

# Appendix B. FONSI and Environmental Assessment

U. S. Department of the Interior  
Fish and Wildlife Service  
California/Nevada Operations Office

## FINDING OF NO SIGNIFICANT IMPACT

Environmental Assessment for Management of  
Stone Lakes National Wildlife Refuge  
Sacramento and San Joaquin Counties, California

The U.S. Fish and Wildlife Service (Service) has completed a Comprehensive Conservation Plan (CCP) and the Environmental Assessment (EA) for Stone Lakes National Wildlife Refuge (Refuge). The CCP will guide Refuge management for the next 15 years. The CCP and EA (herein incorporated by reference) describe the Service's proposals for managing the Refuge and their associated effects on the human environment under three alternatives, including the No Action Alternative.

### Decision

Following comprehensive review and analysis, the Service selected Alternative B for implementation because it is the alternative that best meets the following criteria:

- Achieves the mission of the National Wildlife Refuge System.
- Achieves the purposes of the Refuge.
- Will be able to achieve the Service's vision and goals for the Refuge.
- Maintains and restores the ecological integrity of the habitats and wildlife and plant populations on the Refuge.
- Addresses the important issues identified during the scoping process.
- Addresses the legal mandates of the Service and the Refuge.
- Is consistent with the scientific principles of sound fish and wildlife management and endangered species recovery.
- Facilitates priority public uses which are compatible with the Refuge purposes and the Refuge System mission.

### Alternatives Considered

Following is a brief description of the alternatives for managing Stone Lakes National Wildlife Refuge, including the selected alternative (Alternative B). For a complete description of each alternative, see the draft EA. All three alternatives, including Alternative A, focus on wetland conservation, endangered species protection, and providing habitat for migratory birds.

#### *Alternative A (No Action Alternative)*

Alternative A was not selected because it could not reasonably be expected to meet the Service's vision and goals for the Refuge. Under Alternative A, the Refuge would continue to be managed as it has in the recent past. Currently the primary management focus of the Refuge is providing habitat for migrating, wintering and nesting migratory and resident birds with an emphasis on waterbirds, and a variety of special status species.

Restoration and management of seasonal and permanent wetland habitats has been a major emphasis since the inception of the Refuge. The Refuge promotes water management regimes involving specific water draw down dates, spring irrigations and fall flood-up periods to produce quality habitat, primarily for wintering waterbirds. Seasonal wetlands are irrigated in summer to stimulate the growth of high quality waterfowl foods. Wetland vegetation is also manipulated periodically to maintain desired habitat conditions for feeding, loafing and breeding waterfowl, waterbirds and other birds.

This Alternative was not selected for implementation because it does not include needed improvements which have been identified for habitat restoration, management of migratory birds and special status species and it does not accommodate the growing demand for wildlife-dependent recreation.

*Alternative B (Selected Alternative)*

Alternative B was selected because, among the alternatives, it can be most reasonably expected to meet the Service's vision and goals for the Refuge. Under Alternative B, the Refuge would continue its current focus of providing wintering habitat for migratory birds and management for the benefit of special status species. Management programs for migratory birds and Central Valley wildlife habitats would be expanded and improved. Valley foothill riparian habitat would be restored or enhanced, seasonal and permanent wetlands would be enhanced, on the South Stone Lake Unit, and native grassland habitat would be restored. A no-wake zone would be established on all Refuge waters where boating occurs. Overall visitor use opportunities would be expanded. Opportunities for wildlife observation and environmental education would expand. Foot trails would be open to the public seven days per week and universally accessible trails would be constructed. Access for car top boating would be improved.

*Alternative C*

Alternative C was not selected because although it would enhance visitor services, it would be unlikely to meet the Service's vision and goals for the Refuge, related to habitat and wildlife management. Under Alternative C, the Service would continue to focus on providing wintering habitat for migratory birds and managing for endangered species while placing a greater emphasis on historic conditions in management and habitat restoration activities. Opportunities for the six priority public uses would be expanded. Valley foothill riparian habitat would be restored, seasonal wetlands, permanent wetlands and native grassland habitat would be restored or enhanced, but to a lesser degree than under Alternative B. Opportunities for wildlife observations would expand to a larger capacity than under Alternative B. The number of supported environmental education groups would expand to 80 per year. Foot trails would be open to the public seven days per week, with seasonal restrictions, and two and one-half miles of universally accessible trails would be constructed. Car top boating access would be improved.

**Effects of management of the Refuge on the human environment**

As described in the EA, implementing the selected alternative will have no significant impacts on any of the environmental resources identified in the EA. A summary of the impacts analysis and conclusions follows.

*Soils*

In addition to the potential soil impacts related to construction on the Headquarters Unit, Alternative B could also result in similar impacts due to restoration activities. Developing visitor facilities could result in impacts, as well. These impacts are expected to be minor and localized. Additional short-term disturbance would result from mechanical removal of nonnative weeds from the seasonal marsh, riparian and upland habitats.

*Water Quality and Quantity*

The conversion of 200 acres of former agricultural lands on the Headquarters Unit to wetlands would add to the region's floodwater storage capacity and help maintain water quality by trapping sediments and removing some excess nutrients.

Under the selected alternative, periodic flooding of irrigated pastures would begin earlier each fall, adding to groundwater recharge. The restoration and natural expansion of riparian vegetation would help to stabilize shorelines; this would reduce erosion and the resulting

sediment loads in Refuge waters, improving water quality. The prohibition of gas-powered boats within the Refuge would contribute to better water quality by removing a source of turbidity, potential petroleum leaks and possibly inadvertently transported aquatic nuisance species.

#### *Air Quality*

Under all alternatives, soil disturbance and/or use of heavy equipment would cause short-term increases in dust (particulate matter less than 10 microns [PM10]) and tailpipe emissions of PM10, nitrogen oxide (NOX) and reactive organic gases (ROG), including those activities associated with the restoration of wetland habitat on the Headquarters Unit. Minor short-term increases in PM10 and tailpipe PM10, NOX and ROG would result from restoring riparian habitat and constructing trails, parking areas and observation platforms. Tailpipe emissions (ROG, NOX, and PM10) would result from the use of combustion engines in construction equipment and employee vehicles during trips to and from the job sites. Dust emissions and generation (PM10) would result from the excavation, transport and grading of soil. Long-term increases in emissions would result from the increasing number of vehicular trips to and from the Refuge as visitation increases.

#### *Plant Communities*

Under the selected alternative discing, mowing, chemical treatments, and occasionally grazing would be periodically used to maintain cover of emergent vegetation in seasonal wetland impoundments. The Service would continue to use physical and chemical means to control undesirable plants, to manage vegetation in about 25 percent of the moist soil impoundments each year and would continue to mow and graze grassland habitat to reduce the cover of non-native annual grasses and promote native species. Control of invasive weeds would be part of an integrated pest management program that would include physical (e.g., mowing, discing, grazing, and burning) and chemical (herbicide) treatments.

In addition, the Service would increase the cover of native seasonal marsh plants on the Refuge, restore 65 acres of riparian and oak woodland habitat, enhance 40 acres of understory shrub and herbaceous vegetation in existing riparian areas, and restore 30 acres of native grasslands throughout the Refuge. This would have a beneficial effect on the Refuge's vegetation because it would restore a larger diversity of the Refuge's native plant cover.

#### *Wildlife and Fish Resources*

Under the selected alternative, the Service would continue to allow the Sacramento Yolo Mosquito Vector Control District (SYMVCD) to monitor and control mosquitoes on the Refuge. The SYMVCD would use the biological larvicides *Bacillus thuringiensis israelensis* (Bti) and *Bacillus sphaericus* (Bsp) and the insect growth inhibitor methoprene. In the event, adulticide applications become necessary, SYMVCD will utilize synthetic pyrethrins or the organophosphate Naled, applied from an ultra-low volume ground rig.

All applications of aquatic herbicides will be from properly calibrated and maintained ground or boat-mounted spray apparatus. All applications will occur in compliance with best management practices identified in the Aquatic Pesticide Application Plan for the Statewide National Pollution Discharge Elimination System (NPDES) General Permit (No. CAG990005). Control of invasive weeds, particularly aquatic weeds such as water hyacinth, currently require the application of herbicides that could have short-term negative effects on aquatic wildlife and waterbirds, but removal of invasive weeds ultimately improves the quality of wildlife habitat. Herbicide applications are not expected to significantly affect wildlife.

Recreational use of the Refuge is expected to increase dramatically under the selected alternative. Most of these new users are expected to participate in wildlife observation. This

growth in recreational use could adversely affect birds using the Refuge wetlands, resulting in flushing, disruption of feeding and roosting, increased demands on the birds' available energy and reduced use of preferred habitat. Construction of new visitor use facilities could result in the temporary disturbance and/or displacement of wildlife.

Once established, new habitat would provide a long-term benefit to a variety of wildlife. In addition, existing grassland habitat would be maintained for the benefit of grassland dependent species. Riparian habitat would be further protected by further exclusion of cattle from riparian areas. Shorebirds would benefit from exploring reverse-cycle wetlands and by drawing down one permanent wetland until August to provide food. The Refuge would also enhance and create habitat for burrowing owls by reintroducing ground squirrels to the North Stone Lake and Wetland Preserve units and constructing artificial burrows, as needed.

The direct impact of recreational fishing on fish populations is not expected to be detrimental. Fishing may even benefit native fish by reducing competition from introduced species. Indirect effects of fishing and boating, such as disturbance to wildlife, would be controlled by restricting shoreline fishing, by allowing access only during the summer before winter migrants have arrived and by providing sanctuary to species that are present during the summer.

#### *Special Status Species*

No significant adverse effects on special status species are anticipated. Beneficial effects to special status species would result from expansion and enhancement of riparian, wetland and grassland habitats.

#### *Cultural Resources*

Under all alternatives Refuge management activities have the potential to disturb cultural resources. To preserve Refuge archaeological and historic resources, all undertakings will be coordinated with the Service's Regional Archaeologist. Under each alternative: a cultural resources overview would be prepared; baseline data on all cultural resource sites collected; an attempt made to locate and delineate all unrecorded cultural resource sites; appropriate buffers zones established to ensure their protection; and updated or new site records forwarded to the California North Central Information Center. Also, an attempt would be made to locate any human remains, covered under the Native American Grave Protection and Repatriation Act (NAGPRA) (25 USC 3001 et seq. or 43 CFR 10), removed in the past.

#### *Visitor Services*

Volunteer opportunities would be expanded, including at least one comprehensive volunteer training per year. Opportunities for wildlife observations would expand to a capacity of 10,500 visits per year. Four miles of foot trails would be open to visitors seven days a week, with seasonal restrictions. Two miles of universally accessible trails would be constructed. Two new photography blinds would be constructed. Two hundred feet of boardwalk would be constructed. One and one-half miles of foot trails would be constructed and would be open to visitors seven days a week, with seasonal restrictions. Parking facilities and a car top boat launch, for a maximum of ten cars, would be provided. The number of supported environmental education groups would expand to 80 per year. Two new interpretative programs would be developed within five years, including displays illustrating traditional dwelling and subsistence strategies on the Headquarter Unit. Within five years the Refuge would provide safe, boat only fishing with day use parking facilities that could accommodate up to 20 boats per day. Refuge staff would expand community outreach and presentations to local community groups.

#### *Socioeconomics*

The selected alternative is expected to have no significant affect on the local, regional or State economy. Under the preferred alternative, there will likely be a loss of benefits to local

businesses from patronage by high speed boaters, but there will likely be a simultaneous gain in benefits for local businesses from added patronage by increasing numbers of other Refuge visitors. Actions under the preferred alternative are thus expected to have modest net benefits to the local economy once only uses found to be compatible are allowed on the Refuge.

As incompatible high speed boating is phased out, the local water skiing club, would be expected to lose benefits associated with this temporal, exclusive use of Refuge waters and to incur costs associated with finding alternative water skiing locations due to the water ski club's contractual obligation, until 2013, with a local landowner for the use of launch facilities that provides access to a waterway, partially located on the Refuge. The local land owner, who sells access to the water ski club, could incur opportunity costs after 2013 unless another profitable use of the property is substituted.

No projects proposed under any of the alternatives would have a disproportionate negative impact on low-income or minority populations.

#### **Public Review**

The planning process incorporated extensive public involvement in developing and reviewing the CCP. This included two public workshops, distribution of three planning updates, and public review and comment on the planning documents. The details of the Service's public involvement program are described in the CCP and the EA.

#### **Conclusions**

Based on review and evaluation of the information contained in the supporting references, I have determined that implementing Alternative B as the CCP for management of the Stone Lakes National Wildlife Refuge is not a major Federal action that would significantly affect the quality of the human environment, within the meaning of section 102(2)(c) of the National Environmental Policy Act of 1969, as amended. Accordingly, the Service is not required to prepare an Environmental Impact Statement.

This Finding of No Significant Impact and supporting references are on file at the U.S. Fish and Wildlife Service, Stone Lakes National Wildlife Refuge, 1624 Hood-Franklin Road, Elk Grove, CA 95757, (916) 775-4421 and U.S. Fish and Wildlife Service, California/Nevada Refuge Planning Office, 2800 Cottage Way, Sacramento, California, 95825 (telephone [916] 414-6500). These documents can also be found on the Internet at: [www.fws.gov/cno/refuges/planning.html](http://www.fws.gov/cno/refuges/planning.html). These documents are available for public inspection. Interested and affected parties are being notified of this decision.

#### **Supporting References**

U.S. Fish and Wildlife Service. 2007. Final Comprehensive Conservation Plan for Stone Lakes National Wildlife Refuge.

U.S. Fish and Wildlife Service. 2006. Draft Comprehensive Conservation Plan and Environmental Assessment for the San Joaquin River National Wildlife Refuge.



Manager, California/Nevada Operations  
Sacramento, California



Date

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**Stone Lakes  
National Wildlife Refuge  
Comprehensive Conservation Plan Environmental Assessment**

**U. S. Fish and Wildlife Service  
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2800 Cottage Way, Room W-1832  
Sacramento, CA 95825**

**December 2006**

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# Chapter 1. Purpose of and Need for Action

## Introduction

This draft environmental assessment (EA) evaluates the environmental effects of three alternatives for managing the Stone Lakes National Wildlife Refuge (Refuge). The U.S. Fish and Wildlife Service (Service) will use this EA to solicit public involvement in the Refuge planning process and to determine whether implementation of the Comprehensive Conservation Plan (CCP) will have a significant effect on the quality of the human environment. This EA is part of the Service's decision-making process in accordance with the National Environmental Policy Act (NEPA).

## Proposed Action

The Service proposes to implement Alternative B, as described in this EA. More information is provided about Alternative B in the CCP.

## Purpose of and Need for the Proposed Action

The Refuge needs this CCP to guide Refuge management. In addition, the National Wildlife Refuge System Improvement Act of 1997 requires that within 15 years of its enactment, a CCP must be in place for all refuges established prior to 1997.

## Project Area

The Refuge was established in 1994, becoming the 505th refuge in the National Wildlife Refuge System. The Refuge boundary encompasses about 17,640 acres, including a core Refuge of about 9,000 acres, and a 9,000-acre "Cooperative Wildlife Management Area" (USFWS 1992). The Service actively manages about 6,000 acres. The Refuge is located in the Sacramento/San Joaquin River Delta (Figure 1). It is in the Beach-Stone Lakes Basin, found within the Sacramento Valley in the southwestern part of Sacramento County. It lies about ten miles south of the city of Sacramento, straddling Interstate Five from the town of Freeport south to Lost Slough (Figure 2). The Refuge provides wintering habitat for migratory waterfowl and other waterbirds in the Pacific Flyway (Figure 1). It is surrounded by privately owned nonnative grassland used for pasture, agricultural croplands and dense urban development.

## Decisions to be Made

Based on the analysis documented in this draft EA, the California/Nevada Operations Manager must determine the type and extent of management and visitor access that will occur on the Refuge and whether the selected management alternative would have a significant effect on the quality of the environment.

## Issue Identification

The Service identified issues, concerns and opportunities through early planning discussions and the public scoping process. This process began with the mailing of the first planning update in July 2002. The public also provided comments in writing and through personal communications. For a discussion of the planning process and issues raised, please see Chapter 2 of the CCP.

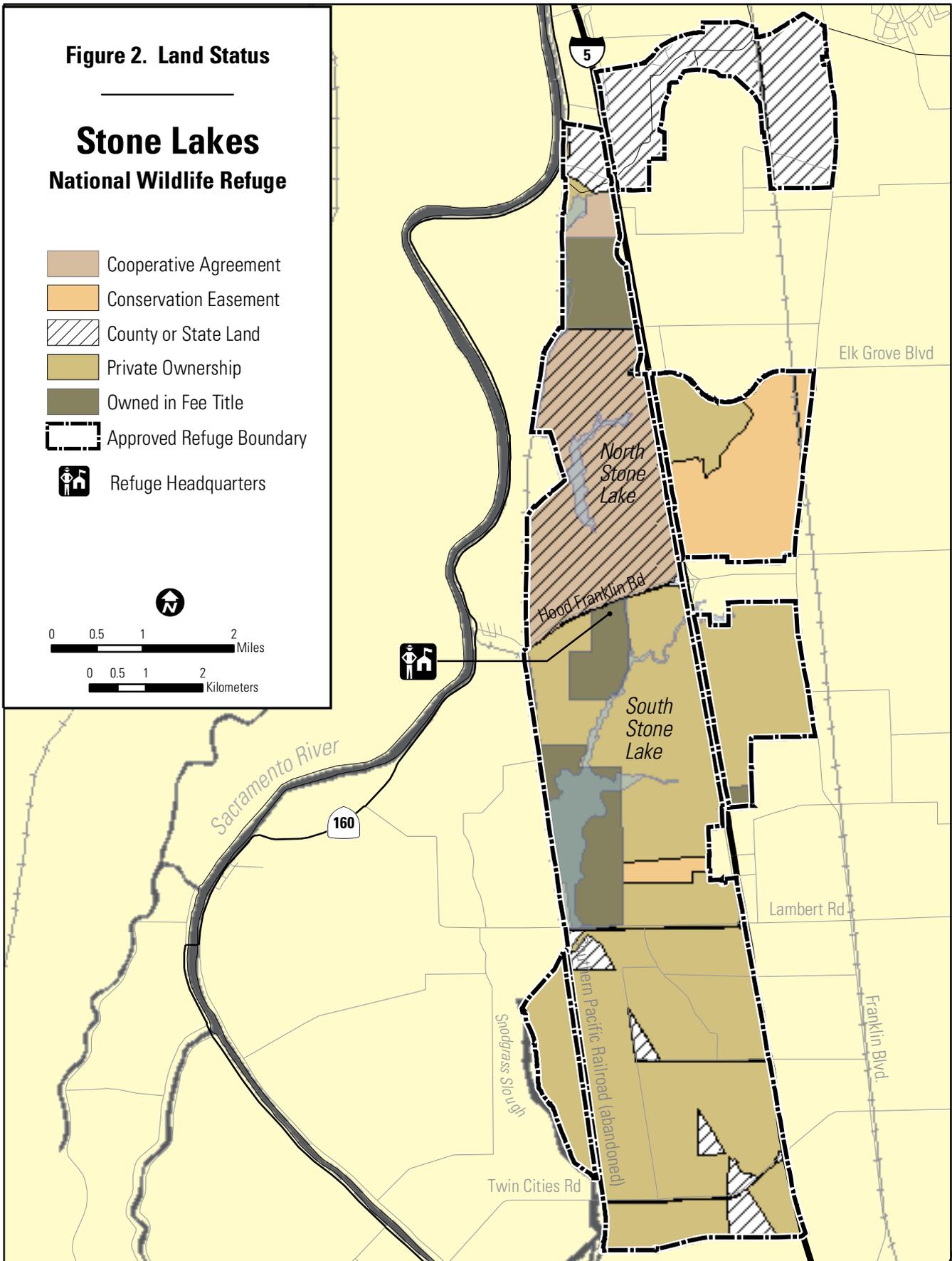
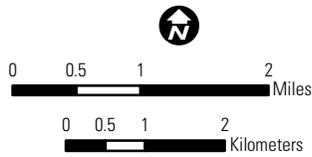
The planning team helped to further define the issues. The planning team includes Service employees from the Stone Lakes National Wildlife Refuge Complex office and the California/Nevada Refuge Planning Office.



Figure 2. Land Status

# Stone Lakes National Wildlife Refuge

-  Cooperative Agreement
-  Conservation Easement
-  County or State Land
-  Private Ownership
-  Owned in Fee Title
-  Approved Refuge Boundary
-  Refuge Headquarters



## **Public Involvement**

The planning team distributed three planning updates to a mailing list of about 210 individuals, groups and agencies in July 2002, September 2002 and December 2002. The team held four public workshops during August and September 2002, one each in; Elk Grove, Sacramento, Walnut Grove and Davis, California.

The planning staff has incorporated public input received in response to these updates and workshops into the CCP and EA; a summary of these comments is included in Chapter 2 of the CCP. The original comments are available for review in planning administrative files at the California/Nevada Refuge Planning Office in Sacramento, California.

## **U.S. Fish and Wildlife Service and the National Wildlife Refuge System**

The mission of the Service is to conserve, protect, and enhance the nation's fish and wildlife and their habitats for the continuing benefit of the American people. The Service is the primary Federal agency responsible for migratory birds, endangered plants and animals, certain marine mammals and interjurisdictional fish. The responsibility to conserve our nation's fish and wildlife resources is shared with other Federal agencies, State and Tribal governments.

As part of this responsibility, the Service manages the National Wildlife Refuge System (Refuge System). The Refuge System is the only nationwide system of Federal lands managed and protected specifically for wildlife and their habitats. The mission of the 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.

The Refuge is managed as part of the Refuge System in accordance with the National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, and other relevant legislation, Executive Orders, regulations, and policies. Chapter 1 of the CCP summarizes these major laws, regulations, and policies and describes the goals of the Refuge System.

### ***Refuge Purposes***

The Emergency Wetlands Resources Act of 1986, the Fish and Wildlife Act of 1956 and the Migratory Bird Conservation Act are the establishing authorities for the Refuge.

The primary Refuge purposes are:

“... for the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ...” 16 U.S.C. §§ 3901(b) (Emergency Wetlands Resources Act of 1986)

“... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 U.S.C. §§ 742f(a)(4) (Fish and Wildlife Act of 1956)

“... 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 ...” 16 U.S.C. §§ 742f(b)(1) (Fish and Wildlife Act of 1956)

“... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” 16 U.S.C. §§ 715d (Migratory Bird Conservation Act)

“... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants ...” 16 U.S.C. §§ 1534 (Endangered Species Act of 1973)

Further refinements in the Refuge purposes can be found in the funding sources used to acquire land. Grants have been provided by: City of Sacramento, County of Sacramento, California Wildlife Conservation Board, California Environmental Enhancement Mitigation Fund, California Environmental License Plate Fund, Cigarette and Tobacco Product Surtax, Department of Transportation-TEA 21 Fund, CALFED Bay Delta Program, North American Wetlands Conservation Act, Land and Water Conservation Fund, Central Valley Project Improvement Act, National Fish and Wildlife Foundation, David and Lucille Packard Foundation, The Trust for Public Land and other private donations.

***Refuge Goals***

Goal 1. Conserve, enhance, restore, and manage Central Valley wetland, riparian, grassland and other native habitats to benefit their associated fish, wildlife, plants and special status species.

Goal 2. Conserve, enhance and restore high quality migrating, wintering and breeding habitat for migratory birds within the Sacramento San Joaquin Delta of the Central Valley.

Goal 3. Provide visitors with wildlife-dependent recreation, interpretation and education opportunities that foster an understanding of the Refuge’s unique wildlife and plant communities in an urban setting.

Goal 4. In cooperation with tribal representatives, identify and protect cultural resources on the Refuge and educate the public regarding Native American people and the history of the region.

## Chapter 2. Alternatives, Including the Proposed Action

### Introduction

This chapter describes three alternatives for managing the Refuge: Alternative A (No Action), Alternative B and Alternative C. These alternatives are described below. Figures 3 and 4 show a graphical representation of Refuge areas described in the alternatives. The Service's proposed action is Alternative B. Two of the three alternatives presented in this chapter are "action alternatives" that would involve a change in the current management of the Refuge. Under Alternative A, the No Action alternative, the Service would continue managing the Refuge as it currently does.

### Current Management

The primary management focus of the Refuge is providing habitat for migrating, wintering and nesting migratory and resident birds with an emphasis on waterbirds, and a variety of special status species by restoring and maintaining wetland, riparian woodland, grassland habitats and valuable agricultural lands.

Restoration and management of seasonal and permanent wetland habitats has been a major emphasis since the inception of the Refuge due to loss or conversion of this habitat in the Central Valley. The Refuge promotes water management regimes on managed wetland impoundments involving specific water draw down dates, spring irrigations and fall flood-up periods to produce quality habitat, primarily for wintering waterbirds. Seasonal wetlands are irrigated in summer to stimulate the growth of high quality waterfowl foods. Wetland vegetation is also manipulated periodically to maintain desired habitat conditions for feeding, loafing and breeding waterfowl, waterbirds and other birds. These manipulations can include mowing, prescribed burning, discing and noxious weed control. The Refuge works cooperatively with local and State agencies and private landowners throughout open water aquatic habitat in the Stone Lakes Basin to control mosquitoes and water hyacinth (*Eichhornia crassipes*), a non-native invasive aquatic plant.

Riparian restoration has included planting riparian trees, such as Fremont cottonwood (*Populus fremontii*), willow species (*Salix* sp.), box elder maple (*Acer negundo* var. *californicum*), valley oak (*Quercus lobata*) and associated understory shrubs and grasses and irrigating restoration areas on the Beach, North Stone, and South Stone Lake, and Headquarters units for three to five years to establish the plants.

Large scale grassland management such as on the North Stone Lake Unit, includes promoting remnant native grasslands through use of cattle grazing, small scale prescribed burns, and invasive weed control. Increased use by sandhill cranes (*Grus canadensis*), long billed curlews (*Numenius americanus*), white fronted geese (*Anser albifrons*), burrowing owls (*Athene cunicularia*), and other raptors has been recorded on the unit since the grazing program was implemented in 1999.

The Refuge cooperative farming program on the Headquarters Unit benefits a variety of migratory birds, including waterfowl, shorebirds, and sandhill cranes, that depend on small grains, alfalfa, tomatoes and invertebrates for a significant portion of their diet. The farming program maintains approximately 80 acres in corn, wheat, or grass to provide wildlife habitat and reduce weeds until the Service can implement expanded restoration plans.

Service staff, cooperators, and volunteers periodically conduct biological surveys and monitoring within a variety of Refuge habitat, including surveys of: (1) colonial nesting waterbirds; (2) mistnetting of landbirds (in cooperation with the Sacramento-Yolo Mosquito and Vector Control District); (3) nesting success and survival of song sparrows; (4) wintering

(October-May) waterfowl populations; (5) invasive weed mapping; and (6) range monitoring through surveys of residual dry matter.

For a complete description of the current management practices, please see “Current Management” in Chapter 3 of the CCP. Table 1 summarizes the alternatives analyzed in this environmental assessment.

### **Features Common to All Alternatives**

All of the alternatives contain some common features. These common features are presented in the following pages to reduce the length and redundancy of the individual alternative descriptions.

#### ***Mosquito Control***

In 1993, the Service and Sacramento-Yolo Mosquito and Vector Control District (SYMVCD) signed a Memorandum of Understanding (MOU). According to the MOU, both parties agreed to cooperate to limit production and harboring of mosquitoes on Refuge habitats. The Service, in cooperation with SYMVCD, manages wetlands and other habitats on the Refuge to discourage mosquitoes by: adopting wetland design features, managing water regimes, planting mosquitofish (*Gambusia affinis*), and applying larvicides or adulticides, as needed. In addition, the Service and SYMVCD collaborate on other mutually beneficial projects, such as landbird monitoring and water hyacinth control. The Service will continue to participate in ongoing studies of Refuge landbirds, related to mosquito borne viruses, in cooperation with SYMVCD. When considering the burgeoning population immediately down wind of the Refuge and the recent establishment of West Nile Virus in the Central Valley, it is essential that the Refuge and SYMVCD continue to build on their successful partnership.

#### ***Weed Control***

Since 1995, the Refuge has adopted an active aquatic and terrestrial weed management program in the Beach-Stone Lakes Basin, particularly as a founding member of the Stone Lakes Water Hyacinth Control Group and the Sacramento Weed Management Area. The Refuge and the Sacramento Regional County Sanitation District conduct treatments for control of water hyacinth (*Eichhornia crassipes*) under a Statewide National Pollution Discharge Elimination System (NPDES) General Permit (No. CAG990005) for discharge of aquatic pesticides. The Refuge and SRCSD utilize Reward (Diquat) and Aquamaster (glyphosphate) to control water hyacinth in the basin. Another aquatic species, Brazilian elodea (*Egeria densa*), is also abundant in waterways and may emerge as a management concern as opportunities for recreational boating are developed on the Refuge.

The Integrated Pest Management methods that the Refuge uses to control weeds include burning, mowing, discing and herbicide application. The Refuge uses Transline® (clopyralid), Telar® (chlorsulfuron), Roundup (glyphosphate), and 2, 4-D, to control the upland weeds such as yellow starthistle (*Centaurea solstitialis*) and perennial pepperweed (*Lepidium latifolium*). To date, the Refuge has found chemical control to be the most effective method of managing water hyacinth and perennial pepperweed. Stone Lakes NWR is a member of the Sacramento County Weed Abatement Team.

#### ***Riparian Habitat Maintenance/Restoration on North Stone Lake Unit***

Ongoing and planned improvements to the grazing program on the North Stone Lake Unit will continue under all alternatives and include developing alternative watering sources for the cattle in each pasture, bank stabilization along the SP Cut in the north irrigated pasture, invasive weed control, and continued monitoring of migratory bird responses.

**Table 1. Summary of Alternatives**

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
	<b>No Action/Current Management</b>	<b>Wetland, Riparian and Grassland Restoration with Facilitated Public Use</b>	<b>Restore to Natural Conditions with Self-Directed Public Use</b>
<b><i>HABITAT MANAGEMENT</i></b>			
<b>Riparian restoration and management</b>	<ul style="list-style-type: none"> <li>• 0 acres of riparian habitat restored</li> <li>• Maintain 360 acres of riparian and oak woodland habitat</li> <li>• 25 acres of riparian and oak woodland habitat actively restored</li> <li>N/A</li> <li>N/A</li> <li>N/A</li> <li>• Maintain existing fencing along SP Cut on the North Stone Lake Unit to exclude cattle from riparian areas</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A but:</li> <li>• Maintain 425 acres of riparian and oak woodland habitat</li> <li>• 65 acres of riparian and oak woodland habitat actively restored</li> <li>• 40 acres of riparian understory restored</li> <li>• Establish a native plant nursery at HQ office</li> <li>• Intensify control efforts for perennial pepperweed in riparian areas using a variety of methods</li> <li>• Maintain and expand fencing along SP Cut on the North Stone Lake Unit to exclude cattle from riparian areas</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A but:</li> <li>• Maintain 385 acres of riparian and oak woodland habitat</li> <li>• 65 acres allowed to restore through natural process restoration</li> <li>• 25 acres of riparian understory restored</li> <li>• No native plant nursery</li> <li>• Same as Alternative B</li> <li>• Same as Alternative A</li> </ul>
<b>Wetlands restoration and management</b>	<ul style="list-style-type: none"> <li>• 200 acres of wetland restored at Headquarters Unit</li> <li>• 452 acres of seasonal wetlands maintained</li> <li>• 136 acres of vernal pool seasonal wetlands manipulated to improve vegetation conditions</li> <li>• 715 acres of permanent wetlands managed to provide habitat for a variety of wetland dependent species</li> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> <li>• 452 acres of seasonal wetlands manipulated to improve vegetation conditions</li> <li>• Same as Alternative A</li> <li>• Same as Alternative A</li> <li>• 50 acres wetlands enhanced on Beach Lake Unit</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> <li>• 133 acres of seasonal wetlands manipulated to improve vegetation conditions</li> <li>• Same as Alternative A</li> <li>• Same as Alternative A</li> <li>• Same as Alternative B</li> </ul>
<b>Grassland restoration and management</b>	<ul style="list-style-type: none"> <li>• 1,900 acres of non-irrigated grassland maintained and enhanced</li> <li>• 0 percent high residual dry matter</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> <li>• 20 percent high residual dry matter</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> <li>• Same as Alternative B</li> </ul>

**Table 1. (continued)**

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
	<ul style="list-style-type: none"> <li>• Implement a long term grazing management plan developed in collaboration with range management experts</li> <li>• 0 acres planted to restore the native grassland community</li> </ul> <p>N/A</p>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> <li>• 30 acres planted to restore the native grassland community</li> <li>• Enhance and create habitat for burrowing owls by reintroducing ground squirrels to the North Stone Lake Unit and constructing and maintaining artificial burrows</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> <li>• Same as Alternative B</li> </ul> <p>N/A</p>
<b>Wet meadow/pasture management</b>	<ul style="list-style-type: none"> <li>• 460 acres of irrigated pasture/wet meadow maintained</li> </ul> <p>N/A</p> <p>N/A</p>	<ul style="list-style-type: none"> <li>• Same as Alternative A.</li> <li>• If feasible, sheet flood irrigated pastures to a depth of less than six inches every two weeks from November through March on the North Stone Lake Unit</li> <li>• Maintain grasslands by periodic disturbance (eg., mowing, grazing, burning, or discing)</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A.</li> <li>• Same as Alternative B</li> <li>• Same as Alternative B</li> </ul>
<b>Moist soil habitat management</b>	<ul style="list-style-type: none"> <li>• 529 acres of seasonal wetlands managed as moist soil habitat</li> <li>• Flood moist soil units early Sept – May</li> <li>• Stagger timing of drawdown starting in March</li> <li>• Irrigate 1-2 times from May – Aug to promote desired vegetation</li> <li>• Disc and/or mow 25-50% of units to stimulate plant growth and maintain equal ratio of open water to emergent vegetation</li> </ul> <p>N/A</p>	<ul style="list-style-type: none"> <li>• Same as Alternative A and:</li> <li>• Same as Alternative A.</li> <li>• Same as Alternative A.</li> <li>• Same as Alternative A</li> <li>• Same as Alternative A</li> <li>• Drawdown one permanent wetland in August to provide shorebird habitat and flood again in September with other wetlands</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A but:</li> <li>• Begin floodup concurrent with first rainfall after Sept. 1</li> <li>• Drawdown beginning in mid-March to mimic natural rainfall conditions</li> <li>• No irrigation from May - Aug</li> <li>• Same as Alternative A</li> <li>• Begin flooding seasonal wetlands concurrent with the first rainfall</li> </ul>

**Table 1. (continued)**

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
	N/A	<ul style="list-style-type: none"> <li>• Explore reverse cycle wetlands management on an experimental basis to benefit shorebirds</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
<b>Sandhill crane habitat management</b>	<ul style="list-style-type: none"> <li>• 2,500 acres of Refuge lands managed to support a population of 400 to 700 sandhill cranes</li> </ul>	<ul style="list-style-type: none"> <li>• 2,950 acres of Refuge lands managed to support a population of 400 to 700 sandhill cranes</li> </ul>	<ul style="list-style-type: none"> <li>• 2,700 acres of Refuge lands managed to support a population of 400 to 700 sandhill cranes</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Periodically sheet-flood irrigated pastures on North Stone Lake Unit in winter</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Maintain 40 to 60 acres of agriculture fields (eg., corn, winter wheat and other small grains) on the Headquarters Unit of the Refuge for foraging cranes</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative</li> </ul>
<b>Pest control</b>	<ul style="list-style-type: none"> <li>• Use integrated pest management techniques to control weeds</li> <li>• Continue cooperative water hyacinth control efforts</li> <li>• Continue using prescribed fire, where appropriate</li> <li>• Drawdown managed permanent wetlands every two to four years to control carp populations and improve germination of desirable wetland plants</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative</li> <li>• Survey for and control Brazilian elodea</li> <li>• Depending on restrictions, employ prescribed burns to reduce nonnative annual grasses and replicate the historical fire regime</li> <li>• Same as Alternative A</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> <li>• Same as Alternative B</li> <li>• Same as Alternative B</li> <li>• Same as Alternative A</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Cooperate with other entities to conduct weed control</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
<b>HYDROLOGY MANAGEMENT</b>			
<b>Water Quality</b>	<ul style="list-style-type: none"> <li>• Develop a long-term water quality monitoring plan</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A and:</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Within 10 years of CCP approval, work toward achieving the water quality supply standard set forth by the USEPA, CDFG and the RWQCB</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>

**Table 1. (continued)**

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
	N/A	<ul style="list-style-type: none"> <li>• Develop a water quality monitoring program to track contaminant concentrations, and water quality parameters resulting from current and future land use patterns around the Refuge within five years</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Develop strategies to educate local landowners, businesses, and neighborhood organizations within the watershed about nonpoint sources of pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Expand outreach and education effort to inform upstream urban residents and businesses about the sensitivity of downstream water uses</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
<b>Floodplain management</b>	<ul style="list-style-type: none"> <li>• Manage Refuge floodplain in a manner consistent with regional water quality objectives, as described in the EIS establishing the Refuge</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Develop Refuge levee and flood control channel maintenance program</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
<b>VISITOR USE</b>			
<b>Visitors</b>	<ul style="list-style-type: none"> <li>• 3,000 wildlife observation visits per year</li> </ul>	<ul style="list-style-type: none"> <li>• 10,500 wildlife observation visits per year</li> </ul>	<ul style="list-style-type: none"> <li>• 15,000 wildlife observation visits per year</li> </ul>
<b>Trails</b>	<ul style="list-style-type: none"> <li>• One trail</li> </ul>	<ul style="list-style-type: none"> <li>• 4.0 miles of foot trails open to the public 7 days a week with seasonal restrictions</li> </ul>	<ul style="list-style-type: none"> <li>• 6.0 miles of foot trails open to the public 7 days a week with seasonal restrictions</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• 2.0 miles of universally accessible trail to be constructed on the Headquarters Unit and named the Blue Heron Trails System</li> </ul>	<ul style="list-style-type: none"> <li>• 2.5 miles of universally accessible trail to be constructed on the Headquarters Unit and named the Blue Heron Trails System</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• 200 feet of boardwalk on Headquarters unit as part of the Blue Heron Trails System</li> </ul>	<ul style="list-style-type: none"> <li>• 140 feet of boardwalk on Headquarters unit as part of the Blue Heron Trails System</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• 40 vehicle parking capacity on Headquarters unit</li> </ul>	<ul style="list-style-type: none"> <li>• 40 vehicle parking capacity on Headquarters unit</li> </ul>

**Table 1. (continued)**

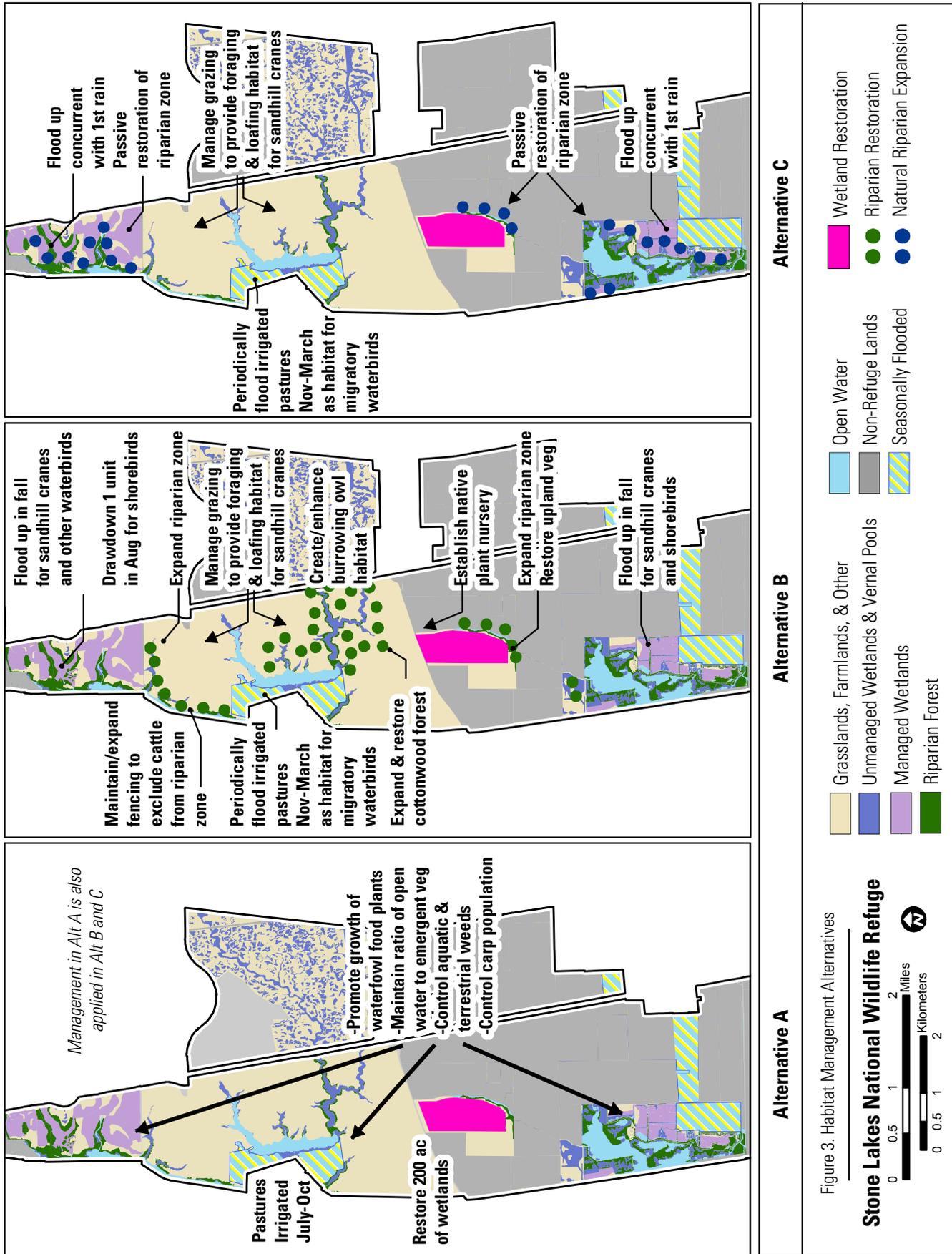
	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
	N/A	<ul style="list-style-type: none"> <li>• 1.5 miles of foot trails to be constructed on the South Stone Lake unit open to the public seven days a week with seasonal restrictions</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• 200 feet of boardwalk to be constructed on the South Stone Lake Unit open to the public seven days a week with seasonal restrictions</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Develop a boat-accessible haul-out site, walking trail, and viewing blind on the South Stone Lake Unit</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Provide parking and boat launch capacity for approximately 10 cartop boats on the Beach Lake unit</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Restrict land-based visitor use near habitat suitable for heron/egret rookeries, nesting Swainson’s hawks, and other areas used by nesting migratory birds during sensitive periods</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Minimize disturbance to sandhill crane habitats by restricting public access during October through March</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>• Reduce potential spread of invasive species by visitors by restricting access to paved or graveled trails</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
	N/A	N/A	<ul style="list-style-type: none"> <li>• Develop two mile trail system on Beach Lake and North Stone Lake tracts to be open to the public seven days a week, with seasonal closures, and improve associated parking</li> </ul>
	N/A	N/A	<ul style="list-style-type: none"> <li>• Resolve access issues and develop a parking area for five to ten cars and walking trails on Lodi Gun Club</li> </ul>
<b>Hunting</b>	<ul style="list-style-type: none"> <li>• The 912-acre South Stone Lake Unit open to waterfowl hunting for up to 22 hunters, 2-3 days per week</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative A</li> </ul>

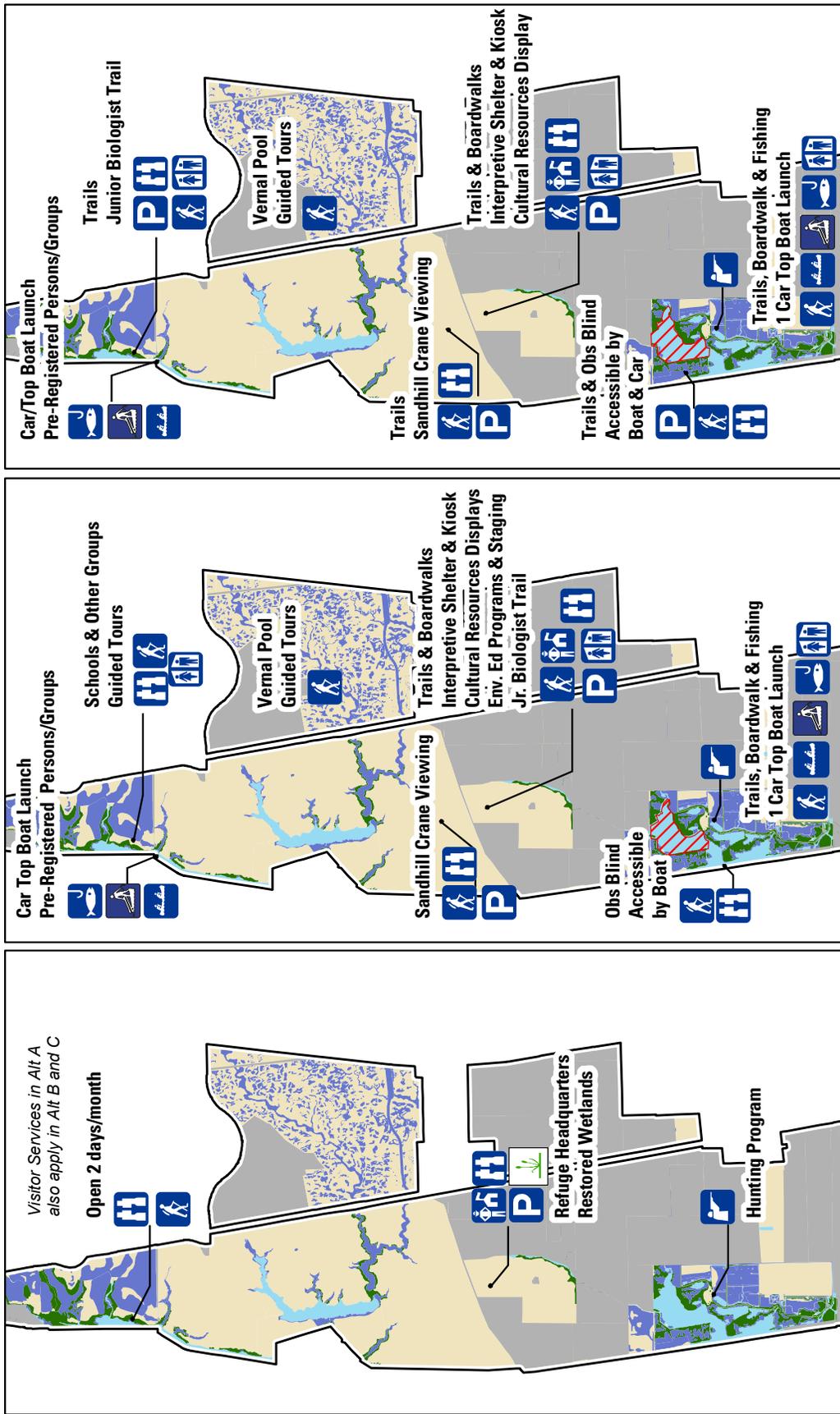
**Table 1. (continued)**

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
<b>Fishing</b>	<ul style="list-style-type: none"> <li>• No legal fishing</li> </ul> <p>N/A</p>	<ul style="list-style-type: none"> <li>• Within five years provide safe, boat-only fishing with day use parking facilities to accommodate approximately 20 boats on South Stone Lake and approximately ten boats on SP Cut from June through September</li> <li>• Fishing will be in accordance with all State regulations, will not include take of frogs or crayfish and will only be done with rod and reel</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> <li>• Same as Alternative B</li> </ul>
<b>Wildlife Viewing and Photography</b>	<p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p>	<ul style="list-style-type: none"> <li>• Minimum of two photography blinds to be constructed</li> <li>• Construct a viewing platform on the Headquarters Unit</li> <li>• Construct a vehicular access point, parking area for 15 cars, a trail and a wildlife observation platform on southern North Stone Lake Unit</li> <li>• Provide parking for approximately 20 cars at the boat launch on the South Stone Lake Unit</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> </ul>
<b>Environmental Education and Interpretation</b>	<p>N/A</p> <p>N/A</p> <p>N/A</p>	<ul style="list-style-type: none"> <li>• Develop a self-guided trail as part of the Blue Heron Trails System with hands-on learning stations within two years</li> <li>• Develop a class/group staging area and 5 open air interpretive shelters with one kiosk and exhibits as part of the Blue Heron Trails System to accommodate approximately 40 children</li> <li>• Develop interpretive displays on the Headquarters Unit to illustrate traditional dwellings, various subsistence strategies, and the overall lifestyle of local American Indians</li> </ul>	<ul style="list-style-type: none"> <li>• Same as Alternative B</li> <li>• Same as Alternative B</li> <li>• Same as Alternative B</li> </ul>

**Table 1. (continued)**

	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
	N/A	<ul style="list-style-type: none"> <li>Develop self-guided trail and interpretive displays for the Wetland Preserve Unit</li> </ul>	N/A
	N/A	N/A	<ul style="list-style-type: none"> <li>Develop interpretive panels and exhibits on South Stone Lake Unit</li> </ul>
<b>Boating</b>	<ul style="list-style-type: none"> <li>High speed boating occurs as a non-sanctioned use, but has been allowed to continue pending compatibility determination. High speed boats (waterskiers) launch from off the refuge and ski through the Refuge.</li> </ul>	<ul style="list-style-type: none"> <li>No-wake speed limit</li> </ul>	<ul style="list-style-type: none"> <li>Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>Develop and maintain a safe public parking lot and boat launch facilities to accommodate approximately 20 cartop boats on the South Stone Lake Unit</li> </ul>	<ul style="list-style-type: none"> <li>Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>Provide a launch for pre-registered canoe/kayak groups in SP Cut on the Beach Lake Unit from June through September</li> </ul>	<ul style="list-style-type: none"> <li>Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>Restrict water-based visitor use near habitat suitable for heron/egret rookeries and Swainson's hawks during sensitive periods</li> </ul>	<ul style="list-style-type: none"> <li>Same as Alternative B</li> </ul>
	N/A	<ul style="list-style-type: none"> <li>Develop facilities for mobility impaired persons to enter and exit canoes and kayaks</li> </ul>	<ul style="list-style-type: none"> <li>Same as Alternative B</li> </ul>
<b>Cultural resources management</b>	<ul style="list-style-type: none"> <li>Develop additional measures to protect, stabilize and/or remediate past damages if necessary</li> <li>Meet annually with the Ione Band of Miwok Indians and other concerned tribal groups to discuss land management and restoration activities planned for the upcoming field season</li> </ul>	<ul style="list-style-type: none"> <li>Same as Alternative A and:</li> <li>Within 15 years evaluate conditions of known cultural resource sites on Refuge managed lands and conduct seasonal monitoring of known sites</li> <li>Develop a minimum of two interpretive panels and exhibits to be located on various units to share with the public the importance of cultural resources on the Refuge and American Indian cultural practices</li> </ul>	<ul style="list-style-type: none"> <li>Same as Alternative B</li> <li>Same as Alternative B</li> <li>Same as Alternative B</li> </ul>





### ***Vernal Pool Management***

Vernal pools are present on the North Stone Lake and Wetland Preserve units. The Wetland Preserve Unit contains the highest concentration of vernal pools (98 percent of all Refuge vernal pools) that harbor the Federally-listed vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardii*) and many vernal pool plant and animal species of concern (USFWS 2005). Only 12 percent of the vernal pools located on the Refuge are naturally occurring. The majority have been created over the last 15 years as mitigation for vernal pool losses elsewhere.

### ***Hunting***

Through a separate planning process from the Refuge CCP, the Service has implemented a waterfowl hunting program on the Refuge that will remain in effect under all Alternatives. Currently, the program is offered two days per week on the South Stone Lake Unit and consists of seven spaced blinds, with an emphasis on youth and handicap hunters. Over the next five years, the program will expand to provide hunting opportunities for up to 22 hunters. Hunting occurs currently only on the Sun River property of the South Stone Lake Unit but as more resources become available for the Refuge, the program will expand to include more of South Stone Lake. The Service currently emphasizes youth hunting by reserving at least two blinds for youth hunters and by providing two youth hunts before and after the waterfowl season in accordance with State regulations. Currently, the entire program is operated by the Refuge but the California Department of Fish and Game may assume a more active role, in cooperation with the Service, as hunting expands.

### ***Boating***

A number of private landowners with property adjacent to the Refuge have allowed access to waterways in the Stone Lakes Basin for a variety of different boating activities (e.g., waterskiing, fishing, waterfowl hunting). The Service has allowed boating to continue on Refuge waters within the Beach Lake and North Stone Lake units pending finalization of compatibility determinations for visitor uses. Under all alternatives, the Service will continue to allow some boating on the Refuge.

### ***Cultural Resources***

To preserve and minimize disturbance to Refuge archaeological and historic resources, all undertakings, including but not limited to ground disturbance and prescribed burns, will be coordinated with the Service's Regional Archaeologist. In consultation with the State Historic Preservation Office and local tribal representatives, the Service will ensure that Refuge activities comply with all relevant cultural resource protection laws, including Section 10 of the National Historic Preservation Act and the Native American Graves Protection and Repatriation Act. Any cultural resources overviews or site surveys for properties or monitoring of ground disturbing activities will be conducted by qualified professional archaeologists. The Refuge will continue to consult regularly with the Ione Band of Miwok Indians and other concerned tribal organizations on management and restoration projects, as well as plant-gathering activities and interpretive projects.

## **Alternatives Removed From Further Consideration**

### ***Auto Tour Route on North Stone Lake Unit and Associated Trails***

The Service considered creating an automobile tour route and associated walking trails on the North Stone Lake Unit. Developing an auto tour route was rejected because since the entire unit lies within the 100-year floodplain, accommodating vehicle traffic would necessitate construction of new roads involving major grading and gravel placement on a unit where preservation of natural topography and hydrology and native grass communities are management priorities. Furthermore, greater sandhill cranes (*Grus canadensis tabida*) and white-fronted geese use the area for foraging during winter and are highly sensitive

to automobile and pedestrian traffic. An auto tour route would also further fragment the, already limited crane habitat on the Refuge. Walking trails and a viewing platform on the North Stone Lake Unit are still components of the alternatives considered in this CCP.

### ***Equestrian Use***

After receiving inquiries from selected members of the public, the Service evaluated accommodation of equestrian use on the Refuge. However, this is considered a non-wildlife-dependent use and there are no trails suitable for riding that would not conflict with other priority visitor uses. Moreover, there are no adequate parking facilities for horse trailers and the Service determined that the limited parking areas available should be primarily for priority visitor uses such as wildlife observation and fishing that do not require trailers. Horses traveling through the Refuge may be a source for the introduction and spread of exotic and invasive plants. Many trails are primarily on levees and use by horses, particularly after precipitation, could accelerate the erosion of these levees. Other nearby areas have more extensive horse trails and are better able to accommodate horse use. These areas include the American River Parkway and Auburn State Recreation Area.

### ***Upland Game and Deer Hunting***

Refuge Staff considered the inclusion of upland game and deer hunting in formulating the alternatives. However, since such a program would be limited to land that the Service owns in fee (1,740 acres in four isolated areas; only two of which support upland habitat), not enough acreage is in Refuge ownership to provide quality, safe upland game or deer hunting with a reasonable chance of hunter success. If additional lands are added to the Refuge, upland game and deer hunting could be reconsidered.

### ***Fishing Derbies***

Some of the public suggested the Service consider fishing derbies on the South Stone Lake Unit. Fishing derbies typically involve fast moving, gas powered boats that conflict with other non-motorized boats, such as canoes or kayaks, used for wildlife observation. Furthermore, South Stone Lake is a small body of water with underwater hazards and dense, submerged vegetation and is too small for a quality fish derby. Other nearby locations, such as reservoirs, are better suited for this activity.

## **Alternative A: No Action**

Under this alternative, the Service would continue to manage Stone Lakes Refuge as it has in the recent past. Management would be consistent with the “Current Management” section in Chapter 3 of the CCP. Current staffing and funding needs would remain the same.

### ***Habitat Restoration***

Under this alternative, the 330-acre Headquarters Unit would be restored primarily to wetland habitat (200 acres), with 50 acres of native grassland habitat and 80 acres of farmed land.

### ***Migratory Birds***

Flood up, drawdown and summer irrigations will continue to be scheduled to provide habitat for migrating, wintering and breeding birds. These actions will occur on 840 acres of wetlands, 360 acres of riparian habitat, 3,320 acres of grassland habitat, 400 acres of open water/aquatic bed habitat, 460 acres of irrigated pasture and 305 acres of cropland. Seasonal wetlands will be managed to provide feeding and loafing habitat for wintering migratory waterbirds. Water would continue to be carefully managed to produce food and to create habitat for nesting waterbirds. The Service would continue to maintain water through most of the summer in permanent wetlands to provide rearing habitat for waterbirds and year-round habitat for other species, such as bitterns, herons and marsh wrens (*Cistothorus*

*palustris*). Drawdowns will continue to vary to stimulate production of a variety of plants and to provide habitat for nesting shorebirds. Wildlife friendly farming practices would be continued to supply grain and other forage for birds on about 320 acres.

### **Monitoring**

The Service would continue its ongoing monitoring programs, including colonial waterbird nesting, landbird, song sparrow, weekly waterfowl, plant, noxious weed and residual dry matter (dry grass remaining after the growing season) surveys.

### **Special Status Species**

**Sandhill crane.** Under this alternative, the Service would continue to manage the Refuge to benefit sandhill cranes by managing 460 acres of irrigated pasture, 540 acres of seasonally flooded wetlands, 305 acres of cropland, and 3,320 acres of grassland habitat.

**Swainson's hawk.** The Refuge would continue to provide breeding and foraging habitat for Swainson's hawks (*Buteo swainsoni*). However, there would be no increase in these habitats since no additional acres of riparian, grassland, or wetland habitat would be restored.

**Valley elderberry longhorn beetle (VELB).** Although there are no documented occurrences of the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*, VELB) on the Refuge, suitable VELB habitat is present on the Refuge. All existing elderberry shrubs (*Sambucus* sp.), the host plant for the VELB, are mapped. Shrubs that may be affected by the water hyacinth control program are monitored during the water hyacinth control season to minimize disturbance during water hyacinth control operations.

**Giant garter snake.** The most recent documented occurrence of the giant garter snake (*Thamnophis gigas*) on the Refuge was in 1992 at Beach Lake. Recent surveys have not located any, although the snake is presumed to be present on the Refuge. Aside from avoidance, no specific measures have been taken to manage for the snake.

### **Wetland, Grassland, Riparian Habitats**

Wetlands would continue to be managed for the benefit of migratory birds. Wetlands (moist soil units) would be flooded from September to May for the benefit of migratory waterbirds. Grassland habitat would continue to be mowed and grazed. Grazing would occur on about 1,900 acres of the Refuge on the North Stone Lake Unit. No attempts to restore native grassland would be pursued. The Service would continue to allow researchers to conduct research on the Refuge but would not actively encourage or support research.

The Service would continue to manage the existing riparian habitat and would continue, sporadically, to plant riparian vegetation up to one mile from the edge of the SP Cut and adjacent to lakes on the Refuge where soils are appropriate and as time and funding allow. Little or no active riparian restoration would occur.

### **New Lands**

Additional lands within the approved Refuge boundary that come under Refuge management would be evaluated and either maintained in agriculture beneficial to wildlife or developed into natural habitats, such as wetlands, grasslands and riparian areas, depending on site-specific conditions.

### **Visitor Services**

Under alternative A, the Refuge visitor services program would continue as described under "Visitor Services" in Chapter 3 of the CCP. The Refuge would continue its current

wildlife observation and photography program, limited to two Refuge tour days per month. Environmental education would not change on the Refuge. Twenty-five groups would continue to visit the Refuge at their current level, with a limited number of presentations by Refuge staff at schools, public service and conservation group meetings. The Refuge would continue to host Walk on the Wildside, an annual special event held on the Refuge. The Refuge would continue to offer a waterfowl hunting program on the South Stone Lake Unit. Sixteen hunters would be accommodated two days a week. Under this alternative, an emphasis would be placed on youth and disabled hunters. In addition to blinds reserved for youth and disabled hunters, the Refuge would hold two youth hunts before the hunting season and two after the season.

## **Alternative B**

Alternative B is the preferred alternative because it meets the criteria described in the Proposed Action Criteria section at the end of this chapter. Under Alternative B, the Refuge would continue its current focus of providing wintering habitat for migratory birds and management for the benefit of special status species. Management programs for migratory birds and other Central Valley wildlife would be expanded and improved, as described below. Visitor use opportunities would also be expanded as described below.

### ***Habitat Restoration***

Alternative B would include the same elements as Alternative A. The Service would also restore Refuge lands based on the habitat requirements of migratory birds and special status species, which includes 65 acres of riparian habitat, 40 acres of wetland habitat and 30 acres of native grassland habitat.

### ***Migratory Birds***

Alternative B would include the same elements as Alternative A. Additional riparian and seasonal and permanent wetlands would be restored. Measures would be implemented to increase the food supply and provide additional migratory bird habitat, such as sheet flooding irrigated pastures, habitat manipulations, grazing to promote native grasses and forbs and exploring reverse-cycle wetland regimes. Reverse-cycle wetlands are flooded during the spring/summer and are dry during the fall/winter. Additional coordination is planned with other agencies and nongovernmental organizations under Alternative B. Visitor use would be restricted during heron and Swainson's hawk nesting and sandhill crane roosting. A portion of South Stone Lake would also be closed to boating seasonally to protect nesting waterbirds and giant garter snake habitat.

### ***Monitoring***

Under this alternative, monitoring would be the same as for alternative A. In addition, the Service would monitor wetland, riparian and oak woodland habitats each spring for invasive species, such as cocklebur, yellow starthistle and perennial pepperweed. The Service would develop a Refuge water-quality monitoring program, expand migratory bird monitoring and develop surveys on the South Stone Lake, Headquarters, Wetlands Preserve units and other lands as they come under Refuge management.

The Service would continue to collaborate with Sacramento-Yolo Mosquito Vector Control District (SYMVCD) on the ongoing landbird monitoring program and pursue funding for a seasonal employee or graduate students to assist with the banding program and data analysis to assess population trends and assist with developing associated habitat restoration and management plans. This expansion is not included in Alternative C.

### ***Special Status Species***

**Sandhill crane.** Under this alternative, the Service would continue to manage for cranes as in Alternative A. In addition, there would be an increase of 80 acres of foraging and resting habitat with 50 acres of wetland and 30 acres of native grasslands habitat restored. In addition, when possible, Refuge staff would begin flooding moist soil units in early September to provide shallow water for cranes earlier in the season.

**Swainson's hawk.** Under this alternative, there would be an increase in 65 acres of breeding habitat since 65 additional acres of riparian habitat would be restored. In addition, 30 acres of native grassland would be restored, adding to existing foraging habitat.

**Valley elderberry longhorn beetle (VELB).** The Refuge would continue to map and monitor elderberry shrubs as in Alternative A. In addition, the Service would restore 40 acres of riparian understory, to include elderberry shrubs, which would benefit the VELB.

**Giant garter snake.** Same as Alternative A.

### ***Wetland, Grassland, and Riparian Habitats***

Wetland habitat would be expanded on 50 acres of the South Stone Lake Unit. The Service would use the same tools and techniques to manage wetland units under Alternative B as it does under Alternative A. However, some fields would be flooded in early September to provide habitat for cranes earlier in the year. Under Alternative B, seasonal marsh management activities would be the same as described under Alternative A. In addition, one permanent wetland unit would be drawn down in August to provide habitat for migrating shorebirds. Vernal pools on the Wetland Preserve Unit would be grazed.

Portions of the Beach Lake, North Stone Lake, and South Stone Lake units would be closed as a sanctuary. The Lewis property of the Beach lake Unit and the Wetland Preserve and portions of the Headquarters units would be subject to seasonal closure to provide wildlife sanctuaries.

Grassland habitat would be restored on 30 acres. For this alternative only, burrowing owl habitat would be improved by reintroducing ground squirrels (*Spermophilus beecheyi*) and constructing artificial burrows. Irrigated pasture would be grazed from July through October to promote native grasses and forbs and shortgrass conditions.

Riparian habitat would be expanded along lower Morrison Creek on the Beach Lake Unit, the south arm of North Stone Lake and the Sacramento drainage canal and South Stone Lake on the Headquarters and South Stone Lake units. In addition, riparian habitat would be managed for a variety of different successional stages for the benefit of neotropical migrants, colonial nesting birds and raptors.

### ***New Lands.***

Same as alternative A.

### ***Visitor Services***

Visitor Services would be improved and expanded under alternative B. For example, the number of units open to visitors would increase from one to five. In addition, environmental education, interpretation, wildlife observation, wildlife photography, hunting and fishing programs would be expanded, as described below. Visitor Services would be offered on the South Stone Lake, Headquarters, Beach Lake, Wetland Preserve and North Stone Lake units. The South Stone Lake, Headquarters, and a portion of North Stone Lake units would be open to visitors seven days a week from sunrise until sundown.

Visitor services would be concentrated south of Hood-Franklin Road at the Headquarters and South Stone Lake Units. A trail system with boardwalks, interpretive displays, parking for 40 cars and an environmental education center would be constructed on the Headquarters Unit. A trail system and observation platform overlooking South Stone Lake would be constructed. The environmental education and interpretive programs would be facilitated by Refuge staff or volunteers.

A boat launching area would be provided on the Sun River property of the South Stone Lake Unit for fishing, wildlife observation and photography from boats. Only non-motorized, hand-launched boats (e.g., canoes, kayaks) or non-trailer boats with electric motors would be allowed. A no-wake zone with boat speeds of less than five mph will be enforced for all Refuge waters. All fishing would be from boats only. A boat haul-out site would be constructed on the Lodi Unit upstream from Sun River. Non-motorized boating by pre-registered groups, including commercial outfitters who engage in fishing, and wildlife observation, would also be allowed on SP Cut on the Beach Lake and North Stone Lake units at the west end of Elliott Ranch Road.

Safe access to the North Stone Lake Unit would be constructed to a parking area for 25 cars on the north side of Hood-Franklin Road. A short trail would lead to an observation platform overlooking North Stone Lake to provide visitors an opportunity to view sandhill cranes and other wildlife. Schools and other groups would use the Beach Lake Unit for guided tours only.

The Wetland Preserve Unit would be open to the visitors for guided tours and via a self-guided trail.

The volunteer and outreach programs would expand and become more defined.

The hunt program would be the same as alternative A.

Other major new visitor services projects under this alternative include: developing new interpretive signs, displays and interpretive brochures for the Wetland Preserve and Headquarters units; and constructing and making accessible on a daily basis, a kiosk, boardwalk, and four miles of walking trails on the Headquarters Unit; and constructing two photo blinds and additional hunting blinds on the South Stone Lake Unit.

## **Alternative C**

Under this alternative, the Service would continue to focus on providing wintering habitat for migratory birds and managing for endangered species while placing a greater emphasis on historic conditions in management and habitat restoration activities as described below. Opportunities for the six priority public uses would be expanded from both alternatives A and B.

### ***Habitat Restoration***

Management of newly acquired Refuge lands would focus on the restoration of historic native plant communities rather than maintaining lands in agriculture or constructing wetlands. Under this alternative, 40 acres of riparian, 25 acres of understory shrub, 50 acres of wetland and 30 acres of native grassland habitat would be restored.

### ***Migratory Birds***

Alternative C would be similar to alternative B, however, more emphasis would be placed on restoration of natural conditions. Riparian restoration would be accomplished by natural process restoration. Flood up would not occur in early September as in alternatives A and B, but would begin with the first rainfall.

### ***Monitoring***

Same as Alternative B, except that there would be no expansion of the SYMVCD monitoring.

### ***Special Status Species***

**Sandhill crane.** Same as alternative B.

**Swainson's hawk.** Same as alternative B, except that restored breeding habitat would be increased by 40, rather than 65, acres. Restored foraging habitat would remain the same as in Alternative B.

**Valley elderberry longhorn beetle (VELB).** Same as alternative B, except with fewer acres of riparian understory shrubs planted. In alternative B, 40 acres of shrubs would be restored; under alternative C shrub habitat would increase naturally by approximately 25 acres.

**Giant garter snake.** Same as Alternative A.

### ***Wetland, Grassland, Riparian Habitats***

Grassland and wetland habitat will be restored as in alternative B. Although seasonal wetlands would still be managed to provide feeding and loafing habitat for waterbirds, they would not be managed as intensely as the moist soil units in alternatives A and B. In addition, flood-up for seasonal wetlands would begin with the first rainfall in fall rather than beginning in early September.

Riparian habitat restoration would be through natural process-based restoration only. Vegetation would not be planted, but would be allowed to expand naturally. In addition, the Service would allow riparian habitat to expand naturally into managed seasonal and permanent wetland units.

### ***New Lands***

Under this alternative, new lands brought under the protection of the Refuge System would be restored to historic conditions, where feasible. Restoring new lands to natural historic conditions would probably result in restoration of grassland habitat and to a lesser extent, wetland and riparian habitats. By contrast, alternatives A and B would likely result in more wetland habitat than grassland habitat.

### ***Visitor Services***

Under this alternative, visitor service facilities would be expanded as in alternative B. In addition, the Beach Lake Unit would be open to visitors seven days a week from sunrise to sunset, subject to seasonal closure.

Visitor Services provided at the Headquarters Unit would be similar. However, the environmental education and interpretive programs would de-emphasize programs facilitated by Refuge staff or volunteers and tours would be self-guided.

Visitor services for the South Stone Lake Unit would be similar to those offered in Alternative B. In addition to the facilities for South Stone Lake described in Alternative B, the Service would create vehicle access to a parking area for up to ten cars. The parking area would be connected to the trail system.

Visitor services for the north side of Hood-Franklin Road would be the same as Alternative B.

In addition to the guided tours and canoe and kayak groups described in Alternative B, visitor services concentrated in the Beach Lake Unit would include environmental education, interpretation, wildlife observation and photography. The parking area near the corral on the North Stone Lake Unit would be improved and include restrooms, trails, interpretive displays, and an environmental education kiosk.

Visitor services for the Wetland Preserve Unit would be the same as alternative B.

The hunt program would be the same as alternative A.

The volunteer and outreach programs would be the same as alternative B.

### **Proposed Action Criteria**

The planning policy that implements the Improvement Act of 1997 requires the Service to select a preferred alternative that becomes its proposed action, as required by the NEPA. The written description of this proposed action is effectively the draft CCP. Alternative B is the proposed action for the Refuge because it best meets the following criteria:

- achieves the mission of the National Wildlife Refuge System;
- achieves the purposes of the Refuge;
- provides guidance for achieving the Refuge's 15 year vision and goals;
- maintains and restores the ecological integrity of the habitats and populations on the Refuge;
- addresses the important issues identified during the scoping process;
- addresses the legal mandates of the Service and the Refuge; and
- is consistent with the scientific principles of sound fish and wildlife management and endangered species recovery.

The proposed action described in this EA is preliminary. The action ultimately selected and described in the final CCP will be determined, in part, by the comments received on this version of the EA. The proposed action presented in the final CCP may or may not be the preferred alternative presented in this version. The final CCP may propose a modification of one of the alternatives presented here or a combination of elements from more than one alternative. Alternative B is the preferred alternative.

## **Chapter 3. Affected Environment**

Chapter 3 of the CCP provides a detailed description of the affected environment for Stone Lakes National Wildlife Refuge.

# Chapter 4. Environmental Consequences

## Overview of the NEPA Analysis Parameters

This chapter describes the direct, indirect and cumulative impacts of the three alternatives. The purpose of this analysis is to provide the context and intensity of the impacts of each action, such that a determination of significance can be made by the deciding official.

In 1978, the Council on Environmental Quality promulgated regulations for implementing the NEPA. These regulations include a definition of significantly as used in the NEPA (40 CFR 1508.27). The elements of this definition are critical to reducing paperwork through use of a Finding of No Significant Impact (FONSI) when an action will not have a significant effect on the human environment and is therefore exempt from requirements to prepare an environmental impact statement (EIS). Human environment is a comprehensive phrase that includes the physical and natural environments and the relationship of people with those environments. Many of the analyses focus on the different resource areas such as soils, air quality, water quality, plant communities, wildlife, visitor services and others. It is important to note that for each of these criteria all of these resources, or human environments, have been considered.

The significance of an action must be analyzed in several contexts, such as the whole of society; affected region; affected interests and locality. Significance varies with the setting. In the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

The regional context of the action alternatives is the Beach–Stone Lakes Basin. Even in a local context, the action alternatives would not pose significant short- or long-term effects. The action alternatives are designed to minimize and avoid adverse impacts to the extent that such impacts are less than significant, even at the local level.

Alternative A, the No Action Alternative, is a continuation of current management practices; it serves as the baseline against which Alternatives B and C are compared. Discussion of the action alternatives, Alternatives B and C, follow each discussion of No Action.

## Soils

**Common to all Alternatives.** Under all alternatives the Refuge would continue to use, Service-approved aquatic herbicides, such as Aquamaster and Remedy and terrestrial herbicides such as Roundup and 2, 4-D, for weed control. Glyphosate, the active ingredient in Aquamaster and Roundup, is considered nonmobile in soils and sediments because it rapidly and strongly adheres to soil particles and degrades in the soil. Glyphosate is moderately persistent in the soil, with an estimated half-life of 47 days. Glyphosate has no known effect on soil microorganisms. The World Health Organization (1984) concluded that 2, 4-D does not accumulate or persist in the environment. The primary degradation mechanism is microbial metabolism, but mineralization and possibly photolysis may also play a role. The average half-life of 2, 4-D is ten days (Tu, M. et al 2001).

**Alternative A.** Under Alternative A, the Service would complete construction of wetlands and grasslands on the Headquarters Unit and would redesign the Headquarters entrance; as described in a previous draft environmental assessment (EA), issued March 4, 2005. Construction activities could result in large areas of bare soil that could be subject to erosion. Erosion is expected to be minor and localized because construction will occur only during the dry season, the terrain is flat and the Refuge will employ dust control measures.

**Alternative B.** In addition to the potential soil impacts related to construction on the Headquarters Unit, Alternative B could also result in similar impacts due to restoration activities, including restoration or enhancement of 105 acres of riparian and oak woodland habitat, 30 acres of grasslands and 50 acres of wetlands. Developing visitor facilities on the South Stone Lake, Headquarters, North Stone Lake, Beach Lake and Wetland Preserve Units could result in impacts, as well. These impacts are expected to be minor and localized for the same reasons described above. Additional short-term disturbance would result from mechanical removal of nonnative weeds from the seasonal marsh, riparian and upland habitats.

**Alternative C.** In addition to the soil impacts described under Alternative B, Alternative C also includes other Refuge improvements that could result in the same type of impacts. These improvements include natural process-based restoration of 65 acres of riparian habitat in addition to the same construction, weed removal and wetland and grassland restoration as in Alternative B.

### **Water Quantity and Quality**

Common to all Alternatives. Under all alternatives, the conversion of 200 acres of former agricultural lands on the Headquarters Unit to wetlands would add to the region's floodwater storage capacity and help maintain water quality by trapping sediments and removing some excess nutrients.

**Alternative A.** No impacts on water quality or quantity are anticipated under Alternative A. Under all alternatives, glyphosate will be used in the form of Roundup and Aquamaster to control aquatic and terrestrial weeds. In most cases, glyphosate will dissipate rapidly from natural water bodies through adsorption to organic substances and inorganic clays, degradation and dilution (Folmar et al. 1979, Feng et al. 1990).

**Alternatives B and C.** Under Alternatives B and C, periodic flooding of irrigated pastures would begin earlier each fall, adding to groundwater recharge. The restoration and natural expansion of riparian vegetation would help to stabilize shorelines; this would reduce erosion and the resulting sediment loads in Refuge waters, improving water quality. The prohibition of gas-powered boats within the Refuge under Alternatives B and C would contribute to better water quality by removing a source of turbidity, potential petroleum leaks and inadvertently transported aquatic nuisance species. As new lands come under Refuge management and are either converted from agricultural uses or removed from urban development pressures, further benefits to water quality would accrue through reductions in erosion, sedimentation and nonpoint source pollution.

### **Air Quality**

**Alternative A.** Under all alternatives, soil disturbance and/or use of heavy equipment would cause short-term increases in dust (particulate matter less than 10 microns [PM10]) and tailpipe emissions of PM10, nitrogen oxide (NO<sub>x</sub>) and reactive organic gasses (ROG), including those activities associated with the restoration of wetland habitat on the Headquarters Unit. However, implementation of Alternative A (No Action Alternative) would not substantially increase pollutant emissions related to Refuge management in the long term. Since no increase in the level of visitor services is proposed, visitor use levels and vehicle trips to and from the Refuge are expected to increase only moderately as the population of the surrounding region grows.

**Alternatives B and C.** In addition to the short-term impacts to air quality from wetland restoration on the Headquarters Unit, under Alternatives B and C, there would be both short and long-term increases in pollutant emissions. Short-term increases in PM10 and

tailpipe PM<sub>10</sub>, NO<sub>x</sub> and ROG would result from restoring riparian habitat on the North Stone Lake, Headquarters, and South Stone Lake units and constructing trails, parking areas and observation platforms. Tailpipe emissions (ROG, NO<sub>x</sub>, and PM<sub>10</sub>) would result from the use of combustion engines in construction equipment and employee vehicles during trips to and from the job sites. Dust emissions and generation (PM<sub>10</sub>) would result from the excavation, transport and grading of large amounts of soil.

Long-term increases in emissions would result from the growing number of vehicular trips to, from and on the Refuge as visitation increases. This increase is expected to be similar under both action alternatives, at about 10,500 to 15,000 more visitors per year by 2012. However, there would be a slight decrease in emissions from gasoline powered boats since only non-motorized and electric motor boats would be allowed.

## **Plant Communities**

**Common to all Alternatives.** Discing, mowing, chemical treatments, and occasionally grazing would be periodically used to maintain cover of emergent vegetation in seasonal wetland impoundments at 45-55 percent of total wetland surface area. The Service would continue to use physical and chemical means to control undesirable plants such as cocklebur and joint grass. These same techniques would be used to manage vegetation in about 25 percent of the moist soil impoundments each year to reduce the cover of emergent vegetation and encourage the growth of annuals that provide food for waterfowl, maintaining an equal ratio of open water to emergent vegetation. The Service would continue to mow and graze grassland habitat to reduce the cover of non-native annual grasses and promote native species.

All applications of aquatic herbicides (e.g., glyphosphate, diquate dibromide) will be from properly calibrated and maintained ground or boat-mounted spray apparatus. In keeping with product labels, no applications will occur when wind speeds exceed 10 miles per hour. All applications will occur in compliance with best management practices identified in the Aquatic Pesticide Application Plan for the Statewide National Pollution Discharge Elimination System (NPDES) General Permit (No. CAG990005) for discharge of aquatic pesticides administered by the Central Valley Regional Water Quality Control Board.

**Alternative A.** Under Alternative A (no action), current vegetation management would continue unchanged. Wetlands would be flooded from early September through May for the benefit of migratory waterbirds and would continue to be mowed, grazed, disced and sprayed with pesticides. In addition, under all alternatives, the Service would maintain 360 acres of riparian and oak woodland habitat, 529 acres of moist soil seasonal wetlands, 136 acres of vernal pool seasonal wetlands, 715 acres of permanent wetlands, 460 acres of irrigated pasture/wet meadow and restore 25 acres of riparian habitat on the Headquarters Unit.

**Alternative B.** Alternative B would include the same vegetation management measures as described under Alternative A. In addition, the Service would increase the cover of native seasonal marsh plants on the Refuge by controlling nonnative weeds. In addition, the Service would restore 65 acres of riparian and oak woodland habitat, along the North Stone Lake, Headquarters and South Stone Lake units, as well as enhancing 40 acres of understory shrub and herbaceous vegetation in existing riparian areas. Planting riparian vegetation and restoring seasonal wetland and grassland habitat would have a beneficial effect on local and regional biodiversity because the vast majority of the historic riparian vegetation in the Central Valley has been lost or degraded. Under both Alternatives B and C, 30 acres would be planted to restore native grasslands throughout the Refuge. This would have a beneficial effect on the Refuge's vegetation because it would restore a larger diversity of the Refuge's native plant cover.

Enhancement and restoration of native grasslands, wetlands, and riparian habitats on the Refuge would not exacerbate threats of weed infestations to adjacent properties because Refuge staff and cooperators would continue to promote desirable vegetation and control invasive weeds as part of ongoing management programs. Some weed species of concern that will require ongoing control include: perennial pepperweed or whitetop, yellow star thistle, Johnson grass, and fennel or anise. Control of invasive weeds would be part of an integrated pest management program that would include physical (e.g., mowing, discing, grazing, and burning) and chemical (herbicide) treatments.

**Alternative C.** Impacts under Alternative C would be similar to those described under Alternative B, with a few differences. Riparian habitat expansion would be allowed to proceed through natural succession and volunteering by riparian woody species. There would be no active planting of riparian vegetation. However, riparian vegetation would be allowed to expand into wetland habitat on the Beach Lake and South Stone Lake units. Under Alternative C, the Service would restore 65 acres of riparian vegetation as under Alternative B. This would have a beneficial effect on the Refuge's vegetation because it would restore a larger diversity of the Refuge's native plant cover.

## **Wildlife**

**Common to all Alternatives.** Under all alternatives, the Service would continue to allow the Sacramento Yolo Mosquito Vector Control District (SYMVCD) to monitor and control mosquitoes on the Refuge. The typical monitoring and control period is March through October. The mosquito species identified by SYMVCD for monitoring and control at the Refuge are *Culex tarsalis*, *Anopheles freeborni*, *Aedes vexans*, *Aedes melanimon*, *Aedes nigromaculis*, and *Aedes increpitus*. The SYMVCD would use the biological larvicides *Bacillus thuringiensis israelensis* (Bti) and *Bacillus sphaericus* (Bsp) and the insect growth inhibitor methoprene. The bacterium Bti is a microbial insecticide that, when ingested, is toxic to mosquitoes, black flies and several other members of the Nematocera suborder within the order Diptera. Methoprene is an insect growth regulator that interferes with the normal maturation process of mosquitoes. In the event, adulticide applications become necessary, SYMVCD will utilize synthetic pyrethrins or the organophosphate Naled, applied from an ultra-low volume ground rig.

See Appendix L, Integrated Pest Management Plan for Mosquito-Associated Threats and Appendix A, Compatibility Determination, Use: Monitor and Control Mosquitoes, for detailed descriptions of mosquito control on the Refuge and the potential impacts to target and non-target organisms.

Under all alternatives, control of invasive weeds, particularly aquatic weeds such as water hyacinth, currently require the application of herbicides (i.e., Diquat dibromide and Glyphosate). Glyphosate has low acute toxicity, is not a carcinogen, does not adversely affect reproduction and development, and does not bioaccumulate (build up) in mammals (Monsanto 2001). When applied properly, Glyphosate is of relatively low toxicity to birds, mammals and fish (Evans and Batty 1986). However, amphibians may potentially be negatively affected by Glyphosate that enters aquatic systems (Smith 2001).

All alternatives identify herbicide use to control invasive terrestrial or aquatic weeds. Glyphosate and Diquat dibromide herbicides could have short-term negative effects on aquatic wildlife and waterbirds, but removal of invasive weeds favors native plants and ultimately improves the quality of wildlife habitat. Refuge staff will continue to comply with National Pollution Discharge Elimination System general permit protocols and best management practices for aquatic herbicide applications and water quality monitoring that were developed by the Central Valley Regional Water Quality Control Board to avoid

adverse effects on water quality and aquatic wildlife. Glyphosate, found in both Roundup® and Rodeo®, does not bioaccumulate in fish. The Rodeo® formulation is practically non-toxic to freshwater fish and aquatic invertebrates, while the Roundup® formulation is moderately to slightly toxic to freshwater fish and aquatic invertebrate animals. However, in laboratory studies, Roundup® has been shown to cause high rates of mortality to juvenile North American tadpoles (Relyea 2005). Clopyralid is of low toxicity to fish, aquatic invertebrate animals, birds, and mammals, is not toxic to bees and has very low acute mammalian toxicity. It does not bioaccumulate in fish. Triclopyr is low in toxicity to fish, does not bioaccumulate in fish, and is slightly toxic or nontoxic to invertebrates; however, it has not been tested for chronic effects in aquatic animals. Triclopyr is slightly toxic to mammals, however, in mammals, most triclopyr is excreted unchanged in urine. Triclopyr and its formulations have very low toxicity to birds and is nontoxic to bees. Sethoxydim is practically nontoxic to birds, has low toxicity to wildlife, and is nontoxic to bees. It is moderately to slightly toxic to aquatic species. Only herbicides that are approved for use near water, such as Rodeo®, Reward®, or Garlon 3a®, would be used on Refuge lands that are within 100 feet of surface waters. In addition, to prevent further water contamination and effects to aquatic species, the Refuge would not spray when wind velocities exceed five miles per hour, when vegetation is wet, or when precipitation is occurring or forecasted in the following 24 to 36 hours. Herbicide applications are not expected to significantly affect wildlife.

Some negative effects to reproductive success of late-nesting ground nesting birds, such as mallards (*Anas platyrhynchos*), and meadowlarks may occur during prescribed fires and mowing operations

**Alternative A.** Under Alternative A, current management of the Refuge would continue unchanged. The Refuge would continue to manage water for migratory waterfowl, shorebirds, water birds and other migratory birds. Grasslands and agricultural lands would continue to be managed to provide foraging and loafing habitat. Under this alternative, no new riparian or wetland habitat would be restored or created beyond the restoration of 25 acres of riparian habitat on the headquarters unit, but existing habitat would be maintained and fostered. Maintaining and fostering habitat would benefit the variety of wildlife that uses the Refuge, including birds of prey, songbirds, waterfowl and colonial nesting birds, such as egrets and herons as well as many species of mammals and reptiles..

Because visitor use is currently limited to bimonthly tour days and hunting for 16 hunters two days per week during waterfowl season, human disturbance to wildlife would be minimal under Alternative A. By contrast, Alternatives B and C both would increase visitor use and implement a recreational fishing program. Potential impacts of visitor use include: flushing of birds, disruption of feeding and roosting activity, reducing use of preferred habitat, and increasing bioenergetic demands (DeLong 2002).

**Alternative B.** Alternative B would result in mostly beneficial and some adverse impacts on wildlife. Recreational use of the Refuge is expected to increase dramatically under Alternative B. Most of these new users are expected to participate in wildlife observation. This growth in recreational use could adversely affect birds using the Refuge wetlands, resulting in flushing, disruption of feeding and roosting, increased demands on the birds' available energy and reduced use of preferred habitat (DeLong 2002).

Under Alternative B, visitor use facilities such as parking areas, kiosks, trails and new buildings would be developed. This could result in the temporary disturbance and/or displacement of wildlife due to construction activities. The riparian portion of the unit would not be directly affected by construction but wildlife would, nonetheless, experience

disruption because of the nearby construction activity. Once construction is completed, substantial numbers of waterfowl, shorebirds and other waterbirds would be expected to utilize the restored and enhanced wetlands of the Headquarters Unit.

Sixty-five acres of riparian vegetation would be restored throughout the Refuge, an additional 40 acres of riparian understory vegetation would be enhanced, 50 acres of wetlands near South Stone Lake would be enhanced and planting native grasses over 30 acres in various portions of the Refuge would begin. Once established, this new habitat would provide a long-term benefit to a variety of wildlife, including migratory songbirds and birds of prey. In addition, existing grassland habitat would be maintained through grazing, mowing and/or burning for the benefit of grassland dependent species. Riparian habitat would be further protected by further exclusion of cattle from riparian areas. Shorebirds would benefit from exploring reverse-cycle wetlands and by drawing down one permanent wetland until August to provide food. The Refuge would also enhance and create habitat for burrowing owls by reintroducing ground squirrels to the North Stone Lake and Wetland Preserve units and constructing artificial burrows, as needed.

Under Alternative B, the Refuge would be opened to fishing from non-motorized, hand-launched boats (e.g., canoes, kayaks) or non-trailer boats with electric motors only. A boat launching area would be provided on the Sun River property of the South Stone Lake Unit. Non-motorized boating by pre-registered groups, including commercial outfitters who engage in fishing, and wildlife observation, would also be allowed on SP Cut on the Beach Lake and North Stone Lake units at the west end of Elliott Ranch Road.

No native game fishes remain in Refuge waters but introduced game fish species are abundant, so the direct impact of recreational fishing on fish populations is not expected to be detrimental. Fishing may even benefit native fish species by reducing habitat competition from introduced species. Indirect effects of fishing and boating, such as disturbance to waterfowl, reptiles and amphibians, would be controlled by restricting shoreline fishing, by allowing access only during the summer before winter migrants have arrived and by providing sanctuary to species that are present during the summer.

**Alternative C.** Alternative C would result in primarily beneficial impacts on wildlife and few adverse impacts. The effects on wildlife under this alternative would be similar to those described under Alternative B, with the following exceptions.

Implementation of Alternative C would have similar effects on the Headquarters Unit as would Alternative B. Under this alternative, riparian vegetation would be allowed to expand naturally into managed wetland units. Though some riparian restoration along North Stone Lake would occur, no new riparian restoration would take place in the Sun River, Headquarters or Beach Lake units. The more limited and gradual increase in riparian habitat would still benefit wildlife over a longer period than under Alternative B. The reduction in wetland restoration and construction under Alternative C would result in reduced disturbance for wildlife. The effects on wildlife from the hunting and fishing programs are similar to Alternative B.

### **Special Status Species**

Suitable habitat exists on the Refuge for the federal ESA listed giant garter snake, valley elderberry longhorn beetle (VELB), vernal pool tadpole shrimp and fairy shrimp. Vernal pool tadpole and fairy shrimp are the only federal ESA listed species whose presence has been verified on the Refuge within the last 13 years. California Endangered Species Act listed species that inhabit the Refuge include greater sandhill crane and Swainson's hawk.

**Alternative A.** Under Alternative A, continuation of current management activities will have beneficial effects on special status species. The Service will continue to manage the Refuge to support sandhill cranes by providing irrigated pasture, seasonally flooded wetlands, grain crops and grasslands. Breeding and foraging habitat would also be provided for Swainson's hawks in the Refuge's riparian forests and grasslands. Though there are no documented occurrences of VELB on the Refuge, all existing elderberry shrubs are mapped and protected from herbicides intended to control invasive weeds.

**Alternative B.** No significant adverse effects on special status species are anticipated. Beneficial effects to special status species would result from expansion and enhancement of riparian, wetland and grassland habitats. However, increases in human disturbance due to the increased number of visitors may also occur. Human disturbance would most likely affect sandhill cranes and Swainson's hawks.

Swainson's hawks would benefit from increased riparian habitat under Alternative B, including the expansion of riparian vegetation along the North Stone Lake, Headquarters, South Stone Lake, and Beach Lake units and the Sacramento Drainage Canal. Access for recreational fishing allowed between June and September could affect nesting Swainson's hawks, because their nesting season typically lasts from mid-February through July. As a result, the Service will prohibit visitor access within a 0.25-mile radius of any occupied hawk nest until the young have fledged.

Under Alternative B, the Refuge would enhance habitat management for sandhill cranes by flooding earlier in the fall (mid-September) than under Alternative A, by periodically flooding irrigated pastures and by developing a grazing program near North Stone Lake to provide foraging and loafing habitat adjacent to roosting sites. The Refuge also plans to construct a new observation platform for viewing sandhill cranes north of Hood Franklin Road on the North Stone Lake Unit. Alternative B's net effect is expected to be beneficial for sandhill cranes because while visitor disturbance will increase, habitat will also increase and greater foraging opportunities will be available.

No impact to vernal pool species is anticipated under Alternative B. The majority of the vernal pools at the Refuge occur in the Wetland Preserve Unit. This area will be opened for guided tours and via a self-guided trail that will be routed to avoid impacts to wetlands. Therefore, visitor use is not expected to affect the vernal pool tadpole shrimp or fairy shrimp.

The VELB would benefit under Alternative B by planting early successional upland vegetation, including elderberry bushes, on the South Stone Lake Unit. Riparian and grassland restoration will also benefit the Swainson's hawk.

**Alternative C.** The effects of Alternative C on special status species are largely the same as in Alternative B except that less riparian habitat would be restored. The Refuge would continue its sandhill crane habitat management as in Alternative B. The natural expansion of riparian vegetation allowed under Alternative C would ultimately benefit Swainson's hawks.

## **Diseases and Toxins**

Common to all Alternatives. Under each alternative, the Service would continue current botulism control practices, including keeping all units dry between June 1 and August 1; patrolling historically problematic wetlands on the Refuges and in the surrounding areas in cooperation with the California Department of Fish and Game; and removing sick birds and carcasses from wetlands. As a result of these coordinated activities, the potential for an outbreak of botulism would be minimized.

Increased wetland habitat under Alternative B, increases the potential for breeding mosquitoes and hence, could lead to an incremental increase in the potential spread of mosquito-borne diseases. In accordance with their 1993 Memorandum of Understanding, Refuge staff will continue efforts to minimize mosquitoes in cooperation with SYMVCD through wetland design, efficient water management, vegetation manipulations through mowing, discing, and burning, biological control such as planting of mosquitofish, and applying larvicides and adulticides, as needed. See Appendix L, Integrated Pest Management Plan for Mosquito-Associated Threats for a detailed description of mosquito control on the Refuge.

Under all alternatives, the Service would continue to prohibit lead shot for waterfowl hunting as it has been Refuge system policy for over 15 years.

### **Cultural Resources**

Common to all Alternatives. Under all alternatives, including the No Action alternative, Refuge management activities have the potential to disturb cultural resources. To preserve Refuge archaeological and historic resources, all undertakings, including but not limited to ground disturbance and prescribed burns, will be coordinated with the Service's Regional Archaeologist. Under each alternative: a cultural resources overview would be prepared; baseline data on all cultural resource sites collected; an attempt made to locate and delineate all unrecorded cultural resource sites; appropriate buffers zones established to ensure their protection; and updated or new site records forwarded to the California North Central Information Center. Also, an attempt would be made to locate any human remains, covered under the Native American Grave Protection and Repatriation Act (NAGPRA) (25 USC 3001 et seq. or 43 CFR 10), removed in the past from within the Refuge boundary

When it is determined after consultation with the Service's Regional Archaeologist and local professional archaeologists, that a consultation with the State Historic Preservation Office (SHPO) under Section 10 of the National Historic Preservation Act is warranted for a planned undertaking, the Refuge will ensure that appropriate procedures to protect cultural resources and provide necessary mitigation are identified and implemented, in accordance with the Service Programmatic Agreement for cultural resources with the SHPO. All monitoring of ground-disturbance will be performed by a professional archaeologist who may request assistance from tribal representatives. The Refuge will provide copies of SHPO correspondence and monitoring reports to the Regional Archaeologist and any concerned tribal organizations.

A cultural resources survey may not be required if burning is proposed entirely within a flood zone, in a previously disced or plowed area, or if burning has been an ongoing practice on the site. However, cultural resources surveys will likely be necessary for all burns on upland sites, and for burns that require excavation (scraping, plowing, or discing) to establish a fire line. In some cases, it may be appropriate to conduct cultural resources survey work after a prescribed burn is completed, because the visibility of artifacts or other resources may be increased after burning and artifacts may be more vulnerable to vandalism or theft when exposed by burning.

As required by the NAGPRA, any construction or ground-disturbing activity with the potential to disturb human remains, burial objects, sacred objects, or objects of cultural patrimony will be planned and implemented in consultation with affected Tribes. If potentially significant artifacts are found during any activity, work will cease within 100 feet of the find and access will be restricted until a qualified archaeologist and members of local Tribes can assess the significance of the find and propose appropriate methods of treatment, as required by NAGPRA. If human remains are found during any activity, work will cease

within 100 feet of the find, access will be restricted and the Sacramento County Coroner will be informed of the discovery, as required under Public Resources Code Section 5050.5. If no investigation of the cause of death is required, remains will be treated in accordance with the requirements of NAGPRA.

With assistance from the Service's Regional Archaeologist and local professional archaeologists, the Refuge has identified the Ione Band of Miwok Indians as the nearest tribal organization with whom the Refuge should consult on management and restoration projects. As a result, the Refuge intends to meet with the tribal liaison at least annually to discuss any planned project that may result in ground disturbance of prehistoric or historic sites.

### **Visitor Services**

According to California State Department of Finance projections, the population of the Delta Region (Sacramento, Solano, Yolo, San Joaquin and Contra Costa Counties) is expected to grow by about 19 percent between 2005 and 2020. The State as a whole is expected to grow by 24 percent over the same period. In the western states, participation in hunting is predicted to decline by 21 percent in the period between 1995 and 2020. For example, statewide hunter use days declined in four out of five years, through 2004 (USFWS 2004). The trend for non-consumptive recreation shows an opposite trend. Participation in non-consumptive recreation is expected to increase by 37 percent over the same period (Cordell et al. 1999).

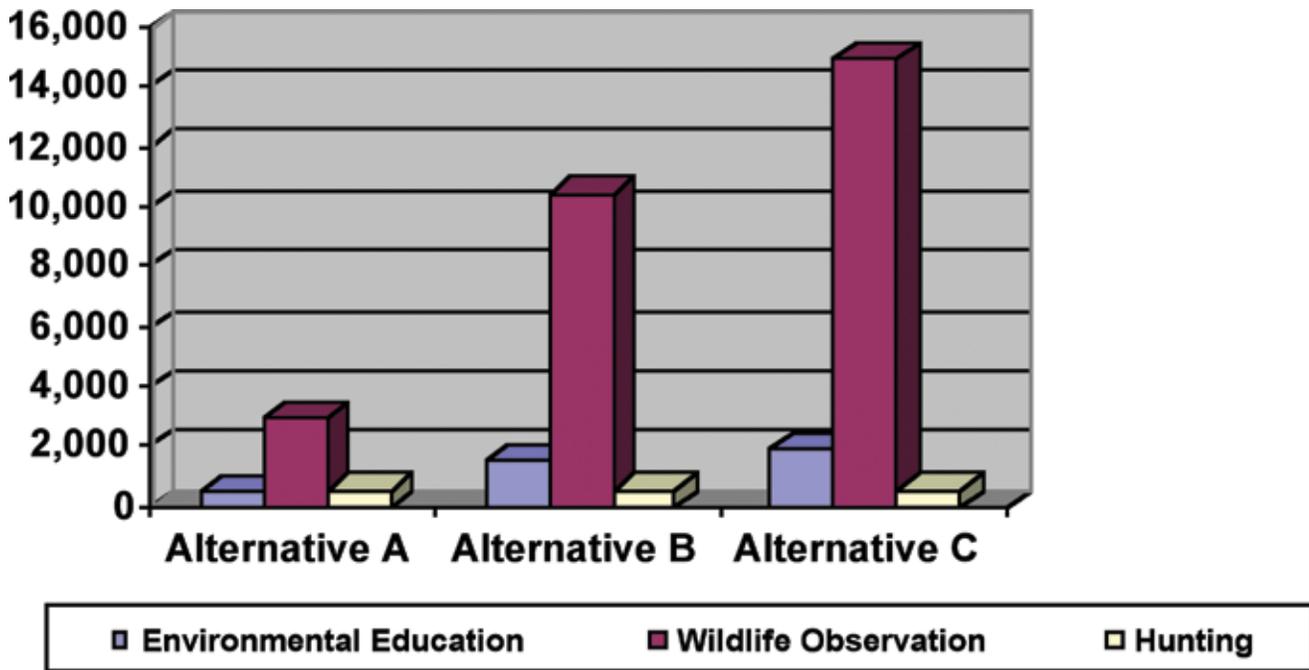
**Common to All Alternatives.** Under each alternative, hunting on the South Stone Lake Unit is expected to continue at 16 hunters per day, for two days per week throughout the hunt season, with two youth only hunts held both before and after the regular hunt season. Non-consumptive recreation will increase at a rate proportional to the predicted population growth for the five county Delta/Sacramento metropolitan region. Currently, Stone Lakes receives about 3,500 visits per year consisting of 3,000 wildlife observation visitors and 25 environmental education groups of 20 each.

**Alternative A.** Under the No Action alternative, the Refuge is expected to receive 4,200 visits annually by 2020. This projected increase in visitor use under the no action alternative serves as a baseline against which to compare the action alternatives. Figure 5 shows the current visitor use levels and predicted use levels under each alternative. Under the No Action alternative, the Service would maintain current Refuge visitor services and facilities. However, overall Refuge use is expected to increase as the population of the Sacramento metropolitan area and the rest of the State continues to grow over the next 15 years.

**Alternative B.** Visitor services would be improved and expanded under Alternative B. Volunteer opportunities would be expanded, including at least one comprehensive volunteer training per year. Opportunities for wildlife observations would expand to a capacity of 10,500 visits per year. Four miles of foot trails would be open to visitors seven days a week, with seasonal restrictions. Two miles of universally accessible trails would be constructed on the Headquarters Unit and named the Blue Heron Trails System. Two new photography blinds would be constructed, on the North Stone Lake and Headquarters Units. Two hundred feet of boardwalk, on the Headquarters Unit, would be constructed as part of the Blue Heron Trails System. One and one-half miles on foot trails would be constructed on the South Stone Lake Unit and would be open to visitors seven days a week, with seasonal restrictions. Two hundred feet of boardwalk would be constructed on the South Stone Lake Unit and would be open to visitors seven days a week, with seasonal restrictions. Parking facilities and a car top boat launch, for a maximum of ten cars, would be provided on the Beach Lake Unit. The number of supported environmental education groups would

expand to 80 per year. Two new interpretative programs would be developed within five years, including displays illustrating traditional dwelling and subsistence strategies on the Headquarter Unit.

Within five years the Refuge would provide safe, boat only fishing with day use parking facilities that could accommodate up to 20 boats per day. Refuge staff would expand community outreach and would expand the number of presentations given to schools, conservation groups and public service organizations.



*Figure 5. Current and Projected Visitation (15 years).*

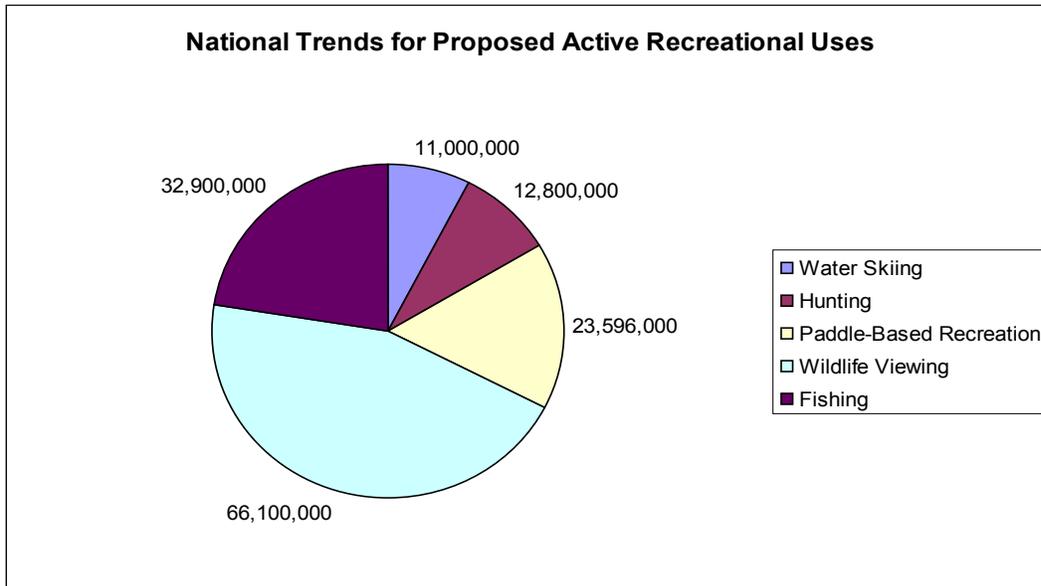
**Alternative C.** Under this alternative, visitor service facilities would be similarly expanded as in Alternative B. Opportunities for wildlife observations would expand to a capacity of 15,000 visitors per year. Six miles of foot trails would be open to visitors seven days a week, with seasonal restrictions. Less boardwalk would be constructed at the Headquarters Unit (140 feet). An additional two miles of trails would be developed on the Beach Lake and North Stone Lakes Units and would be open to visitors seven days a week, with seasonal closures. Four new interpretative programs would be developed within the next five years.

### **Socioeconomics**

It is well known that Americans value recreational opportunities, although there is no general agreement on the best methodology to precisely measure the impact of recreational opportunities on local economies. Recreational use of the Refuge probably has indirect economic benefits to the local community, although given the limited resources available for the production of the draft CCP/EA, no formal economic study of these benefits has been conducted. However, it is probable that local use of Refuge recreational opportunities will approximate National trends to the extent that the uses are allowed on the Refuge.

As determined by a Compatibility Determination (see Appendix A), high-speed boating conflicts with paddle-based recreation (ex. canoeing, kayaking and fishing from non-motorized boats) and limits visitor services that can be offered on the Refuge. Many other proposed Refuge uses, that water skiing and high speed boating are incompatible with, are

actually more popular than water skiing nationally. According to USA Waterski, there are approximately 11 million water skiers in the U.S. (USA Waterski 2006). According to the Outdoor Industry Foundation other proposed Refuge visitor services enjoy much larger national popularity (see Figure 6) including: hunting at 12,800,000 participants, paddle-based recreation at 23,596,000 participants, fishing at 32,900,000 participants and wildlife viewing at 66,100,000 participants (OIF 2006).



**Figure 6. National Outdoor Recreation Totals for 2006.**

As noted in a letter from the Beach Lake Ski Club dated October 23, 2006 (see Appendix G, Response to Public Comments) currently a private water ski club, consisting of 23 families, uses Refuge waterways for high speed boating for approximately four months each year. The water ski club estimates that weekly usage varies from a low of 8 families (boats) per week to a high of 12 families per week or an average of 10 families per week during the ski season. If high speed boating is discontinued on the Refuge, then other conflicting uses such as paddle-based recreation and wildlife observation and photography can increase as proposed, in the preferred alternative, by Objective 3.B. of the draft CCP.

Alternative A. Under the No Action alternative, current management practices would continue to be followed and no change in Refuge staffing would be required. Under the No Action Alternative, there would also be no change in visitor services and no changes in the indirect costs or benefits associated with visitor services to the local economy. The No Action alternative would thus have no impact on local employment conditions or the local economy.

Alternatives B and C. Actions proposed under Alternatives B and C are expected to have no significant affect on the local, regional or State economy. Under the preferred alternative, high speed boating will be phased out and several other uses, that high speed boating conflicts with, will be allowed to increase. Increases in Refuge visitation for activities such as wildlife observation and photography, environmental education and interpretation and recreational boating are expected under the preferred alternative.

Visitor services on the Refuge probably benefit the local economy and employment

conditions when Refuge visitors purchase goods from local businesses, such as gas stations, restaurants, hotels, photography stores, and sporting good stores. Under the preferred alternative, there will likely be a loss of benefits to local businesses from patronage by high speed boaters, but there will likely be a simultaneous gain in benefits for local businesses from added patronage by increasing numbers of other Refuge visitors. Actions proposed under Alternatives B and C are thus expected to have modest net benefits to the local economy once only uses found to be compatible are allowed on the Refuge. Table 2 displays the proposed net increases in Refuge visitor services, under Alternatives B and C.

The proposed expansion in visitor services programs may lead to increases in Refuge budget and staffing. Additional funding and staff proposals related to implementation of the CCP will be entered into the Service’s agency budget systems, including Refuge Operating Needs System and Maintenance Management System. Additional Refuge staff required under these alternatives may be hired from local communities and would likely live in and contribute to the local communities.

Action	Estimated Annual Refuge Visitation	Annual Number of People Visiting	Annual Number of Families Visiting
<b>Alternative A</b>	Average Water Skiing Use	532	160
	Wildlife Observation	3,000	901
	Environmental Education	315	95
	Hunting	315	95
	<b>Total Annual Use - Alternative A</b>	<b>4,162</b>	<b>1,251</b>
<b>Alternative B</b>	Average Water Skiing Use	0	0
	Wildlife Observation	10,500	3,153
	Environmental Education	1,050	315
	Hunting	315	95
	<b>Total Annual Use - Alternative B</b>	<b>11,865</b>	<b>3,563</b>
	<b>Increase from the No Action Alternative</b>	<b>7,703</b>	<b>2,312</b>
<b>Alternative C</b>	Average Water Skiing Use	0	0
	Wildlife Observation	15,000	4,505
	Environmental Education	1,050	315
	Hunting	315	95
	<b>Total Annual Use - Alternative C</b>	<b>16,365</b>	<b>4,914</b>
	<b>Increase from the No Action Alternative</b>	<b>12,203</b>	<b>3,663</b>

**Table 2. Estimated Visitor Services on the Refuge Under Alternatives A, B, and C. \*\* The average family size in Sacramento County is 3.33 persons (ACS 2004).**

As incompatible high speed boating is phased out, the local water skiing club, would be expected to lose benefits associated with this temporal, exclusive use of Refuge waters and to incur costs associated with finding alternative water skiing locations if they choose to do so. The loss of benefits would be due to the water ski club’s contractual obligation, until 2013

(see letter from the Beach Lake Ski Club dated October 23, 2006), with a local landowner for the use of launch facilities that provides access to a waterway, partially located on the Refuge. A local fishing club, that uses gas powered boats, also uses launch facilities provided by the same land owner. Since the Refuge has no authority to regulate high speed boating outside of Refuge boundaries, only a portion of the water course regularly water skied and fished via gas-powered boats will be lost to high speed boating as will commensurate benefits associated with access to those parts of the waterway. However, it is unclear if the parts of the waterway outside of the Refuge boundary would be considered viable for continued water skiing, by the club. If the local water ski club could not continue to water ski, within the waterway outside of the Refuge boundary, then the preferred alternative would result in a total loss of benefits associated with the use of the waterway. The private fishing club could continue to fish throughout the waterway, however without the use of high-speed boats. So there could be a small opportunity cost to the fishing club as travel times within Refuge waterways are increased, without the use of high speed boats.

If the water ski club finds that the waterway outside of the Refuge boundary is not viable for water skiing and therefore chooses not to renew a contract with the local land owner, who provides launch facilities, then the local land owner would incur opportunity costs after 2013 unless the local landowner substituted another profitable use of the property.

The expanded wildlife-dependent visitor use opportunities proposed under Alternatives B and C could result in increased instances of trespass, vandalism, and littering and some minor disruption of farming practices of adjacent to nearby landowners.

No projects proposed under any of the alternatives would have a disproportionate negative impact on low-income or minority populations.

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