

F1-212

**FEASIBILITY ANALYSIS FOR THE
SAN JOAQUIN RIVER - BEAR CREEK FLOODPLAIN RESTORATION PROJECT
SAN LUIS NATIONAL WILDLIFE REFUGE,
MERCED COUNTY**

DWR
97 JUL 29 PM 3:17

Submitted by:
U.S. Fish and Wildlife Service
San Luis National Wildlife Refuge Complex

I. EXECUTIVE SUMMARY

b. Project Description and Primary Biological/Ecological Objectives

Major flood flows along the San Joaquin River mainstem periodically exceed flow capacity within the river levees, causing local and regional flooding. Even lesser flows can result in seepage damage to levees and lands adjacent to the floodway. The U.S. Army Corps of Engineers (Corps) investigated the potential for a demonstration project for distributing peak flood flows over land on wildlife refuges adjacent to the river. A previous analysis of the West Bear Creek Floodplain Restoration Project was a joint effort by the U. S. Fish and Wildlife Service (USFWS) and the California Department of Water Resources (DWR), using the San Joaquin Basin Action Plan (1995) interagency agreement and San Joaquin River Management Program funding. As envisioned by cooperating agencies, this demonstration project could provide a model for addressing several regional problems simultaneously, including reducing flooding and risk of levee failures along the San Joaquin River, enhancing or restoring ecological processes over portions of the historic river floodplain, providing additional riparian habitats, improving the quality of existing seasonal wetlands through periodic inundation, and improving aquatic habitats for anadromous and warm-water fisheries.

The long-term objective is to restore unimpeded overflow to existing and future dedicated wetlands along the San Joaquin River system to the extent that impacts to adjacent lands and facilities can be mitigated and accepted. New and more continuous wetland and riparian floodplain areas are desirable where they can be appropriately justified in relation to other important land uses needed for a growing population. The goal is to develop regional nonstructural methods for flood conveyance and eventually link restored floodplains on both public and cooperating private lands. Where feasible, this would restore habitat corridors, riparian forest, and seasonal and permanent wetlands in the river's historical floodplain. This vision is consistent with recommendations contained within the San Joaquin River Management Plan, and with the draft CALFED vision for the San Joaquin River Ecological Zone.

c. Approach/Tasks/Schedule

This project is anticipated to be implemented over a 12 to 24 month period. Organized stakeholder participation will be employed to help technical staff and consultants select a final list and description of unimpeded and controlled overbank flow options. The design alternatives will be assessed with a sophisticated hydraulic model that simulates conditions on both rivers and broad overbank floodplains and describes flood stage, frequency, depth, and duration of flows, including downstream effects. Resulting hydrologic changes will be used to evaluate and quantify effects on the aquatic and terrestrial ecosystem, and conditions within the mainstem river. Physical and ecological modeling will be used to assist participating agencies and stakeholders in selecting the final project design for implementation following National Environmental Policy Act (NEPA)/California Environmental Quality Act (CEQA) documentation.

d. Justification for Project and Funding by CALFED

The USFWS wants to restore the natural flooding patterns of the river on its lands to benefit native wetland, riparian, and upland habitats, fisheries, and wildlife; to restore natural ecological functions of the

river's floodplain; reduce the spread of non-native weeds; reduce the regional impacts of flooding along the river downstream; and improve regional groundwater recharge.

Restoring the natural floodplain and hydrological processes to this reach of the San Joaquin River will result in enhanced ecosystem functioning and the natural regeneration of broad, continuous stands of shaded riverine and instream aquatic habitats, and seasonal wetlands. Large acreages of restored habitat will enhance the recovery of many special-status species that depend on wetlands for survival. Benefits will also result for anadromous and warm-water fisheries, including enhanced habitat quality and potentially lower water temperatures.

Implementation of this multi-purpose demonstration project is recommended in Governor Wilson's San Joaquin River Management Plan (1995; pages 102-103) and the Final Report of the Governor's Flood Emergency Action Team ("FEAT" Report, 1997; pages 16, 101, 120, and 151).

e. Budget Costs and Third Party Impacts

The total cost of this project will be \$334,815. Implementation of the proposed demonstration project will result in minimal and short-term impacts during construction. The project will restore the natural floodplain and hydrological processes to this area of the San Joaquin River. The project will enhance ecosystem function, enhance and maintain seasonal wetlands, restore riparian and shaded riverine aquatic (SRA) habitat, and provide direct benefits to fisheries. The project is expected to reduce downstream flooding impacts by providing transient storage of high flows. In addition, it is expected to result in added protection for Highway 165. Adjacent private lands will not be affected by refuge flooding and will benefit from reduced flooding downstream.

f. Applicant Qualifications

USFWS San Luis Refuge has a highly experienced refuge staff that currently manages the land to be included in this floodplain restoration project, and will monitor and report project results annually. Refuge staff have maintained good relations with all neighboring landowners and local agencies. Proposal collaborators include experienced staff at U. S. Bureau of Reclamation (USBR), DWR, South Delta Water Agency, and other agencies participating in implementation of the San Joaquin Basin Plan that have committed ongoing staff time to provide oversight and technical support for this effort.

g. Monitoring and Data Evaluation

USFWS staff and technical/engineering consultants will establish baseline pre-project conditions and monitor and compare annually the results of floodplain restoration for biological resources, ecosystem functions, and downstream floodway management. Results will be published annually.

h. Local Support/Coordination with other Programs/ Compatibility with CALFED Objectives

Local landowners, private waterfowl managers, and local agencies have been invited to participate in the oversight of this project, as they have in the preparation of this proposal. This project is an extension of the recommendations for the San Joaquin River Management Plan, and solutions for the San Joaquin Valley contained in the Governor's FEAT Report. This project is consistent with CALFED emphasis on restoration of ecological structure and function through recovery and enhancement of natural physical processes, including the restoration of natural floodplains associated with large rivers. Priority species and habitat benefits, as well as flood risk reduction, are derived from the reintroduction of natural hydrology over several thousand acres of land. Therefore, this project is a prime example for demonstrating the effectiveness and overlapping multiple benefits of the CALFED philosophy for the recovery of ecosystem health.

II. Title Page

**FEASIBILITY ANALYSIS FOR THE
SAN JOAQUIN RIVER - BEAR CREEK FLOODPLAIN RESTORATION PROJECT
SAN LUIS NATIONAL WILDLIFE REFUGE,
MERCED COUNTY**

Applicant:

U.S. Fish and Wildlife Service
San Luis National Wildlife Refuge Complex
Post Office Box 2176
947-C West Pacheco Blvd.
Los Banos, CA 93635
Contact: Mr. Gary Zahm, Project Leader
(209) 826-3508

Type of Organization: Federal Agency

Tax Identification Number: Not Applicable

Technical and Financial Contact: Mr. Gary Zahm, (209) 826-3508

Participants/Collaborators: California Department of Water Resources, State Reclamation Board, California Department of Parks and Recreation, U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, and South Delta Water Agency

Technical Support: proposal technical assistance from Ayres Associates (hydraulic engineering), Jones & Stokes Associates (environmental science), and Mussetter Engineers (fluvial geomorphology)

RFP Project Group Type: Group 1 (Public Works/Construction Projects) and Group 3 (Services)

July 28, 1997

III. PROJECT DESCRIPTION

a. Project Description and Approach

Since the fall of 1995, U.S. Fish and Wildlife Service (USFWS) staff of the 36,000-acre San Luis National Wildlife Refuge (NWR) Complex (Figure 1) have investigated the possibility of using the recently-acquired Bear Creek Unit properties as a demonstration project area for restoring historical flooding patterns to refuge lands and for temporary (transient) storage of peak flood flows from the San Joaquin River. This innovative demonstration project would require deauthorization or modification of a ten-mile section of levees along the river to restore more natural flooding hydrology (i.e., unimpeded or controlled overbank flow) to seasonal wetland, upland, and riparian habitats on the historic floodplain covering several thousand acres of the Bear Creek Unit of the refuge.

Before implementation, the project will evaluate a full range of approaches to floodplain restoration. Levee breaches or setbacks that allow passive, unimpeded overbank flow is one approach. Other alternatives might require flood gates or controlled release weirs built into the existing levees that regulate the diversion of river floodwater into the floodplain. Figure 2 indicates some hypothetical locations for levee gates or weirs that could distribute flood flows over the historic floodplain by diverting a portion of flow from the main river channel.

Specifically, this feasibility study and alternatives analysis would investigate a variety of possible benefits and constraints, including engineering; floodplain management; effects on local roads, highways, and private property; effects on refuge operations; and possible effects on special-status species and other sensitive biological resources. It would examine how much water can be diverted from the San Joaquin River at the Bear Creek Unit during flood events, how and where the water can be moved without damaging biological resources or essential infrastructure, and what third party impacts or benefits might occur.

The proposed feasibility analysis is intended to expand on the California Department of Water Resources' (DWR's) 1996 hydraulic analyses. Preliminary analyses indicate that implementing the floodplain restoration project at the West Bear Creek Unit would be unlikely to result in adverse impacts on private or public property. Hydraulic analyses by DWR, with USBR assistance, showed that reducing peak flows in the San Joaquin River by spreading water on refuge lands would result in a stage height reduction at several downstream locations. The amount of stage height reduction will depend on the capacity, design, and location(s) of structures or levee modifications constructed to redirect flood flows and on how the refuge is operated.

The Reclamation Board staff indicated that a detailed engineering analysis, based on 1983 peak flows, would be required before the Board would recommend deauthorization of the levees.

b. Project Location and Geographic Boundaries

The Bear Creek Unit is a portion of the San Luis NWR Complex (Figure 1). The East and West Bear Creek Units lie directly north of the San Luis Unit; both units straddle the San Joaquin River at the confluence with Bear Creek, and are bordered by Salt Slough and Highway 165 on the west. Across the highway farther to the west, is the extensive Great Valley Grasslands State Park, which also contains native grasslands, seasonal wetlands, and riparian habitats.

Figure 1

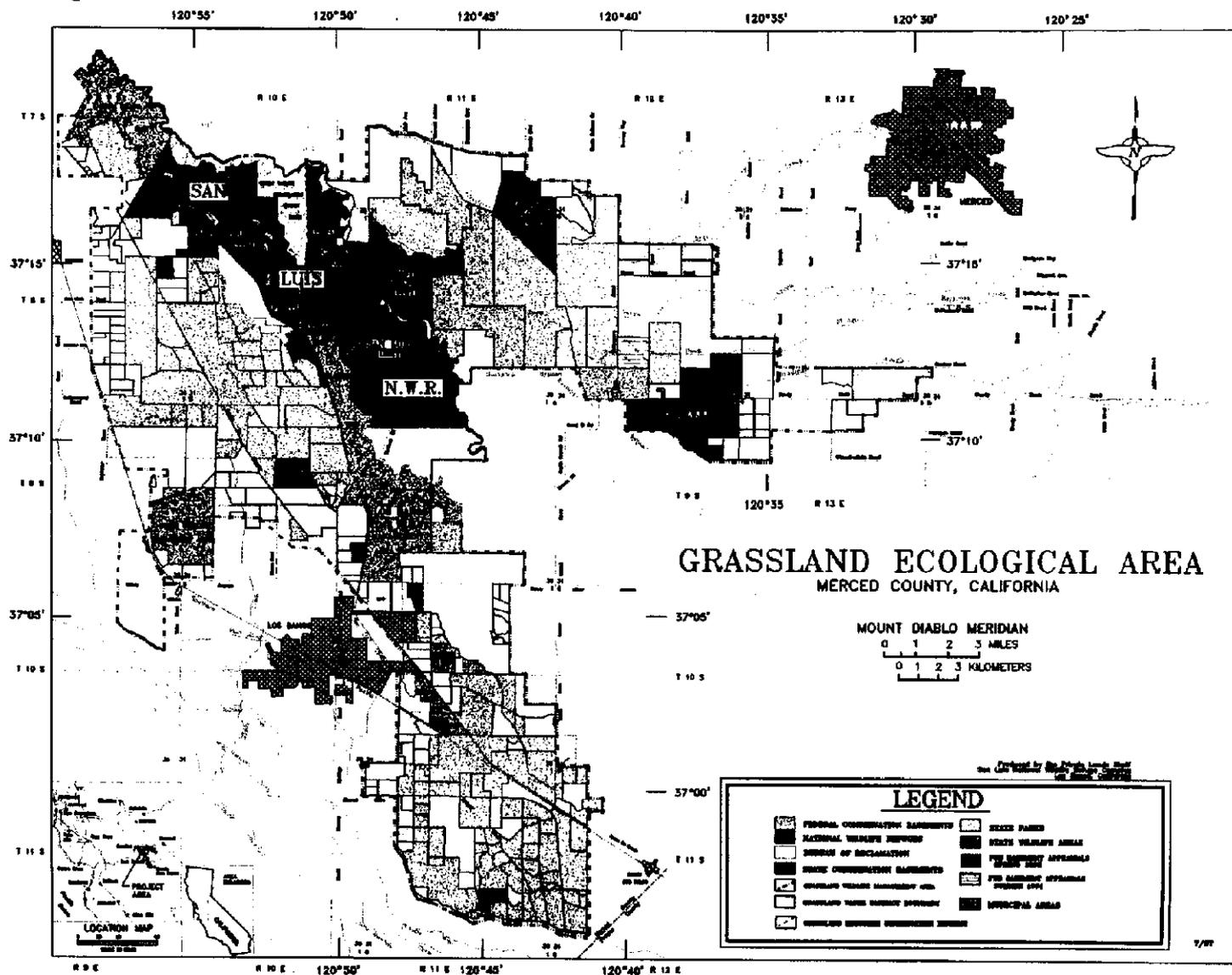
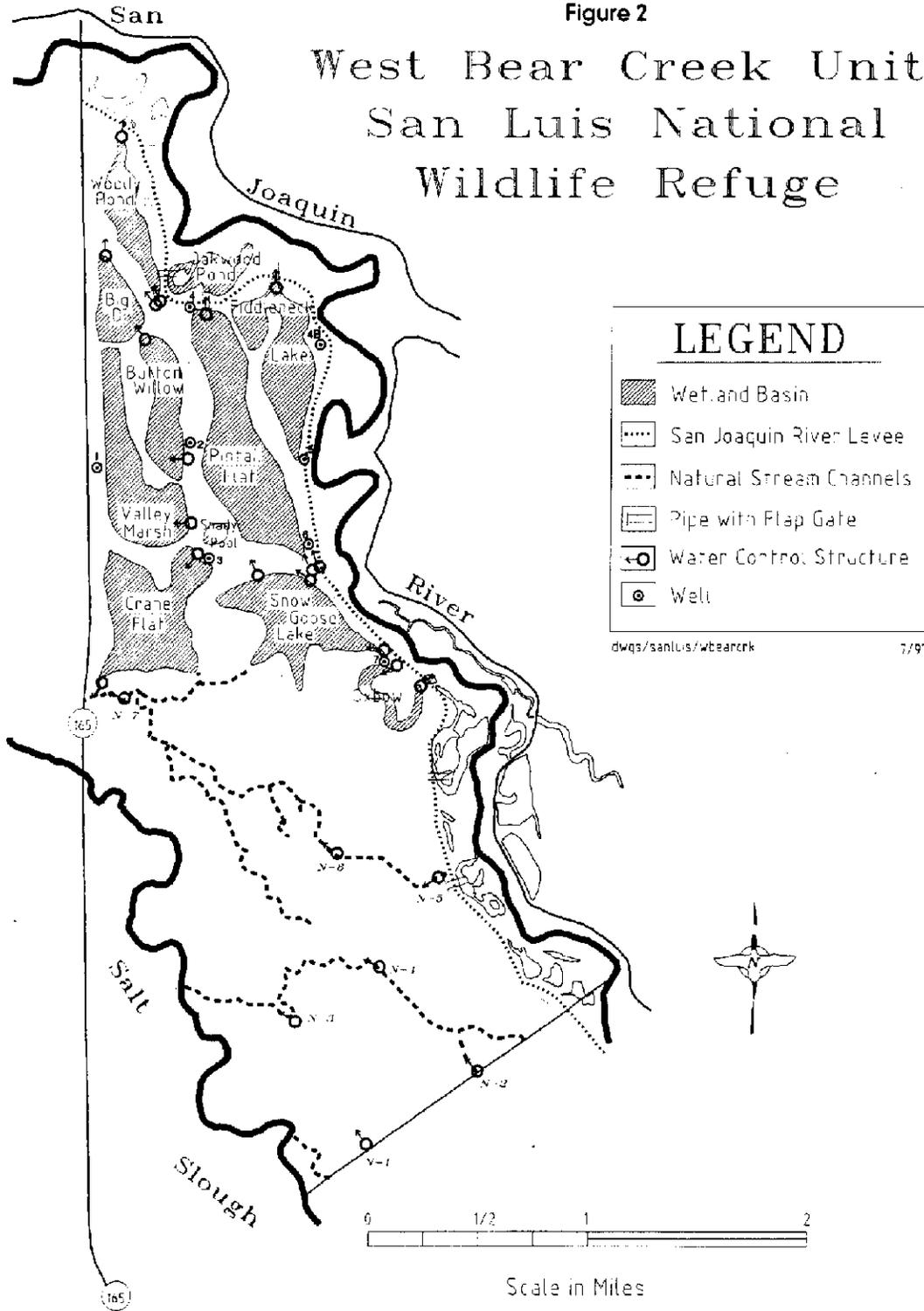


Figure 2

West Bear Creek Unit San Luis National Wildlife Refuge



c. Expected Benefits

This project will provide many benefits that are consistent with the goals and objectives of the CALFED program, including:

- restoring large acreage of native habitats within the river's historical floodplain to include seasonal and permanent wetlands, riparian forests, and shaded riverine and instream aquatic habitats
- enhancing instream aquatic habitats for both native resident fishes including splittail and anadromous species by restoring SRA, potential reductions in instream temperatures, enhanced foodweb production, and through gradual release of floodwater
- restoring high-quality habitats that could potentially support a diversity of special-status species and other wildlife to include greater sandhill cranes, Aleutian Canada geese, giant garter snakes, western yellow-billed cuckoos, Swainson's hawks, tricolored blackbirds, riparian brush rabbits, waterfowl, shorebirds, wading birds, riparian wildlife guild, and neotropical migratory bird guild
- reducing downstream flooding impacts (e.g., fish stranding when levees overtop; prolonged inundation and sedimentation of cropland) by providing transient storage of high flows that would gradually drain back to the river through natural sloughs and channels
- improving groundwater recharge in the San Joaquin River floodplain
- providing technical information and demonstrated results that can be applied to other areas along the San Joaquin River.

d. Background and Biological/Technical Justification

Historically, the upper San Joaquin River provided habitat for the southernmost stocks of spring- and fall-run chinook salmon and perhaps steelhead. Spring-run chinook salmon runs were eliminated from the basin with the closure of Friant Dam in 1949, and fall-run chinook salmon and steelhead trout escapements have been extremely low in recent years. Only five of the original 19 native fish species in the San Joaquin drainage are reasonably abundant and widely distributed. Numerous small and large diversions, elevated water temperatures, channel dredging, waste discharges, low dissolved oxygen, lack of shaded riverine aquatic habitats, agricultural runoff, and other factors contribute to fisheries declines. Restoration of riparian forest and SRA habitat along 10 miles of the San Joaquin River through this demonstration project will provide direct benefits to the fisheries and the aquatic ecosystem. The results of this demonstration project can be used to assist in the further restoration of the San Joaquin River and its natural floodplain.

Most of the 62 miles of riparian habitat existing within the San Luis NWR Complex is currently in degraded condition. This is due to past construction of flood control dams and levees, past livestock grazing, agricultural drainwater discharges, altered channel sedimentation and flow characteristics, and other vegetation management practices. Under existing conditions, the reach of the San Joaquin River bisecting the Bear Creek Units (East and West) is confined by levees. There has been limited opportunity in the past to develop additional shaded riverine or instream aquatic habitats, because of routine channel maintenance activities and channel capacity issues. Similarly, floodwater that would otherwise enhance and maintain seasonal wetlands at this site is prevented by levees along the river from flowing onto refuge lands.

After implementation, this project will be self-sustaining into the future and may only require routine maintenance of levees and floodgates, or less effort if portions of levees are deauthorized and abandoned to accommodate unimpeded overland flooding. (No levees in this reach failed during the January 1997 flood.) Refuge lands will not be flooded until the river reaches a specific flood stage, when the gates or floodplain elevations permit passive flooding. The project floodplain restoration would allow floodwater to expand onto USFWS refuge lands in a fashion that replicates natural river hydrology. No effort to artificially store or retard the drainage of flood waters is anticipated, other than natural floodplain detention functions. Flood water would freely peak and then decrease to lower levels by shallow overland flow that would drain gradually back to the river downstream.

Although USFWS and DWR have been reviewing this project for several years, it has not been implemented because additional technical and feasibility studies are required by the California Department of Transportation and the Reclamation Board. For these reasons, the San Joaquin River - Bear Creek Floodplain Restoration Project should be considered a new project. After the required studies and project implementation are completed, the project will be an excellent demonstration area for other reaches of the San Joaquin River with similar land uses, flooding patterns, and habitat potential.

e. Proposed Scope of Work

Task 1. Describe and Map Baseline Conditions and Develop Topographic Basemap. One-foot contour topographic maps and hydrographic data (underwater contours) developed by DWR and USBR for the project site will be used to create a Microstation topographic basemap for the entire area of the San Joaquin River and floodplain anticipated to be affected by the floodplain restoration project. Important existing infrastructure (e.g., transportation and utility corridors, water control gates) and drainage networks, and any proposed new structures will be located on the new basemap. In conjunction with Reclamation Board staff, project area hydrology will be established for the 2-, 10-, 50-, and 100-year flood events, based on the most current hydrologic data and flood routing assumptions used by the Corps of Engineers, DWR, and USBR for this reach of the San Joaquin River. We will develop a representative hydrograph for the simulation of flood routing through the project reach in the main channel and over the proposed floodplain. Using primarily information on file at USFWS Refuge headquarters, maps will plot the distribution of existing biological resources (habitats, species populations) and refuge management facilities (access roads, managed wetlands and water supply features) on the topographic basemap. Species and habitats sensitive to hydrologic changes and cycles will be described.

Task 2. Facilitate Stakeholder Participation and Refine Descriptions of Nonstructural Alternatives for the Floodplain Restoration Project. Meetings and workshops will be conducted to refine project objectives and develop a suitable range of project alternatives for detailed evaluation. Alternatives to consider will include both passive (unimpeded flow at levee lowering or removal sites) and more active conceptual designs (fixed weirs or managed flood gates). Participants will include landowners adjacent to and downstream of the affected area and appropriate staff from local, state, and federal agencies responsible for flood management, refuge operations, and fish and wildlife resources. Onsite investigations of all proposed flood gate or levee modification and breach sites will be performed to ensure that they will be in appropriate locations for optimal floodwater management and to minimize disturbance of existing resources.

Task 3. Identify Lands for Transient Storage of Floodwaters and Review Existing and Historical Data and Aerial Photographs. Data derived in Task 1 and previous studies performed by DWR will be

used to identify specific lands that will be used for transient storage of floodwaters. Soil morphology and floodplain geomorphology will be interpreted using existing information to determine pre-reclamation (i.e., assumed natural) channels, deposition zones and drainage networks, vegetation type patterns, and presumed variations in natural hydrology. Historical aerial photographs will be reviewed to further identify historic landscape patterns and determine the full restoration potential of refuge habitats.

Task 4. Calculate Capacity of Bear Creek Unit Lands to Detain Floodwaters Under Maximum Storage and Optimal Refuge Management Scenarios. USBR recently performed detailed mapping of the West Bear Creek Unit property (one-foot contours). Using this information and flow data from the San Joaquin River, DWR developed a BOSS HEC-2 model. Additional flood routing analysis required by the Reclamation Board will be performed, including calibration of model hydrology to known high water marks and gage stations at the selected discharges. A UNET hydraulic model will be prepared and used to simulate existing and proposed water surface elevations in the channel and flooding conditions over the broad, shallow floodplain on refuge lands. Simulated flood conditions under project alternatives will also be evaluated for their effects on biological resources throughout the floodplain and potential ecological benefits within the affected area. Additional one-foot contour mapping of the East Bear Creek Unit will be provided by USBR if this study is undertaken by USFWS.

Task 5. Estimate the Project's Contribution to Reducing Local and Regional Flooding. This task will build on information derived by DWR and in Task 3. The project's contribution to reducing local and regional flooding will be examined under various depth and flood duration scenarios. Analyses will focus on:

- the relative magnitude of benefits to reducing downstream river stage and levee risk, comparing existing conditions to relatively unimpeded overflow or alternatives that regulate the rate or maximum elevation of floodplain inundation
- the extent of local flooding of agricultural and other adjacent lands that could be eliminated by implementing this project, and hydrology methods to avoid flooding of local roads (including Highway 165) and refuge maintenance access ways
- identifying optimum flood depth and duration scenarios and associated water surface elevations needed to maximize benefits and minimize impacts to biological resources and refuge operations.

Task 6. Evaluate Geomorphic Effects of Channel and Floodplain Hydraulics. This task will assess qualitatively the effects of proposed overbank flooding scenarios on sediment transport within the river, and the anticipated sediment deposition patterns and flow distribution within the restored floodplain area.

Task 7. Describe Potential Ecological Benefits to Vernal Pools, Riparian Forests and other Sensitive Communities. USFWS is restoring 947 acres of seasonal and permanent wetlands and is protecting 379 acres of vernal pools and riparian habitat independent of the levee deauthorization project for Bear Creek Unit. However, restoring the floodplain and making this area available to high flows from the river will contribute significantly to the success of these restoration and protection efforts by providing a more natural hydrology and self-sustaining ecosystem. The extent and quality of potential habitat areas and ecological functions will be quantified, with and without implementation of this project. Vernal pool distribution will be evaluated in relation to anticipated flood elevations and flood frequency and duration. Conceptual restoration plans will also be developed that will target habitats for species of concern. Early Section 7 Endangered Species Act consultation will be coordinated with USFWS Ecological Services staff.

Mapping associated with this task will be done on a Geographic Information System (GIS) that is compatible with the GIS system that is currently in use at the San Luis NWR Complex. It could be used later by CALFED, DWR, and others.

Task 8. Describe Benefits to Anadromous and Warm-Water Fisheries and Aquatic Habitats. This project will restore approximately 10 miles of shaded riverine aquatic habitat, and could substantially improve habitat conditions for fish in this reach of the river. Published literature and agency file data on local fish populations and instream aquatic habitats will be reviewed and summarized. A stream habitat inventory will be conducted of the area of the San Joaquin River that bisects the Bear Creek Unit and other natural water courses through the San Luis NWR complex that could be affected by this project, using the U.S. Forest Service's modified Bisson habitat classification system and the DFG Stream Habitat Restoration Manual. Maps will be produced that indicate the major channel and habitat characteristics and optimal sites for instream aquatic habitat enhancement activities. The amount of new fish habitat that is likely to be created (including shaded riverine aquatic cover, instream aquatic habitat, and overhanging banks) will be quantified. Potential effects on fish stranding, water temperatures, water quality, aquatic food supply, and dissolved oxygen will also be assessed.

Task 9. Describe Benefits to Waterfowl and Shorebird Habitats and Special-Status Plants and Wildlife. Existing maps and refuge file data will be used to document current use of the Bear Creek Unit by migratory and resident wildlife and identify potential benefits of the project associated with restored natural flooding cycles. Reconnaissance-level field surveys will be conducted at all major wildlife habitats at the Bear Creek Unit. Primary objectives of the field surveys will be to characterize existing wildlife use of the study area, document waterfowl management and population distribution on adjacent private lands and hunting clubs, note the occurrence of special-status species, and identify sensitive habitat areas that should be avoided during intensive restoration activities. Any species that could experience adverse population or habitat effects due to the project will also be identified. Possible effects of altered flood hydrology on adjacent privately managed waterfowl areas will be evaluated.

Task 10. Describe Potential Project Impacts on Cultural Resources. USFWS performed extensive surveys of cultural resources before implementing the ongoing wetland restoration activities at the West Bear Creek Unit. Potential impacts on cultural resources appear unlikely, since the project involves returning natural flooding patterns to this area and is not expected to involve impacts to previously undisturbed lands. Archaeologists will perform a reconnaissance-level survey of areas expected to be disturbed by grading activity as a result of project implementation.

Task 11. Develop Criteria and Guidelines for Identifying Additional Transient Flood Storage Sites. The hydrology and ecological conditions along the San Joaquin River and its floodplain are less completely known than those along the Sacramento River. An important part of this demonstration project will be to tentatively identify and qualitatively evaluate additional sites in the vicinity of San Luis Refuge (e.g., East Bear Creek Unit, Great Valley Grasslands State Park, etc.) potentially suitable for transient storage of flood waters that could provide ecological and flood control benefits similar to the West Bear Creek Unit site. Criteria and guidelines developed for preliminary site selection and conceptual design features could include adjacent and onsite land use and management practices, land ownership (e.g., public or private), floodplain and channel geomorphology, anticipated flood control benefits, existing and potential ecological functions and values, and potential for restoring seasonal and permanent wetlands, shaded riverine/riparian habitats, and aquatic instream habitat. Measures will be considered to provide infrastructures within wetland areas and adjacent floodplains, or ways in which existing infrastructure and management can be

altered to accept infrequent flooding and unimpeded overflow, or protected by ring levees, setback levees, or other means.

Task 12. Perform NEPA and CEQA Compliance and Obtain Permits. A draft and final environmental assessment and initial study will be prepared for the proposed project. In addition, necessary permits will be obtained from state and federal agencies.

f. Monitoring and Data Evaluation

USFWS is committed to implementing a 3 to 5 year monitoring program to evaluate the effects of the proposed project on sensitive biological resources. Focused studies will be performed to document the effects of restoring the natural hydrology to the floodplain of the San Joaquin River. Primary objectives of the monitoring program will be to quantify the effects of overland flow on wetland and upland vegetation communities and their dependent wildlife populations. For example, USFWS will establish fixed study transects to establish a preproject baseline condition to be compared with habitat conditions after the project has been constructed and flooding has occurred. USFWS will measure the extent of new habitat in the first year following the first flood event. Shaded riverine aquatic cover, instream aquatic habitat, and upland vegetation (e.g., weed abatement) will be measured. Survey transects will be evaluated for 3 to 5 years to document changes in these communities and their subsequent use by fish and wildlife. Long-term development of habitat will be determined by monitoring at the site and analyzing the monitoring data. Monitoring will be conducted seasonally (and more often if needed) to address the effectiveness of the project (e.g., surveys will be conducted following high flow events that inundate the site). Aquatic, riparian, and wetland habitats will be mapped initially and thereafter once per year, with habitat gains documented. Information obtained from each survey will be compiled and analyzed, with the results presented in annual data reports. Results will be coordinated with the San Joaquin River Management Program participants and the CALFED technical review committees. Aspects of the work could lend themselves to publication in peer reviewed journals that focus on habitat restoration and flood control.

g. Implementability

This project is consistent with recent policy direction and guidelines of state and federal flood management agencies. It is intended to promote greater emphasis on non-structural solutions, greater utilization of natural floodplains, reduction of exclusive reliance on high-maintenance levees, and reduced flood risk through land use compatibility with managed floodplains. Planning and support for this project has included local landowners and water districts; numerous local, state, and federal agencies; and preliminary technical studies of engineering issues and biological resources. The project will continue to be conducted in coordination with the San Joaquin River Management Program.

The project proposal includes compliance with NEPA and CEQA. Other necessary local, state, and federal permits will be addressed during the environmental compliance process. The land proposed to be inundated by the demonstration project and affected by construction has already been acquired in fee title by USFWS. Construction is expected to occur in the dry season to ensure that the construction sites are not inundated under high flows.

IV. COSTS AND SCHEDULE TO IMPLEMENT PROPOSED PROJECT

a. Project Budget and Partnership Commitments

Table 1 outlines (by task) the direct labor hours, salary, and direct expenses for the USFWS, DWR, and the Corps. The budget for expert technical assistance (by task) is included under "service contracts".

The USFWS and team participants desire funding support for technical and feasibility studies to augment their present efforts through the San Joaquin Basin Action Plan and the San Joaquin River Management Program. It is hoped that the entire feasibility study and environmental compliance and permitting can be funded by CALFED so as to expedite the future implementation of the demonstration project. If, however, CALFED desires to fund this effort in distinct phases, Tasks 1-11 can be considered Phase 1, and Task 12 can be considered Phase 2.

The USFWS will contribute staff time to both project management and administration of the project. In addition, USFWS is contributing considerable field biologist task time to the effort. The USBR, through the San Joaquin Basin Action Plan, will be contributing approximately \$80,000 to prepare one-foot contour maps of the East Bear Creek Unit. These contributions demonstrate the commitment of members of the partnership in the demonstration project. Future operation and maintenance in the project area will be funded through USFWS's operational budget for the San Luis Refuge. The USFWS and team participants continue to be committed to floodplain restoration through the San Joaquin Basin Action Plan and support implementation of this demonstration project.

USFWS has already undertaken a competitive bid process to select environmental and engineering consultants under its Indefinite Quantity Contract (IQC). The USFWS will use its IQC to select subconsultants for the proposed study.

b. Schedule Milestones

The USFWS is committed to expediting this program. The technical and feasibility studies, including environmental compliance and permitting, will be completed in approximately 12 months. Tasks 1-11 are expected to be completed in 9 months, Task 12 in 3 months.

c. Third Party Impacts

Implementation of the proposed demonstration project will result in minimal and short-term impacts during construction. The project will restore the natural floodplain and hydrological processes to this area of the San Joaquin River. The project will enhance ecosystem function, enhance and maintain seasonal wetlands, restore riparian and SRA habitat, and provide direct benefits to fisheries. The project is expected to reduce downstream flooding impacts by providing transient storage of high flows. In addition, the project is expected to result in added protection for Highway 165. Adjacent private lands will not be affected by refuge flooding, and will benefit from reduced flooding downstream.

V. APPLICANT QUALIFICATIONS

The USFWS will develop and monitor this project. Key staff members and their qualifications are listed below.

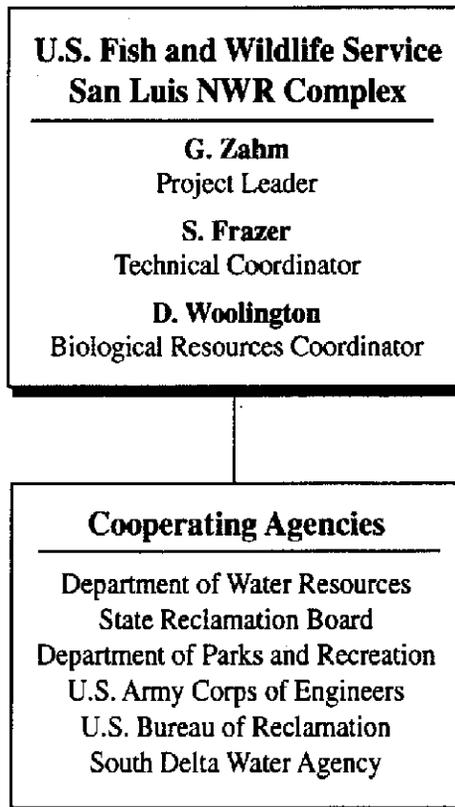
Gary Zahm has been the Refuge Manager for the U.S. Fish and Wildlife Service for the past 34 years. Since 1980, he has served as project leader for the San Luis National Wildlife Complex in Los Banos, California. Mr. Zahm oversees operations and management of five national wildlife refuges plus two wildlife management areas within the Grasslands Ecological area in Merced County, California; with major emphasis on the restoration and enhancement of wetland and riparian habitat. He has managed the restoration of over 1,000 acres of seasonal and permanent wetland habitat; as well as supervising an ongoing riparian restoration on 78 miles of riverine channels. Mr. Zahm received a B.S. in zoology from the University of New Mexico in 1966.

Scott Frazer is the Refuge Manager and refuge operations specialist for the U. S. Fish and Wildlife Service for the San Luis National Wildlife Refuge. His responsibilities include water quality monitoring, intensive wetland management, and large habitat restoration projects. He is the primary technical coordinator for the innovative "non-structural" flood protection proposals on the refuge complex. Mr. Frazer received a B.S. in wildlife biology from Humboldt State University in 1979.

Dennis Woolington is a Supervisory Wildlife Biologist at the San Luis National Wildlife Refuge Complex for the U.S. Fish and Wildlife Service. He serves as a staff advisor to the project leader on biological and management issues, and oversees the biological program on three National Wildlife Refuges totaling more than 35,000 acres. Mr. Woolington's responsibilities include developing and overseeing operational surveys and monitoring efforts; coordinating research, designing and obtaining funding for major habitat restoration projects, implementing riparian restoration efforts, and preparing National Environmental Policy Act documents and Section 7 Consultations. Mr. Woolington received a B.S. in wildlife sciences from Purdue University in 1974, and a M.S. in wildlife management from Humboldt State University in 1980.

Six other agencies will cooperate with USFWS to facilitate the San Joaquin River-Bear Creek Floodplain Restoration Project (see Figure 3).

Figure 3
**Organizational Chart for the
West Bear Creek Floodplain Restoration Project**



VI. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

USFWS will comply with all terms and conditions presented in Appendix D of the CALFED Request for Proposals. Attached to this proposal are the required documents guaranteeing non-discrimination and noncollusion compliance.

NONDISCRIMINATION COMPLIANCE STATEMENT

U. S. Fish and Wildlife Service

CONTRACT NAME

The company named above (hereinafter referred to as "prospective contractor") hereby certifies, unless specifically exempted, compliance with Government Code Section 12990 (a-f) and California Code of Regulations, Title 2, Division 4, Chapter 5 in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program. Prospective contractor agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, disability (including HIV and AIDS), medical condition (cancer), age, marital status, denial of family and medical care leave and denial of pregnancy disability leave.

CERTIFICATION

I, the official named below, hereby swear that I am duly authorized to legally bind the prospective contractor to the above described certification. I am fully aware that this certification, executed on the date and in the county below, is made under penalty of perjury under the laws of the State of California.

OFFICIAL'S NAME

GARY R. ZAHM

DATE EXECUTED

7/28/97

EXECUTED IN THE COUNTY OF

Merced

PROSPECTIVE CONTRACTOR'S SIGNATURE

PROSPECTIVE CONTRACTOR'S TITLE

PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME

Sam Linc National Wildlife Refuge Complex, U.S. Fish + Wildlife Service.

NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY
BIDDER AND SUBMITTED WITH BID FOR PUBLIC WORKS

STATE OF CALIFORNIA)

)ss

COUNTY OF MERCED)

GARY R. ZAHM
(name)

being first duly sworn, deposes and

says that he or she is Refuge Manager of
(position title)

The San Luis N.W.R. (U.S. Fish + Wildlife Service)
(the bidder)

the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

DATED: 7/28/97

By

Gary R. Zahm
(person signing for bidder)

Subscribed and sworn to before me on

Karen Downs

(Notary Public)



(Notarial Seal)