Summary Information

US Geological Survey

Evaluation of the conservation value of lands purchased with CALFED funds for wintering Sandhill Cranes

Amount sought: $490,909

Duration: 36 months

Lead investigator: Michael Casazza, Western Ecological Research Center, USGS

Short Description

This project fills the need for a monitoring and applied research study to evaluate how CALFED's investments in land acquisitions, easements and habitat enhancements in the San Joaquin−Sacramento Delta region (hereafter called the Delta) can contribute to the conservation and recovery of threatened Greater Sandhill Cranes (Grus canadensis tabida). Detailed information on crane habitat requirements and movement patterns is needed to understand the critical links between properties purchased by CALFED and surrounding privately owned lands. A meaningful evaluation also needs to consider crane use at a larger spatial scale by asking questions about connectivity among sites and the role of CALFED properties in meeting the needs of all cranes wintering in the Delta Region.

Executive Summary

This project fills the need for a monitoring and applied research study to evaluate how CALFED's investments in land acquisitions, easements and habitat enhancements in the San Joaquin−Sacramento Delta region (hereafter called the Delta) can contribute to the conservation and recovery of threatened Greater Sandhill Cranes (Grus canadensis tabida). Detailed information on crane habitat requirements and movement patterns is needed to understand the critical links between properties purchased by CALFED and surrounding privately owned lands. A meaningful evaluation also needs to consider crane use at a larger spatial scale by asking questions about connectivity among sites and the role of CALFED properties in meeting the needs of all cranes wintering in the Delta Region. Specific objectives proposed for this project include: 1) Document timing of arrival, abundance, and subspecies composition at key roost sites 2) Characterize the physical properties of crane roost sites and correlate crane population size at a roost 3) Estimate Sandhill Crane abundance and characterize distribution during fall and winter 4) Characterize the daily

movement of Lesser and Greater Sandhill Cranes between roosts and foraging fields and seasonal movements between use areas 5) Determine foraging habitat needs of wintering cranes. The proposed study area for field work will include the Delta, northern San Joaquin Valley and east side tributaries regions.

CALFED has invested over 46 million dollars to acquire and enhance properties that influence the value of the Delta, northern San Joaquin Valley, and eastern tributaries regions for wintering Sandhill Cranes. Purchases of import include 10,130ac associated with the Cosumnes Preserve, 537ac Sun River Ranch that will become a unit of Stone Lakes NWR, and 9,100 ac Staten Island. In the San Joaquin Valley, 10 million dollars were invested in the expansion of San Joaquin River NWR to restore 777 acres of floodplain habitat. These habitat acquisitions may benefit most species of aquatic and terrestrial wildlife, but were intended to specifically contribute to the recovery of at−risk native species identified in the Multi−Species Conservation Strategy (MSCS), the number one goal of CALFED's Ecosystem Restoration Project (ERP; CALFED 2000). The Greater Sandhill Crane is listed as Threatened under the California Endangered Species Act and is classified as an at−risk native species by CALFED's MSCS. CALFED has invested in one year of monitoring work (Ivey and Herziger 2003); however, additional years of monitoring at these sites are needed. We will submit quarterly and annual reports for each part of the proposed work that will include financial status, activities during the period, tasks completed, products produced, problems encountered, and any modifications to the proposed work. A final technical report describing the results of the studies with specific conservation and management recommendations will be submitted by the end of the project.

Evaluation of the conservation value of lands purchased with CALFED funds for wintering Sandhill Cranes

A. Project Description: Project Goals and Scope of Work

1. Problem, Goals, and Objectives

This proposal outlines the need and describes the methods for a monitoring and applied research study to evaluate how CALFED's investments in land acquisitions, easements and habitat enhancements in the San Joaquin-Sacramento Delta region (hereafter called the Delta) can contribute to the conservation and recovery of threatened Greater Sandhill Cranes (*Grus canadensis tabida*). CALFED has invested over 46 million dollars to acquire and enhance properties that influence the value of the Delta, northern San Joaquin Valley, and eastern tributaries regions for wintering Sandhill Cranes. Three purchases of import include 10,130 ac associated with the Cosumnes Preserve, 537acre Sun River Ranch that will become a unit of Stone Lakes NWR, and 9,100 ac Staten Island. In the San Joaquin Valley, 10 million dollars were invested in the expansion of San Joaquin River NWR to restore 777 acres of floodplain habitat. After the initial purchase of Staten Island, CALFED subsequently provided an additional grant to construct interior levees and build a pumping station to improve water management capabilities over parts of the island. An important goal associated with these acquisitions is to improve habitat quality for wetland wildlife. In some cases, habitats were restored to native habitats like seasonal wetlands; in the case of Staten Island, the objective was to foster development and implementation of wildlife friendly farming practices.

These habitat acquisitions may benefit most species of aquatic and terrestrial wildlife, but were intended to specifically contribute to the recovery of at-risk native species identified in the Multi-Species Conservation Strategy (MSCS), the number one goal of CALFED's Ecosystem Restoration Project (ERP; CALFED 2000). The Greater Sandhill Crane is listed as Threatened under the California Endangered Species Act and is classified as an at-risk native species by CALFED's MSCS. CALFED's species goal for Greater Sandhill Cranes is: "Consistent with CALFED's mission, achieve recovery objectives identified in the Pacific Flyway Management Plan for the Central Valley population of greater sandhill cranes [Pacific Flyway Council 1997] and in Assembly Bill 1280 legislation that apply to the CALFED Problem Area, the Butte Sink, and other areas used by these species." (CALFED 2000). A second subspecies, the Lesser Sandhill Crane (*G. c. canadensis*) also winters in significant numbers in the Delta Region and is classified as a "Bird Species of Conservation Concern" by the state (PRBO Conservation Science 2003). The acquisitions at Cosumnes, Staten Island, Stone Lakes NWR and San Joaquin River NWR all include lands known to contain crane winter roost and foraging sites.

Although cranes are known to use these sites, it is not clear how they are using them, nor do we understand the relative importance of these properties to maintaining crane populations in the Delta Region. Detailed information on crane habitat requirements and movement patterns is needed to understand the critical links between properties

purchased by CALFED and surrounding privately owned lands. For example, many major roost sites are protected on public lands, but most foraging occurs on private land (Littlefield 2002, Ivey and Herziger 2003) and these lands are subject to loss from urbanization and conversion to incompatible crops. Long-term conservation planning will require a program that fundamentally links and understands the relative importance of public and private lands to meeting the daily and seasonal needs of cranes. Some specific questions that need to be answered include what are crane-compatible (wildlife-friendly) crops and management practices on agricultural fields? Which crops do cranes prefer? How far will cranes travel from roosts to foraging fields? How much food is available in key crane foraging habitats? What percent of the needs of the birds roosting on CALFED purchased lands can be met on sites already purchased and managed for cranes? Finally, do the two subspecies of Sandhill Crane that winter in the Delta have significantly different habitat needs or behaviors that need to be considered when developing a conservation plan? Lesser Sandhills are smaller-bodied, long distant migrants whereas Greaters are large bodied short distant migrants (Tacha et al. 1994, Petrula and Rothe *in press*, Pacific Flyway Council 1983, 1997). This could translate to significant differences in winter site fidelity, daily movement patterns during winter, habitat use and winter home range size. Data collected during the winter of 2002-2003 suggest habitat use and movement patterns may differ considerably between Greater and Lesser Sandhills (Ivey and Herziger 2003) indicating further study is needed.

In addition to a monitoring program focused on understanding detailed use around a single roost site, a meaningful evaluation also needs to consider crane use at a larger spatial scale by asking questions about connectivity among sites and the role of CALFED properties in meeting the needs of all cranes wintering in the Delta Region. Relevant questions include, what percentage of cranes that winter in the Delta Region relies on habitats acquired by CALFED? How many sites do cranes typically use each winter? How far will a bird move during the course of a single season? If individual cranes rely on relatively few sites each winter and show strong fidelity to individual roosts, it might be reasonable to manage each site in isolation from the others. Conversely, if individual cranes commonly move among sites, failure to consider this in conservation planning may result in failure to meet the seasonal needs of cranes regardless of site-specific management.

Despite the importance of the Delta Region to wintering Sandhill Cranes, their listing as at-risk, and the large number of dollars spent to acquire habitats relevant to cranes, the value of CALFED purchased properties to Sandhill Cranes can not be fully assessed because we lack answers to the critical questions raised above. CALFED has invested in one year of monitoring work (Ivey and Herziger 2003); however, additional years of monitoring at these sites are needed. This proposal requests funding to continue with monitoring begun during 2002-2003 and expand data collection to develop a more complete understanding of crane use of CALFED purchased properties. Our primary goals are to provide CALFED with information needed to assess the current value of CALFED purchased lands to wintering cranes, help understand the role that CALFED purchased properties play in meeting the habitat needs of all Sandhill Cranes wintering in the Delta Region, and help predict how future landscape changes could impact Sandhill

Cranes (e.g., proposals to develop water storage reservoirs as part of the Delta Wetlands Project (California Bay-Delta Authority 2003), the North Delta Flood Control and Ecosystem Restoration Project (California Department of Water Resources 2003). Based on the specific information needs and questions raised above, we propose the following objectives:

1. Document timing of arrival, abundance, and subspecies composition at key roost sites located on Staten Island, Cosumnes Preserve and Stone Lakes NWR.

2. Characterize the physical properties of crane roost sites and correlate crane population size at a roost with physical characteristics of a roost (e.g., size).

3. Estimate Sandhill Crane abundance and characterize distribution in the Delta during fall and winter.

4. Characterize the daily movement of Lesser and Greater Sandhill Cranes between roosts and foraging fields and seasonal movements between use areas.

5. Determine foraging habitat needs of wintering cranes.

2. Justification

Our monitoring and research objectives flow from a conceptual understanding of how cranes use a landscape. Cranes require 2 key habitat components on wintering areas, suitable night roosting habitat and suitable foraging habitat (Tacha et al. 1994). Spatially, daily habitat use can be viewed as one or more round trip flights from a centrally located roost site to one or more foraging fields. To define the population of fields that a crane will potentially use during a single day, you can draw a circle around the roost site with a radius equal to the maximum distance a crane will travel on a daily foraging flight (this value is unknown for Sandhill Cranes in the Central Valley and may differ between the 2 subspecies; this is one focus of Objective 4). Within this population of fields, an individual crane selects a specific field to use based on a number of variables ranging from the number and size of food items in each field, disturbance, predation risk, and social factors. This combination of suitable roost site surrounded by adequate foraging habitat is the basic "ecosystem unit" for understanding conservation and management of wintering cranes.

The geometrically clean conceptual model of crane habitat use described above is inconsistent with the irregular boundaries of property ownership in the Delta. Thus, habitat acquisition targeting a key habitat component (e.g., a known crane roost), likely will not include the entire foraging area potentially used by the roost population. Habitat changes that occur on privately owned fields within the daily flight radius may change crane abundance at a roost, regardless of management actions at the roost site itself. The loss of agricultural habitats around known crane roost sites to urbanization and conversions of row-crops to incompatible orchards and vineyards indicates this scenario is possible (Littlefield and Ivey 1999). Alternately, use of potential foraging habitat on

publicly owned land may be limited by the distribution of suitable roost sites. The latter may be the case at Staten Island, where crane use of the north and south ends of the island is relatively low (Ivey pers. obs.).

More fundamentally, it is not clear what currently limits the carrying capacity of cranes wintering in the Delta (or if current habitats are limiting). At a single, well established roost, we hypothesize that capacity is determined by the amount and types of suitable agricultural crops available to cranes; however an alternate hypothesis is that suitable roost sites are lacking (focus of objectives 1, 2, and 5). At a larger spatial scale (the entire Delta Region), the distribution of wintering Sandhill Cranes may be determined by the distribution of suitable roost site-foraging habitat "ecosystem units" (a pattern we will identify in objective 3). The location of these ecosystem units in conjunction with an understanding of crane movement patterns (the focus of objective 4) provides the basis for understanding connectivity among units. We hypothesize roosts separated by a distance of less than a crane's daily foraging radius will be used as part of a "habitat complex". If true, we predict that individual birds will move freely among roosts within a complex. Because cranes typically show high fidelity to roosts, we further hypothesize that cranes will remain within a habitat complex as long as both habitat components are provided. Additionally, we hypothesize that Lesser Sandhill Cranes will move among ecosystem units more frequently and will move longer distances than Greaters. Using data collected for objective 3 and 4, we can map all potential roost sites and bound each by two circles with radii equal to the daily flight distance for both subspecies. Portions of the Delta not included one of these circles will be considered "unavailable" to cranes. This approach provides a basis for determining what percentage of all lands in the Delta are available to cranes and will help determine the relative importance of CALFED purchased lands to the conservation of wintering cranes.

We suggest the conceptual model described above is a useful frame work for identifying factors that potentially limit crane abundance in the Delta, for assessing the value of CALFED purchased lands to wintering cranes, and for guiding conservation planning for cranes. Our monitoring and research project is focused on gathering key data needed to parameterize these conceptual models. Additionally, identifying key foraging habitats will help define best management practices for cranes on public and private lands and provide guidance for how federal agricultural programs could be used to benefit cranes (e.g. Wetland Reserve Program).

3. Previously Funded Monitoring

CALFED funded one winter of Sandhill Crane monitoring on Staten Island through a grant to The Nature Conservancy (Ivey and Herziger 2003). Information gathered during that year provided the necessary data to formulate and prioritize more specific questions and information needs. For example, that work provided solid evidence that Lesser and Greater Sandhill Cranes differ in important characteristics, requiring that future work needs to include both subspecies. That work also shaped our conceptual thinking about crane use of a landscape. Additionally, Sandhill Cranes were monitored on Delta

Wetlands Project islands during the winter of 2002-03 by DWR biologists (California Bay-Delta Authority 2003).

4. Approach and Scope of Work:

The proposed study area for field work related to the Delta Region Study will include the Sacramento-San Joaquin Delta, the northern San Joaquin Valley and east side tributaries regions (Figure 1).

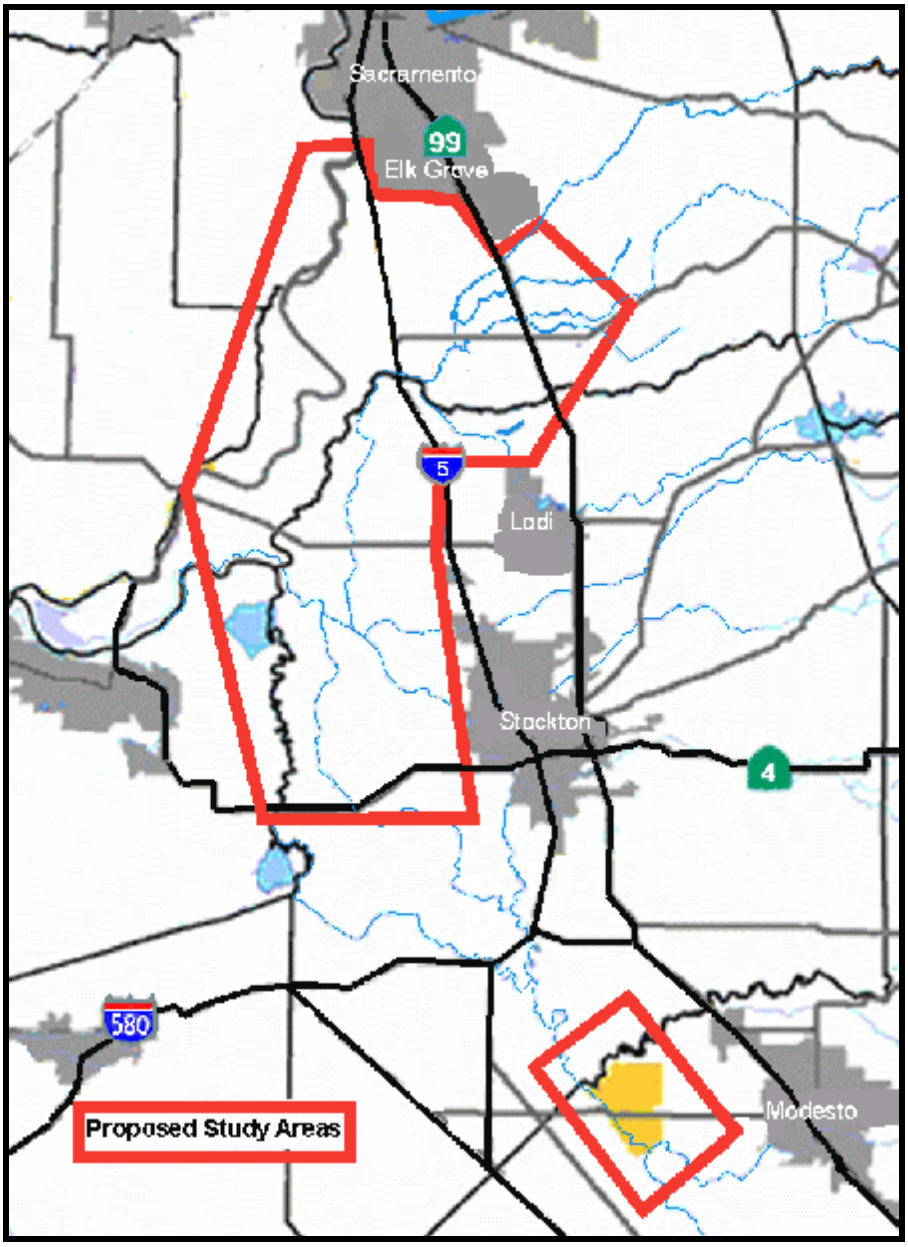

Figure 1. Proposed study area boundaries for Sandhill Crane monitoring and evaluation in the Delta Region, California.

Task 1:
Project Management will be overseen by USGS personnel from the Western Ecological Research Center.

Task 2:
Field studies will be conducted by USGS and Oregon State University personnel. Objectives 1, 2, and 3: We will conduct weekly surveys at roost sites on Staten Island, Cosumnes Preserve, Isenberg Crane Reserve, San Joaquin River NWR, and Stone Lakes NWR to document timing of arrival in fall and departure in spring, chronology of use, and peak population size. These are the first roosts typically available to cranes in fall (Ivey pers. obs.) thus are useful for documenting chronology of crane movement into the Delta. Counts will be conducted from the ground following techniques described in Ivey and Herziger (2003). Lesser and Greater Sandhill Cranes differ enough morphologically, that subspecies can be identified visually using a spotting scope (Ivey and Herziger 2003). In addition to ground surveys of major roosts, we will survey the entire study area once every 2 weeks from a plane to estimate the total crane population size, locate all key roost sites in the study area and identify other sites that seem suitable as crane roosts, but are not being used. Dense ground fog in the Delta during winter can confound aerial survey efforts (Ivey and Dugger pers. obs.), fortunately the information we desire is not dependent on adhering to a strict flight schedule. From the population of known and potential roosts, we will randomly select a sample to visit and record size (m^2), maximum water depth (cm), and habitat type (e.g., flooded corn, flooded rice, seasonal wetland). We will also record qualitative information that might influence site use (e.g., surrounding habitat use, location relative to hunting club). We will use logistic regression to identify characteristics related to use of roost sites by cranes and a mixed linear model to identify variables that influence population size at roosts that are used by cranes. Additionally, we will plot all known and potential roost sites on a digitized map of the study area and measure the linear distance between a roost and other roosts in the region. This data in conjunction with movement data collected for objective 4 will provide a measure of connectivity between adjacent roost sites.

Objectives 4 and 5: We will use radio telemetry to study habitat use and movements of Greater and Lesser Sandhill Cranes. Radio-telemetry has been used successfully to study Sandhill Cranes elsewhere in their range (Bishop 1992, Duan et al. 1997, Bennet 1989). Beginning in September, we will trap 30 Greater Sandhill Cranes and 40 Lesser Sandhill Cranes using rocket nets and noose traps (Hereford et al. 2000). We have planned to radio more Lessers because previous data (Ivey and Herziger 2003) indicate this subspecies may be more likely make large movements that would take some birds outside our study area. Trapping will focus on birds using two CALFED purchased properties (Staten Island and Cosumnes River Preserve), but other sites will be included if needed to achieve desired sample sizes. Each crane captured will be measured (subspecies can be identified by morphology) and banded with a unique color combination of bands. On one band we will attach a 30 g VHF transmitter. Although transmitters are commonly attached to neck bands (Babineau et al. 2004), as backpacks (Dwyer 1972) or surgically

implanted (Korschgen et al. 1996) for other species of birds, leg band attachment is the most common method for cranes (e.g. Krapu and Brandt 2001). We will use truck mounted antennae to locate individual birds during both diurnal and nocturnal time periods at least five times each week. Each time a bird is located, we will record its location on a map of the study area as well as habitat type and flock size (during the day). Once every 2 weeks we will fly to locate birds that have moved away from the primary study areas. We will attempt to locate each bird twice daily both on its roost and in foraging habitat. We will record habitat type, flock size, and subspecies composition of foraging flocks containing radioed birds. We will use a combination of minimum convex polygon and kernel estimation procedures GIS to estimate home range size for each subspecies (Worton 1989, 1995; Tufto et al. 1996).

Task 3:
Public access website will be developed and maintained to keep partners and the general public up to date with project accomplishments. This website will contain maps of current crane locations. The website will also provide information as to the effectiveness of the restoration actions undertaken by CALFED in providing critical habitat for Sandhill Cranes. The website will be hosted through the Western Ecological Research Center.

Task 4:
Habitat model for Sandhill Cranes in the Delta region. Data collected during the field studies portion (Task 2) of this project will be incorporated into a predictive model of habitat use by cranes in the Delta region. The model will help guide management of fee-title lands purchased through CALFED as well as provide input into Wildlife Friendly Agriculture programs that may benefit cranes.

5. Feasibility

The principal investigators each have extensive field experience directly applicable to performing their sections of work described in this proposal. We have a current MOU with California Department of Fish and Game which allows trapping and handling of cranes. We will need to apply for a state banding permit. We have a federal banding permit including the auxiliary marking permit that allows us to do the proposed work on cranes. We will obtain the owners' permission to access any lands we identify as desirable for this study but our ability to successfully complete the objectives of this study are not dependent on access to private lands.

6. Expected Outcomes and Products

We will submit quarterly and annual reports for each part of the proposed work that will include financial status, activities during the period, tasks completed, products produced, problems encountered, and any modifications to the proposed work. A final technical report describing the results of the studies with specific conservation and management recommendations will be submitted by the end of the project. We will also present our

work in newsletter articles, presentations to local, state, and national organizations, workshops, presentations at scientific meetings, scientific publications, habitat models, a GIS data base, a web site for the project, and press releases.

7. Data Handling, Storage, and Dissemination

All data collected during this project will be entered into electronic databases and will be stored on PCs and archived at Oregon State University. Data analysis will be done using ARC/GIS and with SAS and Program Mark and other related software. We will create a web site for this project and make the finalized data available through this site. We will also ship data other files as requested via email and conventional mail.

8. Public Involvement and Outreach

Our research will be shared with interpretive centers at associated Nature Preserves (e.g. Cosumnes Preserve), National Wildlife Refuges, and Wildlife Areas in the Valley for presentations on crane ecology to the visiting public. We would collaborate with the Lodi Crane Festival, where we would give talks at the festival to explain the needs of wintering Sandhill Cranes and specific role of our research will play in making progress on biological planning for the species. We will also give similar presentations at other regional bird festivals (e.g., the Othello, WA crane festival, Modoc NWR's Migratory Bird Festival, etc.). On a professional level, we would present the results of our research at various professional meetings such as The Wildlife Society's, National and Section meetings, the Waterbird Society's Annual meeting, and the North American Crane Working Group workshops. The final results of the studies would be presented for publication in a peer-reviewed wildlife journal.

9. Work Schedule

Table 1. Work schedule. SANDHILL CRANE

Date:	Description (Task):
September -December 2005	Capture and Marking of Sandhill Cranes (3)
October 2005-March 2006	Tracking of Sandhill Cranes VHF transmitters (3)
August 2006	Annual report complete
September -December 2006	Capture and Marking of Sandhill Cranes (3)
October 2005-March 2006	Tracking of Sandhill Cranes VHF transmitters (3)
August 2007	Second annual report
June 2008	Final Report for Sandhill Crane study.

B. Applicability to CALFED ERP and Science Program Goals and Implementation Plan and CVPIA Priorities

1. ERP, Science Program and CVPIA Priorities.

The recovery of at-risk native species is the number one goal of CALFED's Ecosystem Restoration Project (California Bay-Delta Authority 2003). CALFED's species goal for Greater Sandhill Cranes is: "Consistent with CALFED's mission, achieve recovery objectives identified in the Pacific Flyway Management Plan for the Central Valley population of greater sandhill cranes and in Assembly Bill 1280 legislation that apply to the CALFED Problem Area, the Butte Sink, and other areas used by these species." (CALFED 2000).

Monitoring of cranes in the Delta will continue and expand upon a single season of monitoring, funded by CALFED, during 2002-2003 that assessed crane use of key sites in the Delta (Ivey and Herziger 2003). The single year of monitoring needs to be continued and expanded to draw biologically meaningful conclusions.

2. Relationship to Other Ecosystem Restoration Actions, Monitoring Programs, or System-wide Ecosystem Benefits.

There are a number CALFED programs which have the potential to impact wintering cranes. A total of 10,595 acres of sandhill crane habitat would be lost from implementing the In-Delta Storage Project (California Bay-Delta Authority 2003). Additionally, if levee integrity problems result in future failure of Delta levees (like the Jones tract breach this summer), this research can evaluate the consequences to cranes. Also, the planned reduction of rice agriculture due to CALFED's Environmental Water Account Program (CALFED 2003) will likely impact the quality of crane habitat. Although land use differs between the Delta and the Sacramento Valley (where EWA is being implemented), our study will characterize movements and habitat parameters that would help interpret EWA's impact on cranes and possibly guide recommendations to identify crane-compatible substitution crops.

Information derived from this study would help guide decisions about fallowing of rice fields in the Sacramento Valley to allow purchase of water for EWA with minimal impacts to cranes and to identify viable mitigation options for cranes for habitat lost due to CALFED projects. Also, it would be useful for future Sandhill Crane conservation planning such as the recovery plan for the Greater Sandhill Crane as well as management and conservation plans for State Wildlife Areas, National Wildlife Refuges and natural areas such as the Cosumnes River Preserve. This study would also help guide wetland and cropland management, restoration, acquisition and easements programs for the U. S. Fish and Wildlife Service, Bureau of Land Management, California Department of Fish and Game, California Department of Water Resources, the Central Valley Habitat Joint Venture, Ducks Unlimited, California Waterfowl Association, The Nature Conservancy, and the Audubon Society. Finally, this study could also identify wildlife-friendly

farming practices for cranes using private lands and assist the Natural Resource Conservation Service with design of wildlife enhancement projects on private lands.

3. Additional Information for Proposals Containing Land Acquisition.

This section is not applicable to the proposed work.

C. Qualifications

Michael L. Casazza, MS, Senior Wildlife Biologist, Western Ecological Research Center, U.S. Geological Survey, 1989 to present. Principal Investigator studying a variety of wetland and avian species (giant garter snakes, waterfowl, band-tailed pigeons, greater sage-grouse). Expertise in animal capture, radio-telemetry, and habitat utilization studies. Education: M.S. 1995 Recreation Administration, California State University, Sacramento, B.S. 1988 Wildlife Biology, University of California, Davis

Five Selected Publications: **1) Casazza, M. L**. and M. R. Miller. 2000. The Northern Pintail. In: Goals Project 2000. Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish, and wildlife. Prepared by the San Francisco Bay Area Wetland Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, Calif. **2) Casazza** et al. In Press. Evaluation of Current Population Indices for Band-tailed Pigeons. Wildlife Society Bulletin. **3) Casazza, M. L**., G. D. Wylie, and C. J. Gregory. 2000. A funnel trap modification for surface collection of aquatic amphibians and reptiles. Herpetological Review 31(2), 91-92. **4)** Wylie, G.D., **M.L. Casazza**, and M. Carpenter. 2003. Diet of bullfrogs in relation to predation on giant garter snakes at Colusa National Wildlife Refuge. California Fish and Game 89(3): 139-145. **5)** Miller, M. R., J. P. Fleskes, J. Y. Takekawa, D. L. Orthmeyer, **M. L. Casazza**, and W. M. Perry. 2001. Satellite tracking of northern pintail spring migration from California, USA: the route to Chukotka, Russia. Casarca 7: 229-233.2**.**

Joseph P. Fleskes, Ph.D. Wildlife Research Biologist, USGS-Western Ecological Research Center, Dixon CA. 1986 to present; Vice-Chair, Pintail Action Group-North American Waterfowl Management Plan. 2002 to present. Experience: Over 25 years of research experience on wetland-dependent wildlife and their habitats throughout North America with special emphasis on migratory waterfowl and other waterbirds in the Central Valley of California. Education: Ph.D. (1999) Wildlife Science, Oregon State University; M.S. (1986) Wildlife Biology, Iowa State University; B. S. (1980) Fisheries and Wildlife Biology, Iowa State University.
Five Selected Publications: 1. **Fleskes, J. P**., R. L. Jarvis, and D. S. Gilmer. 2002. Distribution and movements of female northern pintails radiotagged in the San Joaquin Valley, California. Journal of Wildlife Management 66:138-152. 2. **Fleskes, J. P**., R. L. Jarvis, and D. S. Gilmer. 2003. Selection of flooded agricultural fields and other landscapes by female northern pintails wintering in Tulare Basin, California. Wildlife Society Bulletin 31:793-8032. 3. **Fleskes, J.**, J. Yee, M. Casazza, J. Daugherty and B. Perry. 2000. Waterfowl distribution, movements and habitat use relative to recent habitat

changes in the Central Valley of California: A cooperative project to investigate impacts of the Central Valley Habitat Joint Venture and changing agricultural practices on the ecology of wintering waterfowl. Published Progress Report. U.S. Geological Survey, Dixon, CA. 143pp. 4. Van Kessel, C., J. Eadie, W. Horwath, F. Reid, J. E. Hill, and **J. Fleskes**. 2002. Integrating agronomic management practices with waterfowl populations in rice fields: opportunities and mutual benefits. Pages 51-59 *in* J. E. Hill, and B. Hardy, editors, Proceedings of the Second Temperate Rice Conference, 13-17 June, 1999, Sacramento California. Los Banos (Phillippines): International Rice Research Institute. 714 pp. 5. **Fleskes, J. P**., W. M. Perry, K. L. Petrik, R. Spell, and F. Reid. In review. Change in amount of winter-flooded and dry rice in the northern Central Valley of California determined by satellite imagery. California Fish and Game. 17 pp.

Gary L. Ivey. PhD candidate, Oregon State University, Corvallis; Consulting Wildlife Biologist.—Experience: federal wildlife biologist at National Wildlife Refuges in Oregon and California for 18 years specializing in the ecology of migratory waterbirds, especially Sandhill Cranes with technical specialty in application of radio telemetry. Education: B.S., Wildlife Management, Humboldt State University, California, 1978; B.A., Biology, Humboldt State University, California, 1977.

Five selected Publications: 1) Ivey, G. L., C.P. Herziger, and T. Hoffmann. In prep. Annual movements of Pacific Coast Sandhill Cranes. Proc. of the 9th North American Crane Workshop. 2) Ivey G. L. and C. P. Herziger. 2003. Sandhill Crane Monitoring at Staten Island, San Joaquin County, California, 2002-03. The Nature Conservancy, Galt, California. 3) Littlefield, C. D., and G. L. Ivey. 2002. Washington State Recovery Plan for the Sandhill Crane. Washington Department of Fish and Wildlife, Olympia, WA. 4) Ivey, G. L., and C. P. Herziger. 2001. Distribution of greater sandhill crane pairs in California, 2000. California Dept. Fish and Game, Sacramento, CA. 5) Littlefield, C. D., and G. L. Ivey. 1999. Conservation Assessment for Greater Sandhill Cranes wintering on the Cosumnes River Floodplain and Delta regions of California. The Nature Conservancy, Galt, California.

Bruce D. Dugger, Ph.D. Mace Professor of Watchable Wildlife, Dept. Fisheries and Wildlife, Oregon State University. Experience: Research ecologist specializing in ecology, conservation, and management of waterbirds, particularly during the non-breeding season and management and restoration of wetland habitats. P.I. on research projects across the county and internationally for 12 years. Technical expertise includes application of telemetry to wildlife research, experimental design and sampling theory (particularly related to estimating food availability and modeling carrying capacity). Education: B.S. (1986) Fisheries and Wildlife, University California Davis; M.S. (1990) and Ph.D. in Wildlife Ecology from University Missouri Columbia.

Five Selected Publications: Babineau, F. B., **B. D. Dugger**, D. Holm, and A. Woolf. 2004. Winter distribution and habitat use of Trumpeter swans in Illinois. 19th Proceedings of the Trumpeter Swan Society. **Dugger, B. D**. and P. Blums. 2001. Impact of conspecific brood parasitism on host fitness for Tufted Duck and Common Pochard. Auk: 118:717-726. **Dugger, B. D**. and M. J. Petrie. 2000. Geographic

variation in foraging patterns of pre-incubating female Mallards. Canadian Journal of Zoology 78:2240-2243. Dugger, K. M., **B. D. Dugger**, and L. H. Fredrickson. Annual survival of female Hooded Mergansers and Wood Ducks in southeast Missouri. 1999. Wilson Bulletin 111:1-6. Anderson, D. H. and **B. D. Dugger**. 1998. A conceptual basis for evaluating restoration success. Trans. North Am. Wildlife and Nat. Res. Conference 63:1-7.

Organizational Structure:
The USGS will provide project management, infrastructure, equipment, supplies, vehicles, and field expertise in conjunction with a Ph.D. candidate and major Professor from Oregon State University who will provide species expertise, data collection, evaluation and synthesis.

D. Cost

1. Budget

All four tasks are interdependent and are necessary to provide a useful and pertinent evaluation of CALFED acquisitions for Sandhill Cranes.

2. Cost-sharing

We will seek funding and in-kind support from National Wildlife Refuges, Bureau of Land Management, Department of Water Resources, and California Fish and Game.

3. Long-term Funding Strategy

The initial investigation of use of CALFED purchased lands by Sandhill Cranes will establish a baseline for monitoring and effective management strategies. Future studies which examine crane habitat use and movement patterns in the future will be helpful but are not planned for at this time.

E. Compliance with Standard Terms and Conditions

We agree with standard terms and conditions.

F. Literature Cited

Babineau, F. B., **B. D. Dugger**, D. Holm, and A. Woolf. 2004. Winter distribution and habitat use of Trumpeter swans in Illinois. 19th Proceedings of the Trumpeter Swan Society.

Bennett, A. J. 1989. Movements and home ranges of Florida sandhill cranes. J. Wildl. Manage. 53:830-836.

Bishop, M. A. 1992. Habitat use by Florida sandhill cranes on the Kissimmee prairie in central Florida. Proc. North Am. Crane Workshop 6:175.

CALFED 2003. Environmental Water Account Environmental Impact Statement/ Environmental Impact Report, Draft, Volumes 1-3. Sacramento, CA

California Bay-Delta Authority. 2003. Integrated Storage Investigations—In-Delta Storage Program State Feasibility Study Draft Environmental Evaluations. Sacramento, California.

California Department of Water Resources. 2003. Draft Description of Proposed Alternatives: North Delta Flood Control and Ecosystem Restoration Project. . Sacramento, California.

Duan, W., T. A. Bookhout, R. P. Urbanek. 1997. Home range and habitat use by isolation-reared sandill cranes. Proc. North Am. Crane Workshop 7:72-78.

Hereford, S. G., T. E. Grazia, M. Nagendran, and A. Hussain. 2000. Use of traditional Indian trapping methods to capture sandhill cranes. Proceedings North American Crane Workshop 8:220.

Ivey G. L., and C. P. Herziger. 2003. Sandhill Crane Monitoring at Staten Island, San Joaquin County, California, 2002-03. Unpublished report. The Nature Conservancy, Galt, California. http://www.cosumnes.org/staten-cranes.pdf

Korschgen, C. E., K. P. Kenow, W. L. Green, M. D. Samuel, and L. Sileo. 1996. Technique for implanting radio transmitters subcutaneously in day-old ducklings. J. Field Ornith. 67:392-397.

Krapu, G. L., and D. A. Brandt. 2001. Use of satellite telemetry to identify temporal and spatial distribution of the Midcontinent Sandhill Crane population throughout the annual cycle. Proceedings of the Eighth North American Crane Workshop: 222. North American Crane Working Group, Baraboo, WI.

Littlefield, C. D. 2002. Winter foraging habitat of Greater Sandhill Cranes in northern California. Western Birds 33:51-60.

Littlefield, C. D., and G. L. Ivey. 1999. Conservation Assessment for Greater Sandhill Cranes wintering on the Cosumnes River Floodplain and Delta regions of California. Unpublished report. The Nature Conservancy, Galt, California. http://watershed.ucdavis.edu/crg/reports/crane2001.pdf

Pacific Flyway Council. 1983. Pacific Flyway Management Plan: Pacific Population of Lesser Sandhill Cranes. Pacific Flyway Study Committee (c/o Pacific Flyway Representative USFWS), Portland, OR 97232-4181.

Pacific Flyway Council. 1997. Pacific Flyway management plan for the Central Valley Population of Greater Sandhill Cranes. Pacific Flyway Study Committee (c/o Pacific Flyway Representative USFWS), Portland, OR 97232-4181.

Petrula, M.. J., and Rothe, T. C. In prep. Migration chronology, routes, and winter and summer range of Pacific Flyway Population of lesser sandhill cranes. Proceedings North American Crane Workshop 9.

PRBO Conservation Science. 2003. Draft California Bird Species of Special Concern List. Point Reyes Bird Observatory. Stinson Beach, California.

Tacha, T. C., S. A. Nesbitt, and P.A. Vohs. 1994. Sandhill Crane. Pages 77-94 *in* T. C. Tacha and C. E. Braun, editors. Migratory Shore and Upland Game Bird Management in North America. International Association of Fish and Wildlife Agencies, Washington, D.C.

Tufto, J., R. Andersen, and J. Linnell. 1996. Habitat use and ecological correlated of home range size in a small cervid: The roe deer. Journal of Animal Ecology 65:715-724.

Worton, B. J. 1989. Kernel methods for estimating the utilization distribution in home-range studies. Ecology 70:164-168.

Worton, B. J. 1995. Using Monte Carlo simulation to evaluate kernel-based home range estimators Journal of Wildlife Management 59:794-800.

Tasks And Deliverables

Evaluation of the conservation value of lands purchased with CALFED funds for wintering Sandhill Cranes

Task ID	Task Name	Start Month	End Month	Deliverables
1	Project Management	1	36	**Semiannual and final reports. Periodic invoices**
2	**Field Work**	**1**	**24**	**Database, Progress Reports, GIS database and metadata available for uploading into BIOS database.**
3	**Website**	**6**	**36**	**Website with curent project activities.**
4	**Habitat Model**	**25**	**36**	**Habitat Use and Distribution Model during Fall and Winter in the Delta.**

Comments

If you have comments about budget justification that do not fit elsewhere, enter them here.

Budget Summary

Project Totals

Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
$58,261	$18,184	$3,000	$30,720	$325,590	$0	$0	$0	$435,755	$55,154	$490,909

Do you have cost share partners already identified?
Yes.

If yes, list partners and amount contributed by each:

USGS−WERC will contribute approximately $100,000 value for use of capture, marking, and radiotracking equipment including rocket nets, rockets, wire, detonators, scopes, binoculars, bird holding cages, electronic calipers, scales, banding equipment, electronic scanning receivers, headsets, compasses, GPS units, truck and aircraft telemetry antennae, antennae mounting systems, miscellaneous cables, telemetry and GIS computer programs and hardware, and other equipment.

Do you have potential cost share partners?
Yes.

If yes, list partners and amount contributed by each:

USFWS − Stone Lakes NWR amount unknown. CDFG − amount unknown BLM − amount unknown

Are you specifically seeking non−federal cost share funds through this solicitation?
No.

Evaluation of the conservation value of lands purchased with CALFED funds for wintering Sandhill Cranes

Evaluation of the conservation value of lands purchased with CALFED funds for wintering Sandhill Cranes

Year 1 (Months 1 To 12)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	**10389**	**3401**	**1000**	**500**	**0**	**0**	**0**	**0**	$15,290	**6988**	$22,278
2: Field Work (12 months)	**7301**	**2249**	**0**	**13200**	**126612**	**0**	**0**	**0**	$149,362	**14195**	$163,557
3: Website (7 months)	**1968**	**532**	**0**	**500**	**0**	**0**	**0**	**0**	$3,000	**1371**	$4,371
Totals	**$19,658**	**$6,182**	**$1,000**	**$14,200**	**$126,612**	**$0**	**$0**	**$0**	**$167,652**	**$22,554**	**$190,206**

Year 2 (Months 13 To 24)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	**10908**	**3571**	**1000**	**500**	**0**	**0**	**0**	**0**	$15,979	**4302**	$20,281
2: Field Work (12 months)	**7666**	**2361**	**0**	**14520**	**133716**	**0**	**0**	**0**	$158,263	**15229**	$173,492
3: Website (12 months)	**2066**	**559**	**0**	**500**	**0**	**0**	**0**	**0**	$3,125	**1428**	$4,553
Totals	**$20,640**	**$6,491**	**$1,000**	**$15,520**	**$133,716**	**$0**	**$0**	**$0**	**$177,367**	**$20,959**	**$198,326**

Year 3 (Months 25 To 36)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	**11454**	**3750**	**1000**	**500**	**0**	**0**	**0**	**0**	$16,704	**7634**	$24,338
3: Website (12 months)	**2170**	**587**	**0**	**500**	**0**	**0**	**0**	**0**	$3,257	**1488**	$4,745
4: Habitat Model (12 months)	**4339**	**1174**	**0**	**0**	**65262**	**0**	**0**	**0**	$70,775	**2519**	$73,294
Totals	**$17,963**	**$5,511**	**$1,000**	**$1,000**	**$65,262**	**$0**	**$0**	**$0**	**$90,736**	**$11,641**	**$102,377**

Budget Justification

Evaluation of the conservation value of lands purchased with CALFED funds for wintering Sandhill Cranes

Labor

Year 1 Task 1: Project management: Research Wildlife Biologist GS−13: 80hrs = $3365 Senior Wildlife Biologist GS−12: 160hrs = $5056 Wildlife Biologist GS−11: 80hrs = $1968 Task 2: Field Work: Research Wildlife Biologist GS−13: 80hrs = $3365 Wildlife Biologist GS−11: 160hrs = $3936 Task 3: Website: Wildlife Biologist GS−11: 80hrs = $1968 Year 2 Task 1: Project management: Research Wildlife Biologist GS−13: 80hrs = $3533 Senior Wildlife Biologist GS−12: 160hrs = $5308 Wildlife Biologist GS−11: 80hrs = $2066 Task 2: Field Work: Research Wildlife Biologist GS−13: 80hrs = $3533 Wildlife Biologist GS−11: 160hrs = $4133 Task 3: Website: Wildlife Biologist GS−11: 80hrs = $2066 Year 3 Task 1: Project management: Research Wildlife Biologist GS−13: 80hrs = $3710 Senior Wildlife Biologist GS−12: 160hrs = $5574 Wildlife Biologist GS−11: 80hrs = $2170 Task 3: Website: Wildlife Biologist GS−11: 80hrs = $2170 Task 4: Habitat Model: Wildlife Biologist GS−11: 160hrs = $4339

Benefits

Research Wildlife Biologist GS−13 Benefit rate = 35.2% Senior Wildlife Biologist GS−12 Benefit Rate = 33.3% Wildlife Biologist GS−11 Benefit Rate = 27.1%

Travel

Travel costs, both local and non−local, are expected to be $1000/yr for Task 1: Project Management. Non−local travel will be required for presentation of significant findings at scientific meetings, and coordination of field personnel and the contracting agent.

Supplies And Expendables

Applicable to all years: Task 1: Project Management: Office supplies, printing and communication costs $500/year Task 3 Website: Computer supplies $500/year

Services And Consultants

Dr. Bruce Dugger from Oregon State University, and Ph.D candidate Gary Ivey will serve as a sub−contractual entity with duties to collect data, procure equipment, travel and provide written documents to the project manager.

Year 1 Task 2: Field Work: Personnel/Labor: Principle Investigator: 160hrs: $6279 Graduate Research Assistant: 2080hrs: 0.5 FTE: $22150 Research Technician: 1 @ 1040hrs: $14080 Benefits: Principle Investigator: 44% Graduate Research Assistant: 43.1% (Includes tuition waiver) Research Technician: 25% Travel: Out−of−state: $5500 Services/Supplies: Plane time for telemetry: $15600 Radio transmitters: $19000 Miscellaneous: $6000 Mail, communications, printing, publication: $1600 Internal Indirect Costs: $23333 Year 2 Task 2: Field Work: Personnel/Labor: Principle Investigator: 160hrs: $6927 Graduate Research Assistant: 2080hrs: 0.5 FTE: $24365 Research Technician: 1 @ 1040hrs: $15488 Benefits: Principle Investigator: 44% Graduate Research Assistant: 43.1% (Includes tuition waiver) Research Technician: 25% Travel: Out−of−state: $6000 Services/Supplies: Plane time for telemetry: $17160 Radio transmitters: $20900 Miscellaneous/Trapping supplies: $2000 Mail, communications, printing, publication: $1650 Internal Indirect Costs: $24702 Year 3 Task 2: Field Work: Personnel/Labor: Principle Investigator: 160hrs: $7619 Graduate Research Assistant: 2080hrs: 0.5 FTE: $26802 Benefits: Principle Investigator: 44% Graduate Research Assistant: 43.1% (Includes tuition waiver) Travel: Out−of−state: $3000 Services/Supplies: Mail, communications, printing, publication: $3000 Internal Indirect Costs: $9617

Equipment

No equipment will be purchased to complete this project. Equipment required for trapping and telemetry (receivers, etc.) will be provided by the U.S. Geological Survey.

Lands And Rights Of Way

No land or right of way costs will be accrued for this project.

Other Direct Costs

No other direct costs.

Indirect Costs/Overhead

Overhead costs for personnel, benefits, travel and vehicles supported by the U.S. Geological Survey (amounting to 28% of total requested funds) will be assessed the base Overhead rate for the Western Ecological Research Center of 45.7%. The Overhead rate for the contractual services of Oregon State University (72% of requested funds) will be assessed at the "pass−through" rate of 3% by the U.S. Geological Survey. The remainder of funds is subject to an indirect cost rate of 21% by Oregon State University for all categories except the annual tuition waiver.

Comments

Environmental Compliance

Evaluation of the conservation value of lands purchased with CALFED funds for wintering Sandhill Cranes

CEQA Compliance

Which type of CEQA documentation do you anticipate?
X none
− negative declaration or mitigated negative declaration
− EIR
− categorical exemption

If you are using a categorical exemption, choose all of the applicable classes below.
− Class 1. Operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. The types of "existing facilities" itemized above are not intended to be all−inclusive of the types of projects which might fall within Class 1. The key consideration is whether the project involves negligible or no expansion of an existing use.
− Class 2. Replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced.
− Class 3. Construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure. The numbers of structures described in this section are the maximum allowable on any legal parcel, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.
− Class 4. Minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.
− Class 6. Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies. These may be strictly for information

gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded.
– Class 11. Construction, or placement of minor structures accessory to (appurtenant to) existing commercial, industrial, or institutional facilities, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

Identify the lead agency.

Is the CEQA environmental impact assessment complete?

If the CEQA environmental impact assessment process is complete, provide the following information about the resulting document.

Document Name
State Clearinghouse Number

If the CEQA environmental impact assessment process is not complete, describe the plan for completing draft and/or final CEQA documents.

NEPA Compliance

Which type of NEPA documentation do you anticipate?
X none
– environmental assessment/FONSI
– EIS
– categorical exclusion

Identify the lead agency or agencies.

If the NEPA environmental impact assessment process is complete, provide the name of the resulting document.

If the NEPA environmental impact assessment process is not complete, describe the plan for completing draft and/or final NEPA documents.

Successful applicants must tier their project's permitting from the CALFED Record of Decision and attachments providing programmatic guidance on complying with the state and federal endangered species acts, the Coastal Zone Management Act, and sections 404 and 401 of the Clean Water Act.

Please indicate what permits or other approvals may be required for the activities contained in your proposal and also which have already been obtained. Please check all that apply. If a permit is *not* required, leave both Required? and Obtained? check boxes blank.

Local Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
conditional Use Permit	–	–	
variance	–	–	
Subdivision Map Act	–	–	
grading Permit	–	–	
general Plan Amendment	–	–	
specific Plan Approval	–	–	
rezone	–	–	
Williamson Act Contract Cancellation	–	–	
other	–	–	

State Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
scientific Collecting Permit	X	–	
CESA Compliance: 2081	–	–	
CESA Complance: NCCP	–	–	
1602	–	–	
CWA 401 Certification	–	–	
Bay Conservation And Development Commission Permit	–	–	
reclamation Board Approval	–	–	
Delta Protection Commission Notification	–	–	
state Lands Commission Lease Or Permit	–	–	

action Specific Implementation Plan	**–**	**–**	
other	**–**	**–**	

Federal Permits And Approvals	**Required?**	**Obtained?**	**Permit Number (If Applicable)**
ESA Compliance Section 7 Consultation	**–**	**–**	
ESA Compliance Section 10 Permit	**–**	**–**	
Rivers And Harbors Act	**–**	**–**	
CWA 404	**–**	**–**	
other	**–**	**–**	

Permission To Access Property	**Required?**	**Obtained?**	**Permit Number (If Applicable)**
permission To Access City, County Or Other Local Agency Land Agency Name	**–**	**–**	
permission To Access State Land Agency Name	**–**	**–**	
permission To Access Federal Land Agency Name	**–**	**–**	
permission To Access Private Land Landowner Name	**–**	**–**	

If you have comments about any of these questions, enter them here.

Land Use

Evaluation of the conservation value of lands purchased with CALFED funds for wintering Sandhill Cranes

Does the project involve land acquisition, either in fee or through easements, to secure sites for monitoring?
X No.
– Yes.

How many acres will be acquired by fee?

How many acres will be acquired by easement?

Describe the entity or organization that will manage the property and provide operations and maintenance services.

Is there an existing plan describing how the land and water will be managed?
– No.
– Yes.

Will the applicant require access across public or private property that the applicant does not own to accomplish the activities in the proposal?
– No.
X Yes.

Describe briefly the provisions made to secure this access.

Trapping of cranes will likely take place on public and private lands when permission is granted. We will contact potential landowners/managers prior to the capture period and secure permission to access required areas.

Do the actions in the proposal involve physical changes in the current land use?
X No.
– Yes.

Describe the current zoning, including the zoning designation and the principal permitted uses permitted in the zone.

Describe the general plan land use element designation, including the purpose and uses allowed in the designation.

Describe relevant provisions in other general plan elements affecting the site, if any.

Is the land mapped as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance under the California Department of Conservation's Farmland Mapping and Monitoring Program?
X No.
– Yes.

Land Designation	Acres	Currently In Production?
Prime Farmland		**–**
Farmland Of Statewide Importance		**–**
Unique Farmland		**–**
Farmland Of Local Importance		**–**

Is the land affected by the project currently in an agricultural preserve established under the Williamson Act?
X No.
– Yes.

Is the land affected by the project currently under a Williamson Act contract?
X No.
– Yes.

Why is the land use proposed consistent with the contract's terms?

Describe any additional comments you have about the projects land use.

Sandhill Cranes will be monitored via radio-telemetry on numerous lands under varying land uses. Land use data will be recorded for each crane location.