through an integrated pest management approach in which Refuge and County vector control officials coordinate efforts to manage the overall environmental health of adjacent communities while minimizing impacts to Refuge trust resources. County and Refuge staff work together to agree upon issues related to access, methods of operation, and timing of access, as well as to exchange information related to listed species occurrences, permitting, and relevant agency policy.

The current procedures for implementing mosquito management on this Refuge involve an annual meeting between County and Refuge staff to coordinate all necessary permitting and implementation planning required to conduct mosquito monitoring and control on the Refuge for the upcoming year. Issues such as access points and pathways to be used by County personnel, appropriate hours of operation, and requirements for field coordination are discussed, agreed upon, and incorporated into the SUP. As part of this coordination process, County vector control personnel are provided with data generated by the Refuge biologist on listed species and other trust resources. County personnel share relevant data related to mosquito and disease monitoring in the vicinity of the Refuge. In addition, periodic meetings are conducted in the field with County field staff and the Refuge biologist to further coordinate activities. These meetings are scheduled throughout the season when warranted to ensure protection of endangered and threatened migratory birds and to avoid disturbance to nesting birds.

Following the conditions included in the SUP, County vector control personnel conduct periodic mosquito larvae surveys in many discrete areas throughout the Refuge. Because the primary means of mosquito management is the use of larvicides, it is essential that larvae be observed prior to pupation so that they may be treated appropriately by the least environmentally damaging means. As a result, the frequency of larvae surveys increases throughout the mosquito breeding season. Currently, treatment areas are determined based on the season, the species and density of the mosquitoes detected, the proximity of the vectors to surrounding urban areas, and the life stage the mosquitoes are found in. Control of adult or pupal mosquitoes is not currently conducted on the Refuge.

Public concern over human health issues related to mosquito-borne disease has intensified on the west coast with the advance of WNV across the United States. To better address mosquito management, a phased response strategy has been developed for implementation on refuges in the Pacific Region. This strategy encourages an integrated pest management approach that incorporates habitat and best management practices to reduce the need for and use of insecticides on refuges, while also ensuring that legitimate human, fish, and wildlife health concerns are addressed. To implement this phased response strategy, current procedures for managing mosquitoes on this Refuge will be augmented to better identify thresholds for mosquito treatment and present specific responses to various conditions encountered in the field. Under this new program, if mosquito population monitoring and disease surveillance (implemented by County vector control personnel) indicate that human health thresholds are exceeded, the use of larvicides, pupicides, and/or adulticides may become necessary. In some cases, emergency

actions may be required that are not addressed by this Compatibility Determination.

Two larvicide compounds that could be used to manage mosquitoes on the Refuge include Bti (*Bacillus thuringienensis israelensis*) and Altosid (methoprene). These larvicides are intended to control mosquitoes in wetlands prior to their emergence as adults. Bti is used primarily to control early stage larvae and is available in liquid and granular formulations. Altosid is used on later stage mosquito larvae and is available in liquid, briquet and pellet formulations. Both compounds are highly specific to mosquito larvae. The use of Golden Bear 1111, which is effective at preventing adult mosquito emergence from wetlands but toxic to fish and other aquatic organisms, is not currently permitted for use within the South San Diego Bay Unit.

To reduce the potential for mosquito production during and following habitat restoration on the Refuge in accordance with the proposals presented in Chapter 2 of the draft Comprehensive Conservation Plan (CCP)/Environmental Impact Statement (EIS) restored freshwater and brackish wetland habitats would be designed in a manner that reduces the potential for mosquito breeding. Specifically, deeper water channels (greater than 4 feet) would be included in the design to break up areas of dense emergent vegetation and provide access for aquatic predators that feed on mosquito larvae. These restored wetlands would also include appropriate surveillance access points to aid County vector control personnel in monitoring these wetlands for potential mosquito production.

Availability of Resources:

To implement and administer mosquito management on the South San Diego Bay Unit, the following staffing and facilities are required:

Staffing			
Position	Involvement	FTE	Cost
Project Leader/Deputy Project Leader	General oversight	0.2/0.2	\$25,700/\$22,000
Refuge Manager	Periodic on-site oversight	0.3	\$30,300
Refuge Operations Specialist	On-site oversight when necessary	0.3	\$26,000
Wildlife Biologist	Monitoring, reporting, mosquito management plan preparation, coordination and oversight of vector control activities, annual preparing the Refuge SUP	0.3	\$26,000
TOTAL FTES AND COSTS FOR STAFFING		1.3	\$130,000

TOTAL COST FOR FACILITIES	none	\$0
---------------------------	------	-----

Adequate staff positions and financial resources are currently available and committed to implement mosquito management on the South San Diego Bay Unit.

Anticipated Impacts of the Use:

The purpose of this section is to critically and objectively evaluate the potential direct, indirect and cumulative effects mosquito management could have on the Refuge’s endangered and threatened species and other fish and wildlife resources. The evaluation of direct impacts focuses primarily on existing and future freshwater wetlands and coastal salt marsh areas of the South San Diego Bay Unit, as these portions of the Refuge are or will be most prone to mosquito production. The potential for indirect impacts to the remainder of the Refuge, which consists of the open bay, salt pond levees, mudflats, and upland habitat, is also evaluated.

Habitat and Wildlife Disturbance: Vegetation trampling resulting from mosquito monitoring and mosquito control, as well as the possible creation of channels to drain stagnant water areas, could adversely impact native vegetation and wildlife habitat. In addition, these activities could result in disturbances to the existing wildlife that utilizes this area. At present, the Otay River floodplain and the existing salt ponds on the Refuge support both native and non-native vegetation and wetland habitats of varying types. The most significant habitats supported within the Otay River floodplain include freshwater marsh and willow scrub habitat, which occurs along the eastern portions of the Otay River channel and the salt marsh areas located along the western end of the river channel. These wetland areas provide foraging, resting, and nesting habitat for a variety of birds, including migratory shorebirds, waterfowl, and songbirds, as well as various native mammals, reptiles, and amphibians. To minimize impacts related to disturbance, the Refuge biologist would coordinate with County vector control personnel at least annually to review appropriate conduct within sensitive habitat areas. Specific field implementation protocols for working in sensitive habitat areas would be included in the Refuge SUP.

Although the upland portion of the Otay River floodplain currently supports non-native vegetation, this area does provide foraging habitat for a variety of raptor species including northern harriers (*Circus cyaneus*), white-tailed kites (*Elanus leucurus*), American kestrels (*Falco sparverius*) and red-tailed hawks (*Buteo jamaicensis*). Foraging and nesting opportunities for raptors should not be reduced by mosquito control activities.

Endangered and Threatened Species: One of the purposes of the South San Diego Bay Unit is to conserve fish and wildlife that are listed as endangered or threatened. A number of listed species occur within the boundaries of this Refuge, including several that utilize the wetland areas within the Otay River floodplain. The Federal endangered California least tern (*Sterna antillarum browni*) forages within the Otay River channel during the spring and summer, while the Federal

endangered light-footed clapper rail (*Rallus longirostris levipes*) and State endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) utilize the wetland habitats along the river channel year round. The cordgrass stands and brackish marsh habitat growing along the river channel provide foraging, resting, and/or breeding habitat for both species.

Potential impacts to the light-footed clapper rail and Belding's savannah sparrow would consist primarily of direct habitat or nest losses through trampling of cordgrass or pickleweed where nests could occur, but would also include indirect adverse affects related to the disruption of foraging opportunities in both clapper rail and Belding's savannah sparrow territories. The relatively limited time that vector control personnel would be present in these habitat areas, as well as the use of those controlled access points and pathways agreed upon between the County and Refuge personnel and described in the Refuge SUP would minimize the potential for adverse affects to these species as a result of mosquito management.

Mosquito control in this area does require some access to sensitive wetland areas; however no mowing or ditching of wetland areas is authorized. The level of allowed activity, combined with its controlled management by Refuge biological staff would not likely result in direct, indirect, and cumulative impacts to the light-footed clapper rail.

Nesting Season Disturbance: The nesting season varies with species but can generally be described as occurring between mid-February and mid-September. Disturbance to nesting bird species may occur if vector control personnel are present in the vicinity of avian nesting colonies or individual nests.

Several species, many of which are rare, sensitive or state and/or Federally-listed occur within the South San Diego Bay Unit. As described above, the habitats present within the Otay River channel support light-footed clapper rail and Belding's savannah sparrow nesting. Cordgrass stands along the Otay River channel and the brackish marsh within the channel support clapper rail nesting, while high salt marsh vegetation, such as the pickleweed stands that occur in the intertidal habitats within the river channel, are known to support savannah sparrow nesting. No nesting survey monitoring reports for the savannah sparrow are available for this location, but it is probable that nesting attempts by the species do occur within the area being evaluated. To avoid impacts to nesting species within the lower portions of the Otay River channel, periodic meetings would be conducted in the field with County field staff and the Refuge biologist to coordinate activities and delineate sensitive nesting areas that should be avoided or entered within extreme caution.

There is also a potential for direct and indirect impacts to breeding waterfowl such as gadwall (*Anas strepera*) and mallard (*Anas platyrhynchos*), which have also been observed nesting in the Otay River channel, however these impacts are not likely to be significant due to the controlled and limited nature of the access into habitat areas by authorized personnel.

A variety of ground nesting avian species utilize the levees around the salt ponds for nesting, including colonies of Caspian terns (*Sterna caspia*), elegant terns (*Sterna elegans*), royal terns (*Sterna maxima*), gull-billed terns (*Sterna nilotica vanrossemei*), Forster's terns (*Sterna forsteri*), endangered California least terns, and black skimmers (*Rynchops niger*). Avian responses to disturbance can include flocking, alarm calling, nest abandonment, colony abandonment, and inter-colony antagonistic behaviors leading to crushed eggs and killed chicks. Predatory species, such as ravens, crows, certain gulls, and harriers, may also use disturbance episodes to depredate eggs and chicks while the adults are flocking or otherwise distracted by the initial source of the disturbance. However, it is not anticipated that there will be a need in the immediate future for access by vector control personnel to the salt pond nesting areas. Implementation of restoration plans for the salt works (refer to Section 2.3.2.4 of the draft CCP/EIS) would however restore wetland habitats in these areas that would require monitoring. Therefore, additional procedures for monitoring would be incorporated into the Refuge SUP following restoration to ensure protection of nesting seabirds, eggs, and fledglings.

Future Impacts: As described above, the draft CCP/EIS (USFWS 2004) includes a proposal to restore portions of the South San Diego Bay Unit to native vegetation. The intent of this restoration is to restore habitat for the variety of sensitive and endangered species that currently and historically occurred in this area. Following restoration, the field implementation protocols for mosquito management that are included in the Refuge SUP shall be adjusted annually to incorporate new landscape conditions as they develop.

To minimize the potential for successful mosquito breeding in restored wetlands, primarily brackish to freshwater areas, conditions that favor the development of thick stands of aquatic freshwater wetland vegetation would be avoided. Designs for all future restored wetland areas would take into account vector control related issues as well as habitat development. For instance, deep water areas (greater than 4 feet in depth) such as channels through the marsh would be constructed and maintained to provide open areas between stands of vegetation. This would provide access for mosquito predators such as fish and aquatic insects. Open areas of water would also make it difficult for female mosquitoes to lay eggs and mosquito larvae to find cover from predation.

Public Review and Comment:

Two public scoping meetings and a series of public workshops to discuss habitat management, restoration, and public use were held in conjunction with the CCP process. To initiate the CCP process, a Notice of Intent was published in the Federal Register on June 23, 2000 (65 FR 39172). At that time, written comments were solicited. In July 2000, two initial scoping meetings were held, one in Imperial Beach and one in Chula Vista, to receive input from the public on issues related to the South San Diego Bay and Sweetwater Marsh Units. Due to the public's level of interest in these Refuges, focused public workshops were held in September 2000 and June 2001 to specifically address the issue of public use. Three additional workshops were held between November 2000 and May 2001 to receive input from the public on wildlife

management and restoration proposals for these refuges. All of the public meetings were well attended with at least 40 people present at each meeting.

At each workshop, the public was encouraged to provide verbal comments or to send us written comments following the workshop. A CCP web page (www.sandiegorefuges.fws.gov) was established to provide the public with specific information regarding the topics addressed at the various workshops and to present information regarding when and where to provide comments. A number of Planning Updates have also been prepared to summarize the progress of the CCP and to discuss specific issues related to the planning process. These Planning Updates have been distributed to more than 1,000 individuals and organizations representing interested members of the public, conservation organizations, hunting, fishing and boating organizations, public agencies, municipalities, special districts, Tribes, and adjoining property owners. We received more than 50 letters, emails, and phone calls related to the CCP between June and November 2001 and numerous other communications relevant to public uses on the Refuge were received in 2002 and 2003. No public comments related to mosquito management have been received to date.

This draft Compatibility Determination is being presented for public review and comment in conjunction with the draft CCP/EIS.

Determination:

Use is Not Compatible

Use is Compatible With the Following Stipulations

Stipulations:

1. The County of San Diego, Department of Environmental Health, Vector Control Division shall operate on Refuge lands under the terms and conditions outlined in a USFWS Refuge Special Use Permit, which shall be reviewed annually.
2. Special Use Permit conditions shall stipulate that all control work will be carried out in conformance with pre-approved USFWS Pesticide Use Proposals, Section 7 Endangered Species Act consultations, and existing and future USFWS policies on mosquito management.

Justification:

Mosquito management would be implemented on this Refuge in accordance with the guidance provided for the Pacific Region by the Regional Office in March 2003. This guidance for mosquito management incorporates a phased-response strategy developed to manage mosquitoes in a manner that is compatible with refuge purposes and uses the best available science while

minimizing impacts to fish and wildlife, which is consistent with the mission of the National Wildlife Refuge System. Mosquito management proposed for this Refuge would also address legitimate human, fish, and wildlife health concerns. Implementing mosquito control in accordance with the stipulations presented above would therefore not materially interfere with the ability to achieve the wildlife management goals established for this Refuge.

NEPA Compliance for Refuge Use Decision:

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

References Cited:

U.S. Fish and Wildlife Service. 1985. Light-footed Clapper Rail Recovery Plan.

U.S. Fish and Wildlife Service. 2004. Draft Sweetwater Marsh National Wildlife Refuge/South San Diego Bay Unit of the San Diego National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement.

Refuge Determination:

Prepared by: _____ Date: _____

Refuge Manager/
Project Leader
Approval: _____ Date: _____

Concurrence:

Refuge Supervisor: _____ Date: _____

Regional Chief
National Wildlife
Refuge System: _____ Date: _____

California/Nevada
Operations Manager
(for CA and NV): _____ Date: _____

Compatibility Determination

-DRAFT-

Use: Regional Trail

Refuge Name: South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge (San Diego County, Cities of Coronado, Chula Vista, Imperial Beach, National City, and San Diego, California)

Establishing and Acquisition Authorities:

The authorities for the establishment of the San Diego National Wildlife Refuge are the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a-742j, not including 742d-742l) and the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543).

Refuge Purposes:

The South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge (South San Diego Bay Unit) was established:

“...to protect, manage, and restore habitats for federally listed endangered and threatened species and migratory birds, and to maintain and enhance the biological diversity of native plants and animals...” 16 U.S.C. § 1531-1543 (Endangered Species Act of 1973, as amended) and 70 Stat. 1119 (Fish and Wildlife Act of 1956, as amended).

National Wildlife Refuge System Mission:

The mission of the National Wildlife Refuge System is “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use:

At the eastern end of the South San Diego Bay Unit is the Otay River floodplain. This area is included within the approved planning boundary of the Otay Valley Regional Park (OVRP), a multi-jurisdictional planning effort by the County of San Diego and the cities of San Diego and Chula Vista. The planning boundary for the OVRP, which was approved prior to the establishment of the South San Diego Bay Unit, encompasses more than 8,000 acres, and extends about 13 miles inland from the southeastern edge of the salt ponds at the mouth of the Otay River, through the Otay River Valley, to the land surrounding both Lower and Upper Otay Lakes. A Concept Plan for the OVRP was approved by the participating agencies in May 2001 (County of San Diego 2001).

One of the components of the OVRP, as described in the Concept Plan, is a proposal to create a regional trail through the Otay River Valley. The trail would extend east/west through the river valley, from the eastern planning boundary to the Bayshore Bikeway located to the west of Interstate 5 (I-5). To implement this proposal, the County of San Diego and supporters of the OVRP have requested that the Refuge allow the western end of the trail to extend through the Refuge where it would then connect with the Bayshore Bikeway.

This Compatibility Determination addresses the proposal to designate an alignment through the Refuge for the future construction of a portion of this regional trail. Although the exact alignment of the trail will be worked out with the various agencies involved in implementing the OVRP, the alignment currently being considered in the Comprehensive Conservation Plan (CCP) for the South San Diego Bay Unit (refer to Chapter 2 of the draft CCP/Environmental Impact Statement (EIS) for the South San Diego Bay Unit) would extend west from the I-5 undercrossing, north of the river channel, then travel northwest along the eastern border of the South San Diego Bay Unit for approximately 2,000 feet. When constructed, the trail would connect to the proposed Bayshore Bikeway near the northeastern corner of the Refuge. The Concept Plan does not include any specifics regarding the recommended width, proposed surfacing materials, or permitted uses for the trail, however, the portion constructed within the Refuge would be required to meet the accepted standards for accessibility as outlined in the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 – 12213, 47 U.S.C. 225 and 611, and 49 U.S.C. 322). The local agencies participating in the development of the OVRP would be responsible for obtaining approval from the Refuge Manager prior to constructing the trail, funding and installing the trail in accordance with the requirements placed on the project by the Refuge, maintaining the trail and associated amenities such as fencing and signage, monitoring trail use, and patrolling the trail to ensure compliance with established trail regulations.

Once constructed, the trail would support two wildlife dependent recreational uses: wildlife observation and environmental interpretation.

Availability of Resources:

Designation of an alignment for the Otay Valley Regional Trail would not result in the expenditure of any additional Refuge funds and trail construction and maintenance, as well as required fencing and regulatory signage, would be the responsibility of the local agencies participating in the OVRP. However, refuge resources would still be required to assist the local agencies in developing a trail design that meets the approval of the Refuge Manager, as well as to monitor the potential effects of trail use on Refuge wildlife and native habitat. Periodic patrol by Refuge law enforcement would also be required; however, enforcement is already required in this area due to its proximity to urban uses. The following staffing would be required:

Staffing			
Position	Involvement	FTE	Cost
Project Leader/ Deputy Project Leader	General oversight	0.2/0.2	\$25,700/\$22,000
Refuge Manager	Periodic on-site oversight	0.3	\$27,300
Refuge Operations Specialist	On-site oversight	0.3	\$26,000
Wildlife Biologist	Monitoring, reporting, assist in the design and siting of the trail, provide some oversight of trail construction and long-term monitoring of refuge resources surrounding the trail, oversight of biological technicians	0.3	\$26,000
Refuge Planner	Assist in the design and siting of the trail, provide some oversight of trail construction	0.2	\$16,510
Park Ranger	Assist in trail monitoring, facilities maintenance	0.3	\$13,000
Law Enforcement Officer	Law enforcement	0.3	\$20,800
TOTAL FTES AND COSTS FOR STAFFING		2.1	\$177,310

Refuge staffing is adequate to accommodate law enforcement, wildlife monitoring, and planning related to trail design and layout. No Refuge funds would be needed for trail construction or long-term trail maintenance. Adequate resources are available to allow for this use.

Anticipated Impacts of the Use:

The proposed alignment for the future regional trail, which would extend along the Refuge’s eastern border, has been designed to avoid fragmentation of habitat and minimize impacts to wildlife. However, the construction and use of the proposed trail does have the potential to adversely affect the diversity and abundance of wildlife and the quality of its habitat. These impacts may include: direct loss of native vegetation; displacement of native vegetation due to the introduction of invasive species, including noxious weeds; and disturbance and displacement of wildlife. In addition, trail construction and trail use can disturb and compact soils, causing changes in infiltration and runoff that can lead to increased erosion and siltation in adjacent waterways (DeLong and Schmidt, 2000). Unauthorized off trail activities can also occur resulting in additional disturbance and compaction of soil, vegetation trampling, and wildlife disturbance.

In reviewing studies related to the influence of recreational trails on bird communities, DeLong and Schmidt (2000) report that several of these studies suggest that both the physical presence of a trail and human disturbance associated with the trail can affect bird abundance, species composition, and nest predation in the immediate vicinity of a trail. Many of these impacts can be minimized through proper trail planning that limits fragmentation of habitat, avoids sensitive

habitat areas, and establishes clearly defined paths to reduce off trail activities. The anticipated impacts of accommodating the proposed OVRP Trail are presented in detail in Chapter 4 of the draft CCP/EIS for the South San Diego Bay Unit and summarized below.

Endangered and Threatened Species: One of the purposes for the establishment of the South San Diego Bay Unit is to protect federally listed endangered or threatened species. With the exception of the Federal endangered light-footed clapper rail, the habitats that support the Refuge's listed species do not occur in proximity to the proposed regional trail alignment. If however off trail activities increase following the construction of the trail, disturbance to other listed species such as the Federal endangered California least tern (*Sterna antillarum browni*) and State endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) could occur.

Human activity can have adverse impacts on endangered and threatened species, particularly when their nesting or foraging activities are disrupted. Human activity within the Otay River floodplain could increase as a result of the construction of the proposed regional trail potentially impacting several sensitive species, including the clapper rail, which has been observed in the habitats that extend along the Otay River channel within the Refuge boundary. Threats to light-footed clapper rail from humans consist primarily of direct habitat or nest losses due to trampling of vegetation where nests occur. Belding's savannah sparrow utilize the higher salt marsh habitat that occurs near the western end of the river channel, as well as along the edges of the river channel further upstream. Human disturbance in these areas as a result of off trail activity could disrupt foraging activities, as well as result in direct habitat or nest losses through trampling of pickleweed. These species are also vulnerable to injury or death if dogs are not confined to the designed trail. The potential for off trail activity can be reduced through appropriate fencing and signage along the trail and patrol of the trail to regulate the activities of trail users.

Nesting Season Disturbance: The nesting season varies for each species, but can generally be described as occurring between mid-February and mid-September. Disturbance to nesting bird species may occur if persons or dogs are present in the vicinity of avian nesting colonies or individual nests.

Several species, many of which are rare, sensitive or federally and/or state listed, nest within the South San Diego Bay Unit. As described above, the habitats present within the Otay River channel support light-footed clapper rail and Belding's savannah sparrow nesting. Cordgrass stands along the Otay River channel and the brackish marsh within the channel provide nesting habitat for clapper rails, while high salt marsh vegetation such as the pickleweed stands that occur in the intertidal habitats within the river channel are known to support savannah sparrow nesting. Off trail activities by humans and dogs would most likely result in direct adverse impacts to both of these species. Similar impacts to breeding waterfowl, such as gadwall (*Anas*

strepera) and mallard (*Anas platyrhynchos*), which have been observed nesting in the Otay River channel, could occur.

Sensitive Habitats: With the exception of the native vegetation occurring within the river channel, the general area proposed for the future construction of the regional trail is highly disturbed and dominated by non-native, weedy vegetation. Under these conditions, the impacts of trail construction and trail use on sensitive habitats would be minimal, although unauthorized off trail activity could result in impacts to native wetland vegetation. The CCP proposes to restore the upland portions of the Otay River floodplain to native upland habitat necessitating coordination between restoration planning and trail design to avoid future impacts to restored upland areas. The proposed trail alignment is located along the perimeter of the Refuge to minimize the effects of habitat fragmentation. Once native upland vegetation is restored, impacts to this sensitive habitat could occur as a result of unauthorized off trail activities. These impacts could be avoided through the implementation of appropriate measures such as fencing and signage to discourage off trail activities by humans and dogs.

Migratory Birds: The alignment proposed for the regional trail is located in an area that does not currently support migratory bird foraging and loafing, therefore activities on the trail would not be expected to impact these resources. However, if off trail activities were to occur, disturbance to migratory birds could result. The use of appropriate fencing and signage along the trail is expected to reduce the potential for off trail activities. In addition, by providing a well-designed trail within this area to accommodate recreational users, some of the existing unauthorized access on the Refuge could be reduced, resulting in minor benefits to Refuge resources.

Public Review and Comment:

The OVRP Trail has been discussed on several occasions at public workshops held in conjunction with the CCP process. To initiate the CCP process, a Notice of Intent was published in the Federal Register on June 23, 2000 (65 FR 39172). At that time, written comments were solicited. In July 2000, two initial scoping meetings were held, one in Imperial Beach and one in Chula Vista, to receive input from the public on issues related to the South San Diego Bay and Sweetwater Marsh Units. Due to the public's level of interest in these refuges, focused public workshops were held in September 2000 and June 2001 to specifically address the issue of public use. Three additional workshops were held between November 2000 and May 2001 to receive input from the public on wildlife management and restoration proposals for these refuges. All of the public meetings were well attended with at least 40 people present at each meeting. Approximately 50 to 60 people attended those meetings related to public use.

At each workshop, the public was encouraged to provide verbal comments or to send us written comments following the workshop. A CCP web page (www.sandiegorefuges.fws.gov) was established to provide the public with specific information regarding the topics addressed at the various workshops and to present information regarding when and where to provide comments.

A number of Planning Updates have also been prepared to summarize the progress of the CCP and to discuss specific issues related to the planning process. One of these updates was devoted entirely to the topic of public use. These Planning Updates have been distributed to more than 1,000 individuals and organizations representing interested members of the public, conservation organizations, hunting, fishing and boating organizations, public agencies, municipalities, special districts, Tribes, and adjoining property owners. We received more than 50 letters, emails, and phone calls related to public use between June and November 2001 and numerous other communications relevant to public uses on the Refuge were received in 2002 and 2003.

The provision of trails on the Refuge generated relatively few comments during the public scoping process and at the Public Use Workshop held on June 21, 2001. Comments that were provided included a desire to see limited access provided to those areas of the Refuge in which such use would be compatible with and not result in impacts to the Refuge's sensitive wildlife resources. There was also a suggestion that a seasonal walking trail be provided around Ponds 10 and 11 (refer to Figure 2-6 of the CCP/EIS), while others requested that all public access be prohibited with the salt works.

This draft Compatibility Determination is now being presented for public review and comment in conjunction with the draft CCP/EIS for the South San Diego Bay Unit.

Determination:

Use is Not Compatible

Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. Prior to the design and construction of the trail, the entity responsible for implementing the OVRP Concept Plan or one of Park's member agencies shall enter into an agreement and/or obtain a Special Use Permit from the Fish and Wildlife Service. This agreement or permit to allow the installation and use of the proposed trail must outline the responsibilities of each agency. This agreement/permit should specify that the entity responsible for the OVRP will: 1) work cooperatively with the Refuge Manager in the design and proposed alignment of the trail; 2) receive written approval for the final trail design from the Refuge Manager; 3) be responsible for complying with all CEQA/NEPA requirements, as well as obtaining all required local, state, and federal permits for the trail; 4) finance and implement all aspects of trail construction including any required environmental mitigation and monitoring requirements, fencing, signage, and revegetation; 5) maintain the trail in perpetuity; and 6) establish and maintain a volunteer trail patrol to assist the agencies in monitoring trail conditions, the activities of trail users, and wildlife responses to trail use by the public. If an adequate number of volunteers (as

determined by the Refuge Manager) cannot be found, a paid patrol officer should be provided in perpetuity, or until the OVRP volunteer program is activated.

2. The specific route for the trail and any materials developed to publicize the trail shall be coordinated with and receive written approval from the Refuge Manager.
3. The OVRP is responsible for the development and installation of special signage at both points along the trail where the trail enters Refuge property. This signage, which is to be in place before the trail is opened to public access, must explain that the trail is entering a National Wildlife Refuge and describe the importance of staying on the trail.
4. Appropriate fencing and regulatory signage, which must be paid for and installed by the OVRP before the trail opens, is to be provided along the trail as it passes through the Refuge.
5. The trail surface must be approved by the Refuge Manager and should consist of native soil, decomposed granite, or a hardened surface.
6. Equestrian uses will not be permitted on the portion of the trail that crosses the Refuge lands.
7. Use of the trail between dusk and dawn will be prohibited and this regulation should be included on all appropriate trail signage.
8. All stipulations must be in place prior to opening the trail for public use.

Justification:

The extension of the proposed Otay Valley Regional Trail onto refuge lands, if permitted in accordance with the stipulations listed above, would not materially interfere with or detract from the purposes for which the South San Diego Bay Unit was established or the fulfillment of the National Wildlife Refuge System mission. This trail, although not regarded as a priority public use, would provide the public with additional opportunities to observe wildlife on Refuge lands, therefore contributing to the goal of providing safe wildlife dependent recreational activities on the Refuge.

Mandatory Re-Evaluation Date:

 Mandatory 15-year Re-Evaluation Date (for priority public uses)

 X Mandatory 10-year Re-Evaluation Date (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision:

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

References Cited:

DeLong, Anita and Janet Schmidt. 2000. Literature Review: Effects of Human Disturbance on Wildlife with Emphasis on Wildlife-Dependent Recreation Relevant to Stillwater National Wildlife Refuge (Draft).

County of San Diego. 2001. Otay Valley Regional Park Concept Plan. Adopted by the County of San Diego Board of Supervisors, the Chula Vista City Council, and the San Diego City Council.

U.S. Fish and Wildlife Service. 2004. Draft Sweetwater Marsh National Wildlife Refuge/South San Diego Bay Unit of the San Diego National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement

Refuge Determination:

Prepared by: _____ Date: _____

Refuge Manager/
Project Leader
Approval: _____ Date: _____

Concurrence:

Refuge Supervisor: _____ Date: _____

Regional Chief
National Wildlife
Refuge System: _____ Date: _____

California/Nevada
Operations Manager
(for CA and NV): _____ Date: _____

Appendix L

**Fire Management Plan for the San Diego
NWR Complex**

Appendix L: Fire Management Plan Summary

The Department of the Interior (DOI) fire management policy requires that all refuges with vegetation that can sustain fire must have a Fire Management Plan that details fire management guidelines for operational procedures and values to be protected and/or enhanced. The San Diego National Wildlife Refuge Complex has year-round fire-funded personnel that are stationed at the San Diego NWR.

The Fire Management Plan (FMP) for the San Diego National Wildlife Refuge Complex provide guidelines for appropriate suppression and/or prescribed fire programs at the San Diego Bay, San Diego, Seal Beach, and Tijuana Slough National Wildlife Refuges. With respect to San Diego Bay NWR, the plan focuses on preparedness, wildland fire operations, prevention, and detection. Prescribed and wildlife fire use are not proposed as a strategy for achieving land management objectives on this Refuge.

The Plan outlines the fire management objectives for the Complex, describes the Complex's wildland fire management situation, and presents the Complex's fire management strategies. Values considered in the Fire Management Plan include protection of Refuge resources and neighboring private properties, effects of burning on refuge habitats/biota, and firefighter safety. Refuge resources include properties, structures, cultural resources, trust species including endangered, threatened, and species of special concern, and their associated habitats. The Fire Management Plan will be reviewed periodically to ensure that the fire program is conducted in accordance and evolves with the U.S. Fish and Wildlife Service (USFWS) mission and the San Diego National Wildlife Refuge Complex goals and objectives.

Copies of the Fire Management Plan are available for review at the San Diego National Wildlife Refuge Complex, 6010 Hidden Valley Road, Carlsbad, CA 92011 or by contacting Victoria Touchstone, Refuge Planner, at (760) 431-9440 extension 349.

Appendix M

Draft Predator Management Plan

DRAFT

PREDATOR MANAGEMENT PLAN

San Diego Bay National Wildlife Refuge

(Sweetwater Marsh and South San Diego Bay Units)

I. Overview

Pursuant to its endangered species management responsibilities and in conjunction with other wildlife and habitat management activities, the U.S. Fish and Wildlife Service (Service) will implement, per available funding, predator management on the San Diego Bay National Wildlife Refuge (Refuge). Species to benefit from this action include the Federal endangered California least tern (*Sterna antillarum browni*) and light-footed clapper rail (*Rallus longirostris levipes*) and the threatened western snowy plover (*Charadrius alexandrinus nivosus*). Predator management is identified in the draft San Diego Bay National Wildlife Refuge (NWR) Comprehensive Conservation Plan (CCP)/Environmental Impact Statement (EIS) (USFWS 2005) as one of several actions to be implemented in support of the Refuge's listed species.

This predator management plan has been developed as a comprehensive wildlife damage control program that addresses a range of management actions from vegetation control and nesting habitat enhancement to non-lethal and lethal control. The most effective, selective, and humane techniques available to deter or remove individual predators or species that threaten nesting, breeding, or foraging least terns, snowy plovers, or clapper rails will be implemented.

II. Purpose

The San Diego Bay NWR was established to conserve Federal endangered and threatened species. The two Refuge Units share the common goal of “*supporting the recovery and protection efforts for Federal endangered and threatened species, other species of concern, and their habitats.*” The objectives of this predator management plan are intended to assist the Service in achieving this goal and meeting the purpose for which the Refuge was established.

The implementation of this predator management plan is intended to increase the productivity of the Refuge's federally-listed endangered and threatened seabird and shorebird species. Numerous incidents of predation on listed species by a variety of native and nonnative mammalian and avian predators are documented annually within the Refuge. The Refuge, along with most other habitat available to California least terns, western snowy plovers and light-footed clapper rails, represent some of the best remaining examples of coastal wetland habitats in southern California. As such, these remaining habitats act as magnets for the community of migratory and endemic wildlife that survive in the current landscape. Urbanization has led to increased numbers of many species of generalist, common predators. The potential impact of increased native and non-native predator densities on endangered species populations is a significant impediment to their recovery.

Reducing the number of California least tern, light-footed clapper rail, and western snowy plover adults, chicks, and eggs lost to predation is an important strategy in achieving the management objective of recovering and maintaining stable populations of these listed species on the Refuge. Other species that could indirectly benefit from predator management include the Federal endangered California brown pelican (*Pelecanus occidentalis californicus*), which roost along the salt pond levees of the South San Diego Bay Unit, and the State listed endangered Belding's

savannah sparrow, which nests in the pickleweed-dominated salt marsh habitat of both the Sweetwater Marsh and South San Diego Bay Units. Several species identified by the Service as Birds of Conservation Concern (USFWS 2002), including the black skimmer (*Rynchops niger*), elegant tern (*Sterna elegans*), and western gull-billed tern (*Sterna nilotica vanrossemei*), will also derive some benefits from the implementation of this plan.

The western gull-billed tern, however, is a special case in the context of this plan. Since the South San Diego Bay Unit was established in 1999, the gull-billed tern has benefited from various Refuge management activities including predator management and nest site enhancement. Due in part to these Refuge management actions, the breeding population of this species at the salt works has increased from an estimated 11 to 20 breeding pairs in 1999 (Patton 2001) to approximately 40 pairs in 2004 (Patton pers. comm.). During this same period, the number of least tern and snowy plover chicks lost to gull-billed tern predation has also increased (Patton 2004). This interaction between the gull-billed tern and the listed species that nest at the salt works cannot easily be addressed because of the extremely small population size of the western gull-billed tern. Various programs within the Service, including the Division of Migratory Bird Management, Ecological Services, and the National Wildlife Refuge System, are currently working together to identify appropriate actions that when implemented will ensure the recovery and conservation of all three of these trust species (least terns, snowy plovers, and gull-billed terns) throughout their range.

Predator Management Plan Objectives:

- Increase the productivity of California least tern and western snowy plover by reducing the loss of eggs and chicks to predation and reducing the number of adult birds of these species that are lost or driven away by predators;
- Reduce the loss of adult and juvenile light-footed clapper rails and eggs due to predation;
- Reduce the number of individual problem predators in localized areas within the Refuge (*Problem predators* are defined as individual predators that are exhibiting hunting behavior in listed species nesting areas or essential habitat areas or that have been identified as actually preying on a listed species.);
- Eliminate disturbance to roosting California brown pelicans by non-native mammalian predators; and
- Reduce disturbance and predation by mammalian predators within seabird nesting colonies on the South San Diego Bay Unit.

III. Background and Description of Problem

California's coastal wetlands provide essential habitat for a variety of avian species, including the Federal endangered and threatened species and other species of concern supported on the Refuge. The decline in the population of many of these species has been attributed to habitat loss, the introduction of exotic species populations, water and air pollution, habitat degradation, and human disturbance. The California Coastal Commission (1987) estimates that as much as 90 percent of California's original coastal wetlands have been lost to development. Additionally, the majority of California's sandy beaches that historically provided expansive habitat areas for seabirds, such as the California least tern, and shorebirds, like the western snowy plover, are now extensively utilized for human recreation and/or have been modified to support beachfront housing and other coastal development.

Today, coastal migratory birds are faced with two converging problems that seriously reduce reproductive success: limited viable nesting habitat and the concentration of native and non-native predators in proximity to nesting areas. The direct conversion of habitat to urban development and indirect losses of habitat resulting from increased human activity have greatly reduced the availability of suitable nesting areas. With fewer viable sites available, nesting seabirds and shorebirds are concentrated on fewer and more geographically limited nesting areas than previously occurred under more natural landscape conditions. Predation potential under current conditions has increased as predator foraging activities have become more intensely focused on the same remnant areas of coastal habitat that have been set aside for the protection of nesting migratory birds. Additionally, urban development has created conditions that are advantageous to many native, generalist predators resulting in larger populations of some predator species than were present historically. An abundance of non-native predators, such as feral dogs and cats and Virginia opossums, are able to enter the Refuge from adjacent urban areas. Their presence negatively impacts the viability of remaining coastal habitats for supporting endangered species.

Many populations of southern California coastal nesting bird species are declining and others are endangered or threatened with extinction. Without human intervention, it is likely that several of these species will not survive. Reproductive success is strongly influenced by food availability, quality of breeding habitat, and predation pressure. Controlling the numbers of predators in endangered and threatened species habitats is the main variable that humans can directly control in a localized context. Providing additional breeding areas (protected nesting sites) to give the protected species greater opportunity to successfully breed continues to be pursued by land management agencies, however, there are very limited opportunities for such efforts in Southern California's dense urbanizing environment. Therefore, management to reduce the potential for significant losses of threatened and endangered species due to predation on nesting grounds or other crucial habitat areas is an essential wildlife conservation goal.

Various conservation plans have been or are being developed that outline conservation priorities for specific assemblages, guilds, and communities of birds. Among the population conservation issues for waterbirds, as addressed in the North American Waterbird Conservation Plan (*Kushlan et al. 2002*), and the priority conservation actions for shorebirds, as outlined in the Southern Pacific Shorebird Conservation Plan (*Hickey et al. 2003*), is the need for appropriate predator management in waterbird and shorebird nesting areas.

The following are brief summaries of relevant information relating to species populations targeted for protection under this predator management plan.

California Least Tern

The California least tern is a loosely colonial, ground nesting, migratory seabird that returns from tropical latitudes to breed in southern California. Least tern nest sites are largely unvegetated, flat, open areas consisting of light colored, sandy surfaces near water bodies supporting abundant small fish. This tern once nested on beaches throughout southern California, south through Baja California, Mexico, and north to the San Francisco Bay area, however, increasing urbanization and habitat loss has led to the decline of its population with the majority of the remaining nesting colonies confined to San Diego and Orange Counties. With the loss of traditional beach nesting sites, this species has been forced to find alternative, less traditional nesting colony sites including landfills and airports (*Patton 2002*).

The Service published a rule, effective June 2, 1970, listing the California least tern as endangered under the Endangered Species Act of 1973, as amended (ESA). The California

least tern is endangered throughout its range as a result of the loss and degradation of nesting and foraging habitat and disturbance of nesting birds. Recovery actions described in the California Least Tern Recovery Plan (*USFWS 1985a*) include preserving and managing existing nesting colonies and providing new nesting sites in protected areas, maintaining adequate foraging habitat for nesting colonies, and minimizing disturbance and mortality by preventing human disturbance and minimizing predation.

Today, nest sites are largely fixed in their location and size, with two of seven San Diego Bay sites falling within Refuge management responsibility. Historically, least tern nesting success at the salt works within the South San Diego Bay Unit has been poor although little active predator management occurred on the property until the Refuge Unit was established in 1999. On the Sweetwater Marsh Unit, the nesting success on the D Street Fill nesting area has been seasonally variable, with site disturbance and predation being the primary factors in least tern breeding failure.

The least tern is vulnerable to a long list of predators, some of which are very abundant in urban environments, such as feral or domestic cats and dogs, American crows (*Corvus brachyrhynchos*), and American kestrels (*Falco sparverius*). In the 2000 nesting season, 20 species were observed preying on or taking a least tern egg, chick, fledgling, or adult in California. Twelve of these species are considered possible predators on the Refuge (*Patton 2002*); including feral dog, coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), opossum (*Didelphis virginiana*), peregrine falcon (*Falco peregrinus*), American kestrel, gull-billed tern, and various gull species. Between 1999 and 2002, there were numerous documented losses of California least tern chicks due to predation.

Under this plan, the nest site management actions presented below will be implemented to improve least tern reproductive success.

- Vegetation management to control weeds, avoid excessive plant growth, and maintain barren, sandy areas occurs annually at the D Street Fill in partnership with the Unified Port of San Diego (Port);
- Nesting substrate is periodically enhanced by adding clean, light sand to various salt pond levees;
- Signs and fencing are maintained in various areas to reduce human and mammalian disturbance in seabird nesting areas;
- Endangered species monitoring has been conducted annually in the nesting colonies to record reproductive success and document factors affecting success including disturbance and predation (monitoring will continue in accordance with available funding);
- Predator monitoring is conducted annually during the nesting season to provide current data regarding the presence of predators within the vicinity of the nesting colony and to document and address incidents of predation within the colony;
- Active nest sites are often protected using tiles, exclosures, and other physical devices to reduce accessibility of eggs and chicks to predators; and

- All mammalian predators observed in nesting areas are removed and individual problem avian predators may be controlled as appropriate to reduce loss of least tern eggs, chicks, and adults.

Western Snowy Plover

On March 5, 1993, the Pacific coast population of the western snowy plover was listed as threatened under the provisions of the ESA. The western snowy plover is threatened throughout its range as a result of the loss and disturbance of habitat and nesting sites. There are only a handful of snowy plover breeding locations currently used in southern California. Regularly used locations include Bolsa Chica (Orange County), Camp Pendleton, Baticuitos Lagoon, Naval Amphibious Base-Coronado, Silver Strand State Beach, and Tijuana Estuary in San Diego County. Within the South San Diego Bay Unit, snowy plover nesting occurs regularly at the salt works (six of the last nine years) with one to four nest attempts each year. Unfortunately, reproductive success has been poor. No nest attempts were observed at the salt works in 2003. Between two and ten snowy plover nesting attempts with poor reproductive success have historically occurred at the D Street Fill on the Sweetwater Marsh Unit, however, since 2000, there have been no known nesting attempts by snowy plovers in this area. Disturbance and predation are the most likely reasons for this poor history of reproductive success.

The list of potential predators of snowy plover eggs and chicks is long. During extensive surveys of breeding and wintering snowy plovers conducted in San Diego County between 1994 and the winter of 1999, it was determined that most nest failures in 1994, 1996 and 1997 were the result of predation (*Powell et al. 2002*). Documented egg predators included corvids (ravens and crows), coyotes, Argentine ants and gulls. Although the causes of chick mortality are more difficult to determine, several species were determined to be likely causes of mortality during these surveys including great horned owl (*Bubo virginianus*), burrowing owl (*Athene cunicularia*), gull-billed tern, and American kestrel. Due to high densities in surrounding urban areas, corvids, kestrels, and feral dogs and cats represent significant threats to the snowy plover population on this Refuge.

The Western Snowy Plover Pacific Coast Population draft Recovery Plan (*USFWS 2001*) includes the prevention of excessive predation of snowy plover as one of the recovery tasks requiring implementation to maximize the survival and productivity of this species. The draft plan encourages the employment of an integrated approach to predator management that considers a full range of management techniques and recommends seeking assistance from U.S. Department of Agriculture (Wildlife Services Branch) biologists, State wildlife agency biologists, and others. Specific management techniques addressed by the plan include manual removal of litter and garbage from nesting areas, removal of predator perches and unnatural habitats, use of predator exclosures where appropriate, removal of predators where warranted, and removal of bird and mammal carcasses in nesting areas. These actions, as well as those described for the California least tern, will be implemented on the Refuge under this plan.

Light-footed Clapper Rail

Light-footed clapper rails are year-round residents of coastal salt marshes and lagoons, although they may also occasionally be found upstream in freshwater marsh habitat. Generally, they nest in the lower littoral zone of a salt marsh where dense stands of cordgrass (*Spartina foliosa*) are present (*USFWS 1985b*). As a result of the destruction of coastal wetlands throughout southern California, the total population of light-footed clapper rails became so seriously low that on October 13, 1970, this species was added to the Federal list of endangered species and was designated as endangered within the United States.

The leading threats to clapper rails are salt marsh habitat loss, degradation, and fragmentation. These rails are also threatened by disturbance, diseases, contaminants, and predation. Potential predators of clapper rail eggs, nestlings, and adults include California ground squirrel (*Spermophilus beecheyi*), rats (*Rattus* spp.), long-tailed weasels (*Mustela frenata*), garter snakes (*Thamnophis* sp.), striped skunk (*Mephitis mephitis*), feral dogs and cats, opossum, and a variety of hawks and owls (*USFWS 1985b*). The Recovery Plan for the Light-Footed Clapper Rail (*USFWS 1985b*) includes as a recovery action the need to identify and control predators within marshes where predation is believed to be a significant problem.

Clapper rails within the Refuge suffer from a lack of adequate high-tide refugia which limits the rails' ability to hide when forced out of the salt marsh during high tide events. It is a goal the Refuge to restore and manage a fully functional coastal salt marsh/coastal sage scrub transitional habitat for the protection of the rail during its entire life cycle. However, this is a long-term commitment and will take many years to achieve. The rail will need additional management measures intended to protect and restore its populations including predator management. The FWS is currently working with several partner agencies to develop a captive breeding protocol development program for the light-footed clapper rail. This program seeks to bolster the genetic and demographic diversity of the species within isolated wetlands in the United States. As salt marshes are restored, it is hoped that various management actions taken now, will give the species the best possible chance to remain viable within coastal salt marshes in southern California well into the future.

The following actions will be implemented to protect the Refuge's clapper rail population:

- Regulatory signage and periodic patrol by the Refuge law enforcement office is provided to minimize human disturbance in clapper rail habitat;
- Nesting platforms are maintained in the marsh to provide chicks and eggs with enhanced protection from avian predators; and
- Year-round predator monitoring is conducted to identify and control native and non-native mammalian predators that pose a threat to the rails.

California Brown Pelican

The California brown pelican was listed as endangered on June 02, 1970 because of widespread pollutant-related reproductive failures. This bird is extremely sensitive to bioaccumulation of the pesticide DDT (and other organochlorine pesticides), which causes reproductive failure by altering calcium metabolism and thinning eggshells (*USFWS 1983*). Although California breeding populations have rebounded since the elimination of DDT use, the continued presence of DDT and its byproducts in the ecosystem, as well as other factors, still threaten this species. Delisted in 1985 in the areas of the U.S. Atlantic coast, Florida, and Alabama, this species is still considered endangered within California, Louisiana, Mississippi, Oregon, Puerto Rico, Texas, Virgin Islands, Washington and Central and South America.

Today, the availability of adequate food supplies is a major concern for the long-term recovery of this species. Commercial over-harvesting of Pacific mackerel, Pacific sardine, and the northern anchovy has resulted in less food availability for these birds, particularly during the breeding season. Pelicans are also threatened by human development along the coast, which increases disturbance to these birds in their breeding and resting habitats. The availability

and quality of roosting and loafing areas influence the energy budgets and reproductive potential of these birds (*Jaques and Anderson 1987*). Management of these essential habitats to minimize disturbance is therefore important for both breeding and non-breeding birds. The South San Diego Bay Unit, particularly the levee between Pond 10 and 11 within the salt works, is an important roosting area for brown pelicans during the non-breeding season. Feral and domestic dogs, coyotes and human disturbance represent the largest threats to these roosting pelicans. Roosting opportunities within the South San Diego Bay Unit were recently expanded to include a floating platform within the salt works. The use of this platform will be monitored and if adequate numbers of pelicans are using the platform for night roosting, additional platforms may be installed.

Birds of Conservation Concern

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the Service to “identify species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973.” To meet this mandate, the Service has prepared Birds of Conservation Concern 2002 (*USFWS 2002*), which is intended to accurately identify the migratory and non-migratory bird species (beyond those already federally designated as threatened or endangered) that represent our highest conservation priorities and draw attention to species in need of conservation action. The goal of the Service is to preclude the need for additional bird listings under the Endangered Species Act by implementing proactive management and conservation actions. Within the Sweetwater Marsh Unit, four of the shorebirds that frequent the marsh have been identified as Birds of Conservation Concern; these include the whimbrel, long-billed curlew, marbled godwit, and short-billed dowitcher. Six shorebirds and three colonial nesting seabirds included on the list of Birds of Conservation Concern 2002 are supported by the habitats within the South San Diego Bay Unit. These species include the whimbrel, long-billed curlew, marbled godwit, black turnstone, red knot, short-billed dowitcher, gull-billed tern, elegant tern, and black skimmer. The elegant tern and black skimmer could indirectly benefit from the implementation of this predator management plan.

Gull-Billed Tern (*Sterna nilotica vanrossemei*)

Management for the suite of avian species that utilize the Refuge is complex and difficult. The species conflicts inherent in managing the changing community of organisms utilizing coastal wetlands in southern California today present challenges that traditional wildlife managers may never have encountered historically. A case in point is the western gull-billed tern in San Diego Bay.

The gull-billed tern is designated as a Bird of Conservation Concern (BCC) at the national, regional (USFWS Pacific Region), and local scale (Southern Coastal California Bird Conservation Region). The Fish and Wildlife Conservation Act (1988 Amendment) requires that the Service “*identify species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973*”. BCC 2002 is the 3rd edition of this congressionally-mandated list and represents the most comprehensive effort thus far to identify species in need of active conservation measures. The gull-billed tern was included in the list because of its declining population trends and threats to breeding birds. At the subspecies level, the western gull-billed tern is of increased concern due to its extremely small population size (<600 known nesting pairs range-wide), limited distribution (ten sites range-wide), suspected population declines, and threats during the breeding season. The BCC designation does not impose regulatory conditions; however,

birds included on the BCC 2002 list are deemed priorities for conservation actions. In addition, under Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," Federal agencies are to avoid and/or minimize adverse impacts on birds, and BCC species in particular, while conducting agency actions and are encouraged to restore and enhance habitat for migratory birds. Additionally, one of the Service's primary goals is to conserve avian diversity in North America. Conserving ecosystem diversity is one of the goals of the National Wildlife Refuge System.

The western gull-billed terns that nest at the salt works benefit from a number of recovery actions implemented to conserve the California least tern and western snowy plover. These recovery actions include habitat protection, habitat enhancement, reduced human disturbance, and predator management. In addition to the benefits of refuge management and management for endangered species recovery, the Service has also been monitoring the gull-billed terns at the salt works and throughout its range to better understand the population size, nesting ecology, and conservation needs of this species. In 2003, the Service joined with biologists in Mexico to conduct comprehensive surveys of gull-billed terns in western Mexico. The results of these surveys were reported in Palacios and Mellink (2003).

Based on the information available to date, the estimated population of this subspecies in western Mexico is 376 breeding pairs, with 80 percent of the population occurring within two relatively large colonies (Cerro Prieto, Baja California and Laguna de Pericos, Nayarit) (Palacios and Mellink 2003). Within the United States, this subspecies only nests in two locations: the Salton Sea and the salt works within the South San Diego Bay Unit. The combined population of these two colonies in 2003 is estimated at about 190 breeding pairs (Seto pers. comm.). Ongoing monitoring of gull-billed tern colonies by the Service and others will improve our understanding of the breeding biology and distribution of the gull-billed tern range-wide. Information provided by these studies will also assist in developing management actions to conserve this species. Further, we will be able to better assess how conservation of the gull-billed tern can be coordinated with ongoing endangered species recovery actions in Southern California.

Gull-billed tern nesting on the South San Diego Bay Unit was first documented in 1987 (Terp and Pavelka 1999). Between 1999 and 2004, the number of breeding pairs at the salt works has slowly increased from between 11 and 20 in 1999 (Patton 2001) to approximately 40 in 2004 (Patton pers. comm.). Unlike the other colonial nesting seabirds at the salt works, the gull-billed tern is an opportunistic feeder, foraging on a variety of terrestrial and aquatic animals. A recent study conducted in San Diego Bay by Molina and Marschalek (2003) found small invertebrates (primarily mole crabs, *Emerita analoga*) and small fish to be the primary prey items delivered by adults to chicks. Lizards (*Uta stansburiana* and *Sceloporus occidentalis*), insects, and small black-necked stilt (*Himantopus mexicanus*), killdeer (*Charadrius vociferus*), western snowy plover and California least tern chicks were also part of the gull-billed tern's diet. The first report of gull-billed tern predation on a least tern chick occurred in 1988 in Mississippi (Densmore 1990). Predation of least tern and western snowy plover chicks by gull-billed terns has been documented at the San Diego Bay NWR since 1999 (Patton pers. comm.).

Over the past few nesting seasons, gull-billed terns nesting at the salt works have become effective predators of young least tern and western snowy plover chicks. The largest losses occurred in 2003, when 54 chicks were known to be lost to gull-billed tern predation. During the 2004 nesting season, 43 chicks were lost to gull-billed terns. It should be noted

that these are minimum numerical estimates of listed species chick losses due to the fact that observers are only present at certain times. Biologists monitoring these nesting populations infer that depredation by gull-billed terns on snowy plover and least tern chicks is ongoing when observers are not present, therefore, the impacts that gull-billed terns have had on the productivity of nesting sites throughout San Diego Bay and the Tijuana Estuary are not insignificant (*Brian Collins pers. comm.*).

Since 2001, the Service has met with private biologists, land managers, and Service staff prior to each nesting season to discuss strategies for addressing gull-billed tern predation. Based on input from these meetings, the Service has chosen to refrain from conducting predator control actions on the gull-billed tern. The question of whether or not the Refuge should manage the size of the gull-billed tern colony at the salt works in an effort to reduce the loss of least tern and snowy plover chicks to gull-billed tern predation was raised again during the preparation of this predator management plan. Based on the desire to maintain/enhance the numbers of breeding gull-billed terns in Southern California, it was determined that no lethal control of this species will be considered at this time. Instead, over the next few years, the Service will implement several actions to address gull-billed tern predation of least terns and snowy plover chicks including the initiation of a pilot project to experiment with different types of chick shelters for California least terns and developing an experimental design to better document avian predation on both least terns and snowy plovers. In addition, during the 2005 breeding season a limited monitoring program of the gull-billed tern colony at the salt works will be implemented to evaluate nesting activity, reproductive success, and predation activities. The Service's Migratory Birds Program will also continue to work with partners in Mexico to complete year two of a range-wide survey for gull-billed terns.

IV. Existing Predator Management Efforts in the San Diego Bay Region

San Diego National Wildlife Refuge Complex. The San Diego National Wildlife Refuge Complex (Complex) currently conducts a variety of management activities on the Tijuana Slough NWR, Sweetwater Marsh Unit, and South San Diego Bay Unit for the purpose of protecting colonies and/or pairs of California least tern, western snowy plover, light-footed clapper rail, and other Federal trust species of migratory birds. Management activities currently conducted to minimize attractants to predatory populations include: trash management, installation and maintenance of perimeter fencing in some locations, removal or trimming of large shrubs and trees in proximity to nesting areas to reduce the availability of resting and perching areas, and the use of various forms of exclosures over the nests of some species such as the western snowy plover. Another activity, public education and outreach, is an important component of the predator management program conducted at the Tijuana Slough NWR. This involves ongoing education programs relating to endangered species, the annual distribution of educational materials to the local community just prior to the nesting season. These materials address the problems associated with intended or unintended feeding of feral populations of domestic animals, clearly identify wildlife protected areas, and explain the importance of responsible control of household pets to the Refuge's wildlife species. Special emphasis, usually in the form of door-to-door distribution of materials, is placed on getting these materials to those residents who live immediately adjacent to the Refuge.

Predator management activities are closely coordinated with regular biological monitoring of nesting colonies in part to provide evidence of the identity of problem predators and the magnitude of the predation impacts to listed species populations. When indirect means do not provide

adequate protection based upon data gathered through biological monitoring, direct predator management actions, including non-lethal and if necessary lethal control, are implemented.

Unified Port of San Diego. The Unified Port of San Diego (Port) manages two sites surrounding the Bay, including tern nesting areas within Lindbergh Field (San Diego International Airport) and the Chula Vista Wildlife Reserve. The D Street Fill portion of the Sweetwater Marsh Unit is co-managed by the Port and the Service, which each owns a portion of this fill area. Management is similar to that conducted on the San Diego Bay NWR and includes site preparation, annual monitoring, and predator control. USDA APHIS-WS currently conducts active predator management on these areas under contract with the Port.

United States Navy. The United States Navy manages three of the six current least tern and snowy plover nesting areas surrounding San Diego Bay. These three locations are located within the Naval Air Station North Island and Naval Amphibious Base Coronado. Management is similar to that conducted on the San Diego Bay NWR and includes site preparation, annual monitoring, and predator control. However, some nesting areas occur within heavily used training areas and the Navy's training needs may influence the timeliness of these programs. The Navy has historically contracted with USDA APHIS-WS for predator management implementation at these sites.

Interagency Coordination. Coordination among agencies is ongoing and statewide pre and post-breeding season least tern and western snowy plover meetings are held annually to discuss plans and results of the various management programs for that season. These meetings provide the opportunity to discuss what actions are most effective in achieving the recovery goals for the various endangered and threatened species covered by these programs. Additionally, interagency meetings are periodically scheduled to address species-specific issues related to predation and recovery. Interagency meetings to address issues related to gull-billed terns have been conducted since 2001. These meetings have led to support for continuing population assessments for the species, as well as support by some for the candidacy as threatened or endangered for the western North American population of the gull-billed tern.

V. Management Plan

The predator management plan for the San Diego Bay NWR will be implemented to reduce damage by predators to Federal threatened or endangered species populations. The threat may be to adults, chicks, or eggs. A range of management actions, including non-lethal and lethal control, will be implemented. As such, the plan represents a comprehensive wildlife damage control program that will integrate and apply practical methods of prevention and control to reduce damage by wildlife while minimizing the harmful effects of the control measures on humans, other species, and the environment. The activities conducted on the Refuge will vary depending upon the specific wildlife damage problem that is occurring. A particular predator problem may be addressed through the implementation of activities related to resource management, physical exclusion, wildlife management, or any combination of these.

For most predatory species, removal will be accomplished primarily by hazing or live trapping and secondarily by lethal control. In all cases, the most humane methods available will be used. Efforts will be made to avoid and minimize losses of non-target native wildlife and all uninjured non-target species inadvertently captured will be immediately released near the site of capture or at a suitable location at the discretion of the Refuge Manager.

Direct control methods will include live-capture and translocation of individual predators; the intentional hazing (scaring off) of predatory species from nesting areas; and in some cases the lethal removal of problem predators. Lethal removal, which may involve shooting or the use of body grips or gas cartridges, may be used to remove predators that are identified as known and immediate threats to endangered or threatened species within the Refuge. Only licensed and authorized agencies or individuals will implement predator management actions.

Without continued management of mammalian and avian predators, the Refuge's population of light-footed clapper rails could be eliminated and the population size and nesting success of snowy plovers and least terns could decline dramatically. As a result, the Service believes that the following approach to predator management within the various areas of the Refuge will achieve the goals, objectives, and legal mandates of the Service on the San Diego Bay NWR.

D Street Fill

This 40-acre area on the Sweetwater Marsh Unit will continue to be jointly managed by the Service and the Port. Management will include the removal of weedy vegetation and control of shrubs and other potential perching or hiding areas for avian and mammalian predators. To reduce accessibility to the site by large mammals, the Service will continue to maintain the fence and gate at the eastern edge of the property. Roof tiles, exclosures, and other nest shelters will also be used when deemed appropriate to minimize take of eggs and chicks by avian predators. Under this plan, predator monitoring on the D Street Fill will be conducted during the nesting season. Endangered species monitoring within the nesting colony will also be conducted provided that adequate funding is available. Throughout the nesting season (March through September), the colony will be monitored for signs of specific predators, tracks, or other indicators of the presence of mammalian predators in the vicinity of nesting areas. The area will also be monitored for evidence of losses due to avian predators. Endangered species monitoring of nesting colonies will provide hatch and fledge rates, as well as adult survivorship and population size.

The predators that will be most commonly targeted for control include feral cats and dogs, California ground squirrels, Virginia opossums, Norway and black rats, striped skunks, common raven, American crow, and western gull. Prior to each nesting season ground squirrels will be lethally removed from the site to reduce the loss of tern and plover eggs. Coyotes, foxes, and other native mammalian predators will be trapped or shot when found within the nesting colony.

Non-lethal methods will be emphasized as the preferred tool for controlling avian predators. During the nesting season only, individual problem avian predators may be live-captured and later released in a suitable location. In cases where trapping is unsuccessful and an individual predator has learned to depredate tern or plover eggs and chicks, the predator may be lethally removal upon approval of the Refuge Manager.

Salt Pond Levees

Management actions to protect nesting least terns and western snowy plovers on the salt pond levees of the South San Diego Bay Unit will be similar to those described for the D Street Fill. Levee tops and other nesting areas will be maintained annually as needed. Fencing will be installed as needed to reduce access into the area by mammals, and predator monitoring will occur during the nesting season. During monitoring, dead animals that might attract predators to the area will be removed from the site.

Paradise Marsh/Sweetwater Marsh/Otay River Floodplain

Predator management will also be implemented within those areas of the Refuge that support the endangered light-footed clapper rail. The clapper rail is a year-round resident of the Refuge; therefore, predator management will also be conducted year-round. Various actions will be taken to reduce clapper rail predation. A public outreach program will be conducted annually to inform nearby residents of the adverse effects that cats and dogs can have on the species. Unauthorized access by the public into sensitive marsh areas will be controlled through signs, fencing, and patrol by law enforcement personnel. Nesting platforms will be installed and maintained where appropriate to protect eggs and young clapper rail chicks. Mammalian predators are the primary predators of concern for this species. These include domestic and feral cats, raccoons, and the non-native red fox, among others. Predator monitoring will be implemented throughout the year to look for signs of specific predators, tracks, or other indicators of the presence of mammalian predators in the marsh that could pose a threat to the rails. Avian predators are documented to take light-footed clapper rails. Avian predators will be treated on a case-by-case basis. Non-lethal methods will be tried first before implementing lethal removal.

VI. Direct Control of Predators - Species Specific Protocols

The direct control of predators on the Refuge has historically been implemented by U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Wildlife Services (APHIS – WS) through an interagency agreement with the Service. It is likely that this arrangement will continue in the future, provided funds are available. Contracts will be issued annually and will include detailed descriptions of approved control methods, disposition procedures for captured predators, and species-specific protocols. Predator management will be implemented year-round, although the majority of the contracted activities will occur during the breeding season. During the non-breeding season for endangered species, APHIS – WS will concentrate on the control of feral dogs and cats and mammalian predators such as skunks and opossums, which pose a threat to the light-footed clapper rail.

Various types of equipment and techniques will be used to implement predator management on the Refuge and all such implementation will occur in accordance with federal and state regulations. The preferred control methods include live trapping and hazing. Knowledge of the particular predator's habits, particularly the habits of avian predators, will determine which trapping technique is employed.

Live trapping may include the use of box type mammal traps, Bal-chatri traps [a type of baited monofilament line leg-hold/cage trap], scent baited padded leg-hold traps and perch pole traps. Manual capture methods may also be employed using hand held capture poles or other manual techniques. Traps are inspected in accordance with State Fish and Game Code and Service policy. Specifically, traps set out overnight for mammalian predators are checked within two hours of sunrise and traps left out during daylight hours are monitored regularly and checked a minimum of four times per day. Traps set for avian predators may be left out overnight if nocturnal predation is considered a threat to protected species. The use and monitoring of pole traps will be conducted in accordance with Service policy.

Hazing may be used to deter particular predators at the discretion of the Refuge Manager, and can include the use of firearms, pyrotechnics, and/or audio or visual stimuli.

When deemed necessary, lethal removal by shooting, body grip traps, and gas cartridges may be used to take predators that are identified as known and immediate threats to endangered or

threatened species. Lethal removal of avian predators is most often employed when an individual problem predator has focused its foraging activities on the nesting colony. In this case, an entire colony's productivity or even survival can be jeopardized in a short time frame. One such example occurred in 1997. A pair of burrowing owls was observed preying on adult and chick California least terns at the Tijuana Estuary. Refuge staff determined that live trapping was the preferred method of control because of a concern for the sensitivity of the local burrowing owl population. Over about a 12-day period (the time it took to locate and live-capture the owls), this pair of owls had taken between 70 and 80 breeding adult least terns and an unknown number of chicks. This one event resulted in the loss of approximately 18% of all breeding individuals in the colony during that nesting season (*Patton 1998*). Under this plan, selective removal of individual problem predators will be permitted for all avian predators with the exception of gull-billed terns.

Routine predator monitoring will be conducted in the nesting colonies. Problem predators may be identified through direct observation of predators in the act of hunting or preying on listed species. The presence of predators in the colony can also be established through the identification of tracks of birds, reptiles, or mammals in the nesting colony, dissection of raptor pellets (disgorged undigested material from previous meals), observations of preyed-upon individuals, eggs, or other material. In many cases these observations can be used to identify, at least to species, the predator impacting the site.

Some problem predators will defeat all attempts at hazing or live trapping and will be removed by lethal methods. Prior approval from the Refuge Manager is required for all actions involving the lethal removal of an avian predator. Permission for lethal removal may be in the form of blanket discretionary removal of certain species found within the confines of the breeding colony site (such as for corvids, feral dogs, or feral cats where live trapping has been ineffective and nesting has begun) or on a case-by-case basis (such as for identified individual raptors).

Although not approved for use on these Refuges at this time, the avicide DRC 1339, a pesticide used to control corvid populations, may be approved for use in the future if deemed necessary, to control corvids. DRC 1339 is injected into chicken eggs, which are then secured onto strategically placed elevated bait stations in the vicinity of endangered species nesting areas. Ingestion of the pesticide is lethal to the crow or raven. Specific baiting and pre-baiting activities are conducted to eliminate the possibility of attracting non-target species.

Species Specific Protocols

Procedures for intervention with predators will be dependent upon several factors, including, but not limited to: 1) the degree of threat the individual predator poses to protected populations; 2) the native or non-native status of the predator; 3) the conservation status of specific predator species populations; and 4) the general condition of a particular protected species nesting colony including; species, nest colony phenology, relative disturbance levels from other sources, numbers of vulnerable individuals on site, and other factors.

The following species may be trapped or otherwise removed if observations, tracks, or other indicators of the presence of the species are found within the vicinity of protected species' nesting areas during the nesting season, or if it is determined that the species poses a threat to light-footed clapper rails or roosting California brown pelicans: domestic and feral dogs and cats, coyote, red fox, gray fox, California ground squirrel, Virginia opossum, striped skunk, raccoon, Norway rat, black rat, common crow, common raven, or injured gulls.

The following native avian species will be live trapped from the immediate vicinity of nesting terns and plovers, when they are determined to pose a threat to these species by USDA

APHIS-WS in consultation with the Refuge Manager: American kestrel, loggerhead shrike, barn owl, great horned owl, burrowing owl, red-tailed hawk, sharp-shinned hawk, Cooper's hawk, and various gull species.

The following species require prior consultation with the Refuge Manager before lethal or non-lethal control actions can be taken: peregrine falcon, northern harrier, and short-eared owl.

Disposition of Captured Animals

All raptors and other avian predators that are live captured will be removed and held in a licensed/permitted rehabilitation/holding center until they can be released back into the wild. Release will be at a suitable location after the endangered species nesting season is completed. Holding facilities and the location of all release sites must be approved by the Refuge Manager.

All non-native mammalian predators, other than dogs and cats, will be euthanized using approved humane methods. Target and non-target predators that are injured during trapping will be treated on a case-by-case basis. These animals may be euthanized or taken to an approved rehabilitation/veterinary care facility depending on species and extent of injuries.

All non-target wildlife (animals determined not to be a threat to protected species) that is captured unharmed will be immediately released near the capture site or at another suitable location. All domestic or feral dogs and cats, when feasible, will be taken to an approved shelter facility operated by a cooperating local unit of government, humane society or a veterinary care facility.

VI. Monitoring and Reporting

Implementation of this predator management plan will be monitored and a report will be issued annually describing the actions taken to control predation and the numbers and types of predators controlled. In addition, the report will include documented incidents of predation on listed species, recommendations on how predation might be further reduced, and an evaluation of how the current year's predator management actions relate to the objectives established for this plan.

VII. Cooperators

This plan will be implemented in cooperation with the following agencies and organizations, as appropriate:

- Fish and Wildlife Service, Carlsbad Ecological Services Field Office
- Fish and Wildlife Service, Division of Migratory Birds and Habitat Programs, Region 1
- California Department of Fish and Game
- U.S. Department of Agriculture, Animal Plant Health Inspection Service -Wildlife Services
- Unified Port of San Diego
- San Diego County Department of Animal Control
- Project Wildlife

VIII. Other Recovery Actions to be Implemented on the Refuge

Predator management is just one of several strategies that will be implemented to achieve the management goal of recovering and maintaining stable populations of the Federal threatened and endangered species and species of concern that occur within the Refuge. Other strategies described in detail in the San Diego Bay NWR Comprehensive Conservation Plan (CCP) include

expanded habitat and wildlife management activities, habitat enhancement, and habitat restoration strategies are described below.

Various management strategies are proposed in the CCP to minimize human disturbance of sensitive habitat areas, including fencing, signage, and public education and outreach. Habitat enhancement is proposed to improve tidal circulation within existing marsh habitat, improve the quality of the nesting substrate for ground nesting birds, and expand the availability of cordgrass-dominated salt marsh habitat to support the clapper rail.

The CCP also includes a variety of habitat restoration proposals that would provide additional nesting, foraging, and resting habitat for endangered and threatened species and other species of conservation concern. Within the Sweetwater Marsh Unit, coastal salt marsh restoration is proposed that would provide additional nesting and foraging habitat for the light-footed clapper rail and additional habitat for foraging least terns and a variety of migratory shorebirds. Large areas of coastal salt marsh restoration are proposed within the South San Diego Bay Unit that would benefit the clapper rail, least tern, and various Birds of Conservation Concern. Also proposed is the creation of additional nesting areas that could benefit the least tern and snowy plover, as well as several colonial nesting seabirds. Water management proposals within the salt ponds could also provide additional nesting and foraging habitat for the western snowy plover.

IX. Alternatives Considered

In addition to the predator management plan presented above, various alternative methods for addressing predation of listed species on the Refuge were considered. These included:

- Non-lethal Control Only
- Indirect Control Only (implement management activities that reduce predation without non-lethal or lethal removal of predators)
- No Predator Management

Proposed Plan

The proposed predator management plan combines direct actions to control predation along with indirect actions related to reduced disturbance and improved habitat quality. The Service believes this proposal represents the most effective and most humane alternative.

Non-lethal Control Only

A predator plan that relies on the control of all predators using only non-lethal methods could have devastating effects on the Refuge's least tern and snowy plover populations. This is particularly true if an avian predator learns to prey on the eggs or young of a listed species. In some cases, considerable time can pass before a problem predator is trapped; as was the case in 1997 involving a pair of burrowing owls at the Tijuana Slough NWR (refer to Section IV.). Because lethal removal was not implemented in this case, the offending burrowing owls took a large number of chicks and more importantly, breeding adults. These events had a lasting effect on productivity at the site since losses of breeding adults can have population effects for many seasons. Least terns can be quite long-lived birds and may make many nesting attempts in their lives.

Indirect Control Only

Indirect control of predation would involve implementing management activities that reduce predation without lethal or non-lethal removal of predators. Instead, measures such as the use of visual and auditory repellents and physical barriers would be employed. Visual and auditory repellents are limited by several factors, including: 1) unintentional hazing of protected

species while attempting to haze predatory species; 2) reduced effectiveness over time as some predatory species become accustomed to particular stimuli and begin to ignore them; 3) difficulties in effectively deploying such repellents in the field; and 4) limited effectiveness of repellents on particular species. Physical barriers are a part of an integrated predator management program and will be used for some purposes such as keeping most off-leash dogs out of the nesting colonies. However, physical barriers in the absence of the ability to remove a predator are ineffective in controlling avian predation, as well as some forms of mammalian predation. The use of exclosures over nesting plovers has been effective in protecting eggs, but once the chicks leave the exclosure, they are once again vulnerable to predation. Although predation reduced to some extent through indirect control, this reduction in loss is not considered adequate to achieve the goals and objectives of the Refuge for listed species.

No Predator Management

Under this alternative, no actions would be taken on the Refuge for the specific purpose of controlling predators. Mammalian and avian predators would not be harassed or specifically deterred from traveling or flying through the Refuge or entering the nesting colonies. Based on previously documented losses of listed species to predation, it is likely that the Refuge's population of least terns, snowy plovers, and light-footed clapper rails would no longer be able to achieve sustainability goals for fledging success. In addition, a dramatic reduction in nest productivity could cause least terns and snowy plovers to abandon the existing nesting areas on the Refuge. A management strategy that excludes any form of predator management would place the viability of the Refuge's listed species at risk and would be inconsistent with the purposes for which this Refuge was established.

X. Justification

The implementation of this predator management plan will result in temporary localized reductions in populations of some mammalian and native avian predators around the Refuge. In recent years, the California ground squirrel, Norway rat, and black rat were the mammalian species most affected by predator management, while ravens and western gulls were the avian species most often removed from nesting areas. The lethal removal of some raptors and large native mammalian predators will occur annually on the Refuge, however the numbers of individuals lost will be low (one to three annually). Lethal removal will generally only be implemented after other non-lethal methods for removal and relocation have proved to be unsuccessful. For the most part, avian predators, with the exception of corvids and some gulls, will be trapped and released into suitable habitat elsewhere, and only those avian predators that are foraging within nesting areas will be removed.

The Federal endangered and threatened avian species supported by these Refuges were once more widely distributed throughout southern California and the sizes of the various populations throughout the region were much larger. The loss of coastal habitat, displacement of nesting areas due to increasing human use of beaches and surrounding wetlands, increases in non-native predators in proximity to natural areas, and the concentration of native predators into smaller, more isolated natural areas have all contributed to significant declines in the populations of California least tern, western snowy plover, and light-footed clapper rail. The recovery plans prepared for the Refuge's Federal endangered and threatened species (*USFWS 1985a, 1985b, 1998, 2001, 2002*), as well as the conservation plans prepared to address declines in the populations of shorebirds and waterbirds (*Page et al. 2003 and Kushlan et al. 2002*), all include predator control in the list of recovery and conservation actions that must be considered if reversal of these population declines is to be achieved. However, predator control alone cannot achieve the recovery goals established for these species, which is why this predator management plan is just one

component of a larger overall management plan for the Refuge. The CCP for this Refuge includes habitat enhancement and restoration proposals, as well as additional actions directed at reducing disturbance to sensitive species. Through this combination of efforts, the Refuge's populations of endangered and threatened species are expected, at a minimum to sustain their current sizes, and ideally to increase as these various actions are implemented.

X. References Cited

California Coastal Commission. 1987. *The California Coastal Resource Guide*. University of California Press.

Densmore, Robin J. 1990. Gull-billed Tern Predation on a Least Tern Chick. *Wilson Bulletin* 102(1): 180-181.

Hickey, C., W.D. Shuford, G.W. Page, and S. Warnock. 2003. Version 1.1. *The Southern Pacific Shorebird Conservation Plan: A strategy for supporting California's Central Valley and coastal shorebird populations*. PRBO Conservation Science, Stinson Beach, CA.

Jaques, D. and D. Anderson. 1987. "Conservation Implications of Habitat Use and Behavior of Wintering Brown Pelicans (*Pelecanus occidentalis californicus*)." Final Report to Public Service Research and Dissemination Program University of California, Davis, California.

Kushlan, J.A., J. Steinkamp, K.C. Parsons, J. Capp, M. Acosta Cruz, M. Coulter, I. Davidson, L. Dickson, N. Edelson, R. Elliot, R. M. Erwin, S. Hatch, S. Kress, R. Milko, S. Miller, K. Wheeler, and K. Wohl. 2002. *Waterbird Conservation for the Americas: The North American Waterbird Conservation Plan, Version 1*. Waterbird Conservation for the Americas, Washington, DC, U.S.A.

Palacios, Eduardo and Eric Mellink. 2003. *Status, Distribution, and Ecology of Nesting Larids in Western Mexico, with Emphasis on Vanrossemi Gull-billed Terns and Caspian Terns – Final Report*. (Draft, November 2003)

Patton, Robert. 2001. *The Status of Western Gull-billed Terns at South San Diego Bay National Wildlife Refuge in 2001*.

Patton, Robert. 2002. *California Least Tern Breeding Survey 2000 Season. Final Report to the State of California Department of Fish and Game*.

Patton, Robert. 2004. *The Status of Western Gull-billed Terns at South San Diego Bay National Wildlife Refuge in 2003*.

Powell, A.N., C.L. Fritz, B.L. Peterson, and J.M. Terp. 2002. "Status of Breeding and Wintering Snowy Plovers in San Diego County, California, 1994 – 1999." *Journal of Field Ornithology* 73(2):156-165.

U.S. Fish and Wildlife Service. 1983. *The California Brown Pelican Recovery Plan*.

U.S. Fish and Wildlife Service. 1985a. *California Least Tern Recovery Plan*.

U.S. Fish and Wildlife Service. 1985b. *Light-footed Clapper Rail Recovery Plan*.

U.S. Fish and Wildlife Service. 2001. Western Snowy Plover (*Charadrius alexandrinus nivosus*) Pacific Coast Population Draft Recovery Plan. (May 2001)

U.S. Fish and Wildlife Service. 2002. Birds of Conservation Concern 2002. Division of Migratory Bird Management, Arlington, Virginia (December 2002).

U.S. Fish and Wildlife Service. 2003. Draft Comprehensive Conservation Plan/Environmental Impact Statement for the Sweetwater Marsh National Wildlife Refuge and the South San Diego Bay Unit of the San Diego National Wildlife Refuge. San Diego National Wildlife Refuge Complex, Carlsbad, CA.

Appendix N

Wilderness Inventory

Appendix N: Wilderness Inventory

Introduction

The purpose of a wilderness review is to identify and recommend for Congressional designation National Wildlife Refuge System (System) lands and waters that merit inclusion in the National Wilderness Preservation System (NWPS). Wilderness reviews are a required element of comprehensive conservation plans (CCPs) and conducted in accordance with the refuge planning process outlined in 602 FW 1 and 3, including public involvement and the National Environmental Policy Act (NEPA) compliance.

There are three phases to the wilderness review: 1) inventory, 2) study; and 3) recommendation. Lands and waters that meet the minimum criteria for wilderness are identified in the inventory phase. These areas are called wilderness study areas (WSAs). WSAs are evaluated through the CCP process to determine their suitability for wilderness designation. In the study phase, a range of management alternatives are evaluated to determine if a WSA is suitable for wilderness designation or management under an alternate set of goals and objectives that do not involve wilderness designation. The recommendation phase consists of forwarding or reporting recommendations for wilderness designation from the Director through the Secretary and the President to Congress in a wilderness study report.

If the inventory does not identify any areas that meet the WSA criteria, we document our findings in the administrative record for the CCP, fulfilling the planning requirement for a wilderness review. We inventoried Service lands and waters within the Sweetwater Marsh and South San Diego Bay Units of the San Diego Bay NWR and found no areas that meet the eligibility criteria for a WSA as defined by the Wilderness Act. This appendix summarizes the wilderness inventory for the Sweetwater Marsh and South San Diego Bay Units of the San Diego Bay NWR.

Inventory Criteria

The wilderness inventory is a broad look at the planning area to identify WSAs. These are roadless areas that meet the minimum criteria for wilderness identified in Section 2(c) of the Wilderness Act.

"A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions, and which: (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological or other features of scientific, educational, scenic, or historical value."

A WSA must be a roadless area or island, meet the size criteria, appear natural, and provide outstanding opportunities for solitude or primitive recreation. The process for identification of roadless areas and islands in the Sweetwater Marsh and San Diego Bay Units and application of the wilderness criteria are described in the following sections.

Identification of Roadless Areas and Roadless Islands

Identification of roadless areas and roadless islands required gathering and evaluating land status maps, land use and road inventory data, and aerial photographs for the Sweetwater Marsh and South San Diego Bay Units. “Roadless” refers to the absence of improved roads suitable and maintained for public travel by means of motorized vehicles primarily intended for highway use. Only lands currently owned by the Service in fee title were evaluated.

Evaluation of the Size Criteria

Roadless areas or roadless islands meet the size criteria if any one of the following standards apply:

- An area with over 5,000 contiguous acres. State and private lands are not included in making this acreage determination.
- A roadless island of any size. A roadless island is defined as an area surrounded by permanent waters or that is markedly distinguished from the surrounding lands by topographical or ecological features.
- An area of less than 5,000 contiguous Federal acres that is of sufficient size as to make practicable its preservation and use in an unimpaired condition, and of a size suitable for wilderness management.
- An area of less than 5,000 contiguous Federal acres that is contiguous with a designated wilderness, recommended wilderness, or area under wilderness review by another Federal wilderness managing agency such as the Forest Service, National Park Service, or Bureau of Land Management.

Evaluation of the Naturalness Criteria

In addition to being roadless, a WSA must meet the naturalness criteria. Section 2(c) defines wilderness as an area that “... generally appears to have been affected primarily by the forces of nature with the imprint of man’s work substantially unnoticeable.” The area must appear natural to the average visitor rather than “pristine.” The presence of historic landscape conditions is not required. An area may include some human impacts provided they are substantially unnoticeable in the unit as a whole. Significant human-caused hazards, such as the presence of unexploded ordnance from military activity, and the physical impacts of refuge management facilities and activities are also considered in evaluation of the naturalness criteria. An area may not be considered unnatural in appearance solely on the basis of the “sights and sounds” of human impacts and activities outside the boundary of the unit.

Evaluation of Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation

In addition to meeting the size and naturalness criteria, a WSA must provide outstanding opportunities for solitude or primitive recreation. The area does not have to possess outstanding opportunities for both solitude and primitive and unconfined recreation, and does not need to have outstanding opportunities on every acre. Further, an area does not have to be open to public use and

access to qualify under this criteria; Congress has designated a number of wilderness areas in the Refuge System that are closed to public access to protect resource values.

Opportunities for solitude refer to the ability of a visitor to be alone and secluded from other visitors in the area. Primitive and unconfined recreation means non-motorized, dispersed outdoor recreation activities that are compatible and do not require developed facilities or mechanical transport. These primitive recreation activities may provide opportunities to experience challenge and risk; self reliance; and adventure.

These two "opportunity elements" are not well defined by the Wilderness Act but, in most cases, can be expected to occur together. However, an outstanding opportunity for solitude may be present in an area offering only limited primitive recreation potential. Conversely, an area may be so attractive for recreation use that experiencing solitude is not an option.

Evaluation of Supplemental Values

Supplemental values are defined by the Wilderness Act as "...ecological, geological, or other features of scientific, educational, scenic, or historic value." These values are not required for wilderness but their presence should be documented.

Inventory Findings

As documented below, none of the parcels in the Sweetwater Marsh or South San Diego Bay Units of the San Diego Bay NWR meet the criteria for a WSA.

Roadless Areas and Roadless Islands

The Sweetwater Marsh Unit includes an access road that accommodates motorized access to both the Chula Vista Nature Center and the Refuge office. This road, although gated and not available for travel by the general public, is used to transport the public to and from the Nature Center and Refuge via a bus. No public roads are located within the portion of the South San Diego Bay Unit that is owned by the Service in fee title.

Size Criteria

A total of 316 acres of Service owned-land are included within the Sweetwater Marsh Unit. The majority of the 2,324 acres of land included within the current boundary of the South San Diego Bay Unit is leased to the Service from the State of California for management as a National Wildlife Refuge. Approximately 90 acres of the Refuge are owned by the Service in fee title. No islands are included within the San Diego Bay NWR.

Naturalness Criteria

The marsh habitat within the Sweetwater Marsh Unit appears natural to the refuge visitor. However, the upland area on Gunpowder Point, which was the site of industrial and agricultural activity for many decades prior to the establishment of the Refuge, continues to include evidence of these past activities and supports a mix of exotic plants, weedy invasive plants, and some native shrubs. The Otay River floodplain portion of the South San Diego Bay Unit was also farmed for several decades and currently supports weedy vegetation that would not appear natural to the refuge visitor. Also included within this Unit is an active commercial solar salt operation.

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation

The San Diego Bay NWR is located immediately adjacent to the urbanized communities of National City, Chula Vista, San Diego, Coronado, and Imperial Beach. Although the Refuge does provide opportunities for escape from the urban environment, the sites and sounds of urbanization are always present just beyond the Refuge boundary.

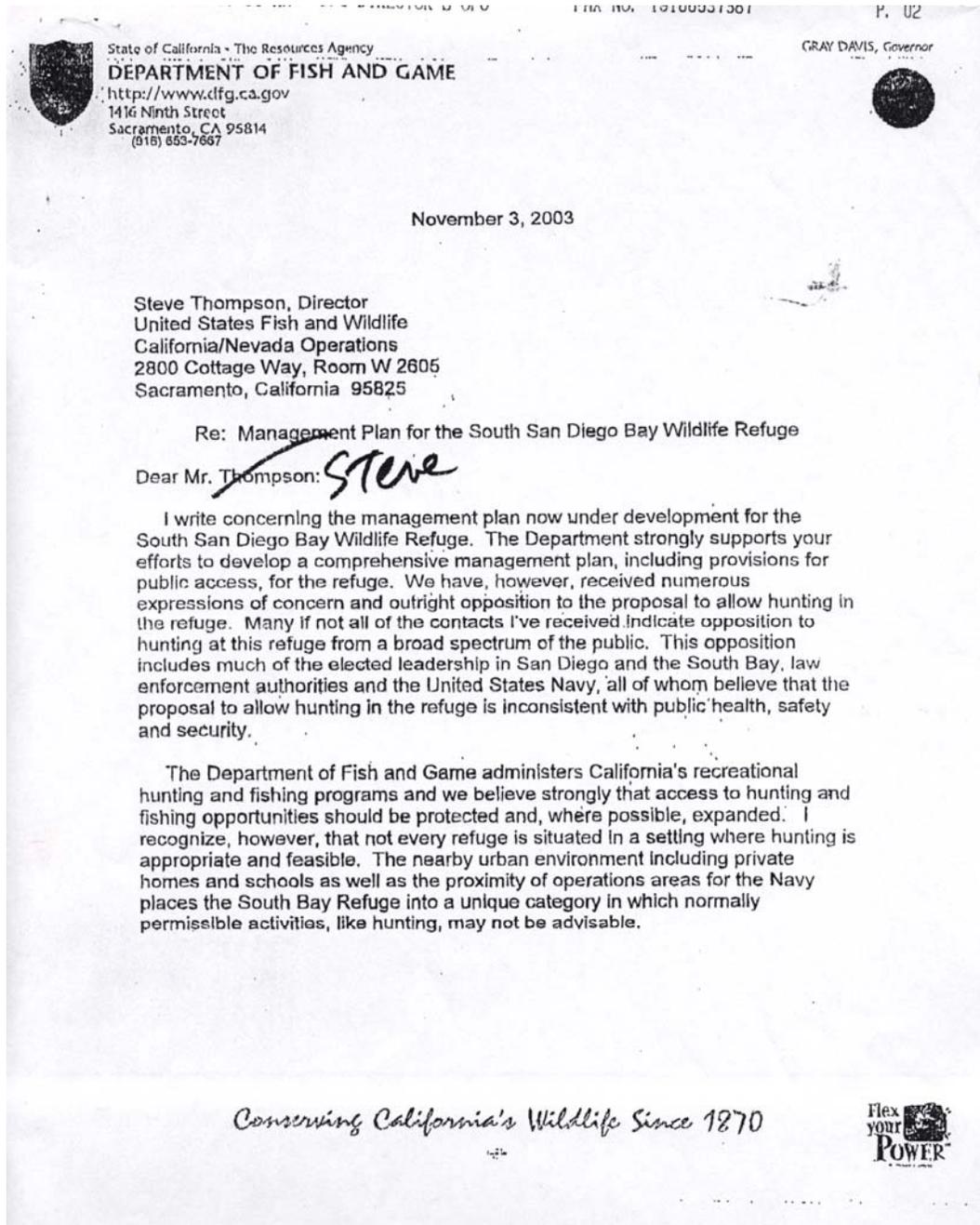
Supplemental Values

The San Diego Bay NWR includes portions of San Diego Bay, which provides significant scenic value to visitors of the Refuge and the surrounding communities. The undisturbed salt marsh habitat on the Sweetwater Marsh Unit also provides scenic and regionally significant ecological value.

Appendix 0

**Letter from the California
Department of Fish and Game**

Appendix O: Letter from the California Department of Fish and Game

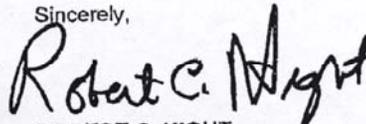


Steve Thompson
November 3, 2003
Page 2

The lease pursuant to which the United States has management authority over State owned lands within the boundary of the refuge allows waterfowl hunting if a "joint determination" is made by the Fish and Wildlife Service and the Department of Fish and Game that such hunting is "consistent with public safety considerations..." Pursuant to section 2, paragraph 4 of Lease PRC 8075.9 the Department of Fish and Game has concluded that the proposed hunting of waterfowl at the South San Diego Bay Refuge is not consistent with public health and safety. We have therefore determined that waterfowl hunting on the lands subject to the lease is not appropriate.

Thank you for your consideration of my concerns. Inquiries concerning this matter may be addressed by contacting Deputy Director Sonke Mastrup at (916) 653-4207.

Sincerely,


ROBERT C. HIGHT
Director

cc: Sen. Denise Moreno Ducheny

San Diego Bay National Wildlife Refuge
San Diego Bay National Wildlife Refuge Complex
6010 Hidden Valley Road
Carlsbad, CA 92011
Telephone: 760/930 0168
Fax: 760/930 0256

California Relay Service
TTY 1 800/735 2929
Voice 1 800/735 2922

U.S. Fish & Wildlife Service
<http://pacific.fws.gov>

For Refuge information
1 800/344 WILD



July 2005

Photo: USFWS/J. Konecny

