

# M&T/Llano Seco Fish Screen Facility - Short-Term/Long-Term Protection Project

## Project Information

1. **Proposal Title:**

M&T/Llano Seco Fish Screen Facility - Short-Term/Long-Term Protection Project

2. **Proposal applicants:**

Les Heringer, M & T Chico Ranch

3. **Corresponding Contact Person:**

Les Heringer  
M & T Chico Ranch  
3964 Chico River Rd Chico, CA 95928  
530 342-2954  
mtchico@sunset.net

4. **Project Keywords:**

**Fish Passage/Fish Screens**  
**Fluvial Geomorphology**  
**Sediment Generation, Movement, and Accumulation**

5. **Type of project:**

Fish Screen

6. **Does the project involve land acquisition, either in fee or through a conservation easement?**

No

7. **Topic Area:**

Fish Screens

8. **Type of applicant:**

Private for profit

9. **Location - GIS coordinates:**

Latitude: 39.701

Longitude: -121.941

Datum:

**Describe project location using information such as water bodies, river miles, road intersections, landmarks, and size in acres.**

The project location is on the East Bank of the Sacramento River just south of the Bidwell State Park at River Mile 193. The project is downstream of the Big Chico Creek's confluence with the Sacramento River and is approximately six miles SSW of the City of Chico.

**10. Location - Ecozone:**

3.3 Chico Landing to Colusa, 7.5 Big Chico Creek

**11. Location - County:**

Butte

**12. Location - City:**

Does your project fall within a city jurisdiction?

No

**13. Location - Tribal Lands:**

Does your project fall on or adjacent to tribal lands?

No

**14. Location - Congressional District:**

2nd

**15. Location:**

**California State Senate District Number: 1**

**California Assembly District Number: 3**

**16. How many years of funding are you requesting?**

3

**17. Requested Funds:**

a) Are your overhead rates different depending on whether funds are state or federal?

No

If no, list single overhead rate and total requested funds:

Single Overhead Rate: N/A

Total Requested Funds: \$2,159,850

b) Do you have cost share partners already identified?

No

c) Do you have potential cost share partners?

No

d) Are you specifically seeking non-federal cost share funds through this solicitation?

No

If the total non-federal cost share funds requested above does not match the total state funds requested in 17a, please explain the difference:

**18. Is this proposal for next-phase funding of an ongoing project funded by CALFED?**

No

Have you previously received funding from CALFED for other projects not listed above?

No

**19. Is this proposal for next-phase funding of an ongoing project funded by CVPIA?**

No

Have you previously received funding from CVPIA for other projects not listed above?

No

**20. Is this proposal for next-phase funding of an ongoing project funded by an entity other than CALFED or CVPIA?**

No

**Please list suggested reviewers for your proposal. (optional)**

**21. Comments:**

**17a) The single overhead rate is not applicable because the applicant is not performing the work described in this proposal. All work will be done by subconsultants. 17c) M&T Chico Ranch and Llano Seco Ranch have demonstrated strong commitment to this project by contributing to the Environmental Documentation - Negative Declaration, legal fees to assist in securing the necessary permits for construction, and surveying and appraisal of the gravel bed. Other potential cost share partners may include the City of Chico and U.S. Fish and Wildlife although no commitment has been made at the time this proposal was completed. 18) Construction for the M&T/Llano Seco Fish Screens and relocation of the pumping facility was delivered by Ducks Unlimited, Inc. CALFED No. 96-M22. (\$4.7 Million)**

# Environmental Compliance Checklist

## M&T/Llano Seco Fish Screen Facility - Short-Term/Long-Term Protection Project

### 1. CEQA or NEPA Compliance

a) Will this project require compliance with CEQA?

Yes

b) Will this project require compliance with NEPA?

Yes

c) If neither CEQA or NEPA compliance is required, please explain why compliance is not required for the actions in this proposal.

2. **If the project will require CEQA and/or NEPA compliance, identify the lead agency(ies). If not applicable, put "None".**

CEQA Lead Agency: CA Department of Fish and Game

NEPA Lead Agency (or co-lead:) US Army Corps of Engineers

NEPA Co-Lead Agency (if applicable):

3. **Please check which type of CEQA/NEPA documentation is anticipated.**

#### **CEQA**

-Categorical Exemption

Negative Declaration or Mitigated Negative Declaration

-EIR

-none

#### **NEPA**

-Categorical Exclusion

Environmental Assessment/FONSI

-EIS

-none

If you anticipate relying on either the Categorical Exemption or Categorical Exclusion for this project, please specifically identify the exemption and/or exclusion that you believe covers this project.

### 4. CEQA/NEPA Process

a) Is the CEQA/NEPA process complete?

No

If the CEQA/NEPA process is not complete, please describe the dates for completing draft and/or final CEQA/NEPA documents.

CEQA: The draft Proposed Negative Declaration is to be submitted to the State permit clearing house for public review on 9/14/01. The final CEQA documents should be completed shortly after or by July 2002. NEPA: NEPA documentation will be secured by July 2002 or sooner.

b) If the CEQA/NEPA document has been completed, please list document name(s):

5. **Environmental Permitting and Approvals** (*If a permit is not required, leave both Required? and Obtained? check boxes blank.*)

**LOCAL PERMITS AND APPROVALS**

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**

Scientific Collecting Permit

CESA Compliance: 2081

CESA Compliance: NCCP

1601/03 Required

CWA 401 certification Required

Coastal Development Permit

Reclamation Board Approval Required

Notification of DPC or BCDC

Other

**FEDERAL PERMITS AND APPROVALS**

ESA Compliance Section 7 Consultation Required

ESA Compliance Section 10 Permit Required

Rivers and Harbors Act

CWA 404

Other Required

## **PERMISSION TO ACCESS PROPERTY**

Permission to access city, county or other local agency land.

Agency Name:

Permission to access state land.

Agency Name: CA State Park and Recreation

**Required**

Permission to access federal land.

Agency Name:

Permission to access private land.

Landowner Name:

### **6. Comments.**

8) Under Federal Permits and Approvals: A Letter of Permission (LOP) will be secured by the US Army Corps of Engineers. At the time of this proposal, the permits listed were checked as being required, but not yet obtained. The environmental documentation process has begun and it is possible that many of the permits listed above will be secured between the time this proposal is submitted and when it is reviewed.

# Land Use Checklist

## M&T/Llano Seco Fish Screen Facility - Short-Term/Long-Term Protection Project

1. Does the project involve land acquisition, either in fee or through a conservation easement?

No

2. Will the applicant require access across public or private property that the applicant does not own to accomplish the activities in the proposal?

Yes

3. Do the actions in the proposal involve physical changes in the land use?

Yes

If you answered yes to #3, please answer the following questions:

- a) How many acres of land will be subject to a land use change under the proposal?

8

- b) Describe what changes will occur on the land involved in the proposal.

The inside of the gravel bar will be excavated to approximately 5 feet below the summer-fall low-flow water surface elevation. Excavation of the gravel bar would return flow patterns to those that occurred in 1995.

- c) List current and proposed land use, zoning and general plan designations of the area subject to a land use change under the proposal.

Category	Current	Proposed (if no change, specify "none")
Land Use	Gravel Bed along the edge of the river	none - Gravel bed will be reduced
Zoning	A-5	none
General Plan Designation	OFC (Orchard Field Crops)	none

- d) Is the land currently under a Williamson Act contract?

No

- e) 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?

**No**

- f) Describe what entity or organization will manage the property and provide operations and maintenance services.**

**M & T Chico Ranch will manage the property and provide operations and maintenance services.**

**4. Comments.**



# **Conflict of Interest Checklist**

## **M&T/Llano Seco Fish Screen Facility - Short-Term/Long-Term Protection Project**

**Please list below the full names and organizations of all individuals in the following categories:**

- **Applicants listed in the proposal who wrote the proposal, will be performing the tasks listed in the proposal or who will benefit financially if the proposal is funded.**
- **Subcontractors listed in the proposal who will perform some tasks listed in the proposal and will benefit financially if the proposal is funded.**
- **Individuals not listed in the proposal who helped with proposal development, for example by reviewing drafts, or by providing critical suggestions or ideas contained within the proposal.**

**The information provided on this form will be used to select appropriate and unbiased reviewers for your proposal.**

**Applicant(s):**

**Les Heringer, M & T Chico Ranch**

**Subcontractor(s):**

**Are specific subcontractors identified in this proposal? Yes**

**If yes, please list the name(s) and organization(s):**

**Olen Zirkle - DU                      Various - MWH**  
**Dan Tibbits                      Owen Ayres & Associates**  
**Christian Braudrick      Stillwater Sciences**

**Helped with proposal development:**

**Are there persons who helped with proposal development?**

**Yes**

**If yes, please list the name(s) and organization(s):**

**Chris Leininger      CL & Co**  
**Amy L. Wade              MWH**  
**Neil Schild      MWH**

**Kevin Foerster U.S. Fish and Wildlife Service**

**Olen Zirkle Ducks Unlimited**

Budget Summary												
M&T/Llano Seco Fish Screen Facility - Short-Term/Long-Term Protection Project												
Please provide a detailed budget for each year of requested funds, indicating on the form whether the indirect costs are based on the Federal overhead rate, State overhead rate, or are independent of funding source.												
<u>Independent of Fund Source</u>												
Year 1												
Task No.	Task Description	Direct Labor Hours	Salary (per year)	Benefits (per year)	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Costs
1	Project Management	50	7500	2850		500	156800	2300				169950
2	Public Outreach/Local Involvement						28900					28900
3	Gravel Bar Engineering						100000					100000
4	Gravel Bar Reduction						200000					200000
5	Gravel Bar Monitoring						25000					25000
6	Compile Existing Data						16000					16000
7	Steering Committee						96800					96800
8	Data Collection/Investigation						152000					152000
9	River Model						48000					48000
10	Develop Project Alternatives						43600					43600
11	Biological Assessment											0
12	Conceptual Design of Preferred Alternative											0
13	Long-term Planning Study											0
<b>Total Year 1</b>			<b>7500</b>	<b>2850</b>	<b>0</b>	<b>500</b>	<b>867100</b>	<b>2300</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>880250</b>

**Year 2**

Task No.	Task Description	Direct Labor Hours	Salary (per year)	Benefits (per year)	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Costs
1	Project Management	50	7500	2850		500	143500					154350
2	Public Outreach/ Local Involvement						28900					28900
3	Gravel Bar Engineering											0
4	Gravel Bar Reduction											0
5	Gravel Bar Monitoring						25000					25000
6	Compile Existing Data											0
7	Steering Committee						88800					88800
8	Data Collection/ Investigation											0
9	River Model						85300					85300
10	Develop Project Alternatives											0
11	Biological Assessment						35500					35500
12	Conceptual Design of Preferred						52000					52000
13	Long-term Planning Study						79850					79850
	<b>Total Year 2</b>		<b>7500</b>	<b>2850</b>	<b>0</b>	<b>500</b>	<b>538850</b>					<b>549700</b>

**Year 3**

Task No.	Task Description	Direct Labor Hours	Salary (per year)	Benefits (per year)	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Costs
1	Project Management	50	7500	2850		500	87050					97900
2	Public Outreach/ Local Involvement						28900					28900
3	Gravel Bar Engineering						100000					100000
4	Gravel Bar Reduction						355000					355000
5	Gravel Bar Monitoring						25000					25000
6	Compile Existing Data											0
7	Steering Committee						81800					81800
8	Data Collection/ Investigation											0
9	River Model											0
10	Develop Project Alternatives											0
11	Biological Assessment											0
12	Conceptual Design of Preferred											0
13	Long-term Planning Study						41300					41300
	Total Year 3		7500	2850	0	500	719050	0	0	0	0	729900
<b>Proposal Total Budget: \$2,159,850</b>												

**Budget Justification: M&T/Llano Seco Fish Screen Facility - Short-Term/Long-Term Protection Project**

**Direct Labor Hours.** Provide estimated hours proposed for each individual.

It is estimated that an administrative assistance will require 100 hours annually to meet the requirements of the Project.

**Salary.** Provide estimated rate of compensation proposed for each individual.

Applicant is charging for administrative support at \$7.50/hour All other labor charges are contracted out.

**Benefits.** Provide the overall benefit rate applicable to each category of employee proposed in the project. Benefit load is calculated at 38 %

**Travel.** Provide purpose and estimate costs for all non-local travel.

N/A - Applicant is not performing the work described in this proposal that requires travel. All such work will be contracted out.

**Supplies & Expendables.** Indicate separately the amounts proposed for office, laboratory, computing, and field supplies.

Applicant will only require modest expenses of \$500/year.

**Services or Consultants.** Identify the specific tasks for which these services would be used. Estimate amount of time required and the hourly or daily rate.

Various subconsultants will perform the tasks listed under Services and consultants. Ducks Unlimited will perform Programmatic Management, oversee outreach, chair the steering committee and assist in Long-Term Study review. These tasks are expected to comprise 550 hours per year at an hourly rate of \$94 per hour. CL& Co will assist Ducks Unlimited in the same duties at an hourly rate of \$65 per hour. It is estimated that two outside experts will be invited to sit on the Steering Committee at an annual cost of \$50,00 per year. MWH Americas and its subcontractors will complete all the technical requirements of the Project for a total of 8420 hours spread over the three-year period. The hourly rate for MWH Americas ranges from \$80 per hour for an Associate Engineer to \$170 per hour for a Principal Engineer.

**Equipment.** Identify non-expendable personal property having a useful life of more than one (1) year and an acquisition cost of more than \$5,000 per unit. If fabrication of

equipment is proposed, list parts and materials required for each, and show costs separately from the other items.

A computer to hold all permanent files at M&T Chico Ranch and to run the model developed by Ayres Associates. These files will be made available to CALFED upon request.  
Estimated Costs: Computer - \$1,500, 21" Monitor - \$760  
Keyboard - \$20 Mouse - \$20 Total = 2,300

**Project Management.** Describe the specific costs associated with insuring accomplishment of a specific project, such as inspection of work in progress, validation of costs, report preparation, giving presentations, response to project specific questions and necessary costs directly associated with specific project oversight.

The costs associated with the tasks listed below are for a three-year period. Tasks / Costs: Contract preparation and Project Initiation = \$15,000, Performance Measures/Project Monitoring = \$70,400, Project Presentations = \$10,000, Prepare Work Plan = \$19,500, Institute and maintain QA/QC Program = \$50,400, Programmatic Oversight/Budget Management/Quarterly Reports = \$178, 150, Administrative Support = \$40,900

**Other Direct Costs.** Provide any other direct costs not already covered.

N/A - Applicant is not performing the work described in this proposal. All work will be contracted out.

**Indirect Costs.** Explain what is encompassed in the overhead rate (indirect costs). Overhead should include costs associated with general office requirements such as rent, phones, furniture, general office staff, etc., generally distributed by a predetermined percentage (or surcharge) of specific costs.

N/A - Applicant is not performing the work described in this proposal. All work will be contracted out.

## **Executive Summary**

**Location:** M&T Chico Ranch, Bidwell State Park, Butte County, River Mile 193 on east bank of the Sacramento River, six miles SSW of the City of Chico.

**Project Type:** Fish Screen and Ladder Construction

**Project Approach:** This project is designed to achieve short-term protection for the existing M&T/Llano Seco Fish Screen Facility and the City of Chico's Wastewater Treatment Plant outfall from sediment depositions while developing a long-term solution that considers fish screen requirements for threatened and endangered fish and water demands for adjacent agriculture and private, state and federal managed wetlands, as well as operations of a public utility facility with no significant impacts on river meander functions. In 1997, the M&T/Llano Seco Pumping Facility was relocated from its historic location in Big Chico Creek to a new point of diversion in the Sacramento River. With support from CALFED and the Central Valley Improvement Act, the new pumping facility was reconstructed with state-of-the-art fish screens for over \$5 million. The relocation of these pumps, that service the M&T Chico Ranch, the Llano Seco Ranch and both of the State and Federal Wildlife Refuges on the Llano Seco, has been credited as a model of cooperation and resource planning. Not only did the joint effort remove an impediment to salmon production on Big Chico Creek, it allowed for a diversion reduction on Butte Creek and provided, in perpetuity, up to 40 cfs of instream flows for Spring-run Salmon in Butte Creek. Since the construction of the fish screens and pumping facility in the Sacramento River, river dynamics have created substantial sediment depositions causing a significant gravel bar and eddy in front of the pumping plant fish screens and intake, as well as the City of Chico's Wastewater Treatment Plant outfall situated 300 ft downstream from the pumping facility. This encroachment of a gravel bar creates a barrier to maintaining a sweeping flow critical to fish screen operation and fish survival and places both facilities in continual danger of being severed from the Sacramento River by river meander during seasonally increased river flows. In November 2001, a partnership between the City of Chico, U.S. Fish and Wildlife Service, California Dept. of Fish and Game, and California Dept. of Parks and Recreation, and M&T/Llano Seco Ranches worked together to set back the gravel bar in order to protect the existing facilities from damage or loss. It is proposed that this project will provide continued support to maintain this gravel bar at its 1995 size and location in order to protect the facility until a long-term solution has been developed and implemented that will continue to provide a fish-friendly water diversion while maintaining the river meander. An investigative and peer-reviewed process will be conducted by stakeholders and recognized experts to develop a long-term solution to diverting water from the Sacramento River, while protecting the fisheries and accommodating the river meander and sediment deposition. The process will develop a planning study that will evaluate lessons learned from past efforts, appraise relative impacts and benefits, address uncertainties and risk, and assess innovative technologies in order to develop a recommended alternative design solution that will incorporate innovative diversion and fish protection techniques and natural riverine processes.

### **Hypothesis:**

It is possible to protect pumping requirements and water demands for adjacent agriculture, managed wetlands and City of Chico Wastewater Treatment Facility and have no significant impacts on river meander functions and threatened and endangered fish populations in the Sacramento River.

**Key Uncertainties:** 1) Rate of sediment deposition; 2) River meander and hydrology; 3) proven applied fish screen technologies; 4) Proven applied water diversion technologies.



**Expected Outcome(s):**

- Continued protection for the M&T/Llano Seco Pumping Plant and the City of Chico Wastewater Treatment Plant outfall from alluvial river depositions causing the fish screen, pumping facility and outfall to become damaged and inoperable until a long-term solution has been determined and implemented.
- A long-term solution to diverting water from the Sacramento River while protecting the fishery and accommodating the river meander and sediment deposition.
- A long-term solution to protecting the Chico Wastewater Treatment Facility outfall while accommodating the river meander and sediment deposition.

**Relationship to CALFED ERP and CVPIA Goals:** This project is effectively implementing the CALFED ERP Goals 1,2 & 4 and fulfilling the CVPIA Anadromous Fish Restoration Program – Section 3406(b)(1) objectives and the Anadromous Fish Screen Program (AFSP) – Section 3406(b)(21).

**Changes to Proposal for Directed Action Resubmittal:** This proposal is revised to structure a process that will develop a long-term solution to meeting water needs of the beneficiaries of the M&T/Llano Seco pumping facility while maintaining the natural river meander process in the Sacramento River. The project will bring together informed experts on innovative diversion techniques, fish protection facilities, and natural riverine processes to develop inventive solutions on how to maintain river meander and protect fish from the impacts of water diversion. A Steering Committee will be formed comprised of these acknowledged experts, as well as stakeholders and agency representatives. The Steering Committee will develop a preferred solution through a comprehensive evaluation of alternative approaches to feasible modifications of the existing pumping facility that will accommodate the river meander, the constant alluvial sediment migration and deposition and protect threatened and endangered anadromous fish populations. The changes in the structure of this proposal are best described in Section 2. Justification and Section 3. Approach.

## A. Project Description: Project Goals and Scope of Work

**Project Location:** M&T Chico Ranch, Bidwell State Park, Butte County, River Mile 193 on east bank of the Sacramento River, six miles SSW of the City of Chico. Ecozone 3 – Sacramento Region, 3.3 – Chico Landing to Colusa. (See **Attachment 1** for a location map.)

### 1. Problem:

Diverse and cumulative impacts are associated with downward trends of all four races of chinook salmon, steelhead trout, splittail and other Sacramento River dependent aquatic species within the Sacramento River Basin. Poorly screened diversions, seasonal dams installed in rivers, small, unscreened diversions, and a limited number of large diversions (> 250 cfs) have contributed to a decrease in survival rates of juvenile and adult salmon populations within the basin. As part of a major effort to reduce the risk of mortality for salmonid species within the Sacramento River Basin, the M&T Chico Ranch diversion pumps, located in Big Chico Creek, were relocated to the mainstem Sacramento River Channel in 1997. This project involved consolidating the diversion with the Llano Seco Wildlife Refuge, constructing state-of-the-art fish screens on the pumping facility and dedicating up to 40 cfs of flow to Butte Creek for fish and wildlife in exchange for Sacramento River water. The project was listed as an action item in the *CVPIA Anadromous Fish Restoration Program* and the *California Department of Fish and Game's 1993 Restoring Central Valley Streams: A Plan for Action*. Total project costs supported by the CALFED Program were \$4.7 million.

At full capacity, the new diversion supplies water at 150 cfs from the Sacramento River to M&T Chico Ranch, Llano Seco Ranch, the Llano Seco Unit of the Sacramento River National Wildlife Refuge, and the Llano Seco Unit of the Upper Butte Basin Wildlife Area. As a year-round pumping facility, water is delivered to 15,000 acres of farmland and refuge land, including over 4,000 acres of wetland owned and managed by the U.S. Fish and Wildlife Service and the California Department of Fish and Game (CDFG). These wetlands provide valuable habitat for waterfowl and other wetland species. In addition to providing key wetland habitat, the new pumping plant ensures salmon restoration in Big Chico and Butte Creeks by eliminating entrainment and by providing fish transportation flows, respectfully. As a result of the investment made for the M&T/Llano Seco Fish Screen Facility, valuable increases to populations of at-risk species and their associated habitats have been enhanced and restored. However, the natural processes occurring in the Sacramento River are posing a substantial threat to these restoration activities and the on-going operations of this facility.

Since the time of project completion, subsequent geomorphic changes in the Sacramento River channel, in the vicinity of the M&T/Llano Seco diversion pumps, have formed a gravel bar that poses a significant risk to continued pumping and fish screen operations of the M&T/Llano Seco facility. This encroaching gravel bar appurtenant to Bidwell State Park just upstream of the M&T/Llano Seco pumping plant also threatens the City of Chico's wastewater treatment outfall, located on the same bank of the Sacramento River approximately 300 feet downstream of the pumping plant intake. Both facilities are in danger of being severed from the Sacramento River because the pumping plant intake is now in an eddy behind the gravel bar located at the mouth of Big Chico Creek. Subsequently, the intake screens are no longer providing sufficient sweeping flows consistent with National Marine Fisheries Service and CDFG) fish screen criteria due to the deposition of sediment. Eddy currents are also unable to maintain a clean screen as originally designed. As a result of these changes, anadromous fish including spring-, fall-, late fall-, and

winter-run chinook salmon and steelhead trout in the Sacramento River and Big Chico Creek have the potential to be adversely impacted by nonfunctioning fish screens. Should the M&T/Llano Seco pumps become inoperable, valuable private, state and federal wetland refuges would be impacted from a loss of water supplied by the M&T/Llano Seco pumps. Also, a significant investment made by the CALFED Program would be lost with the damage or destruction of the M&T/Llano Seco Fish Screen Facility.

Past evaluations of the river were made to select the current diversion site on the Sacramento River. Historical maps and aerial photographs compiled by California Department of Water Resources (CDWR) indicate that, since 1896, the river has not meandered east of its current location at the pumping plant that is located on a geologic control. Because the bank is relatively stable, it was chosen as the site for the new pumping plant. At this location, however, the Sacramento River has historically migrated to the west. As recently as 1935, the west bank was approximately 1,000 feet west of its current location. Between 1995 and 2001, the Sacramento River shifted 500 feet toward the west bank (or an average of 83 feet/year). As the river migrated in this direction, flow velocities at the pump intake and outfall were reduced and sediment deposition increased. In addition, aerial photographs indicate that the mouth of Big Chico Creek has shifted both upstream and downstream from its current location over recent decades.

Concurrent with the lateral migration of the channel, a gravel bar at the apex of the meander migrated downstream toward the pump facility. Between 1995 and 1999, the gravel bar migrated over 1,100 feet downstream. Between 1999 and 2001, the gravel bar moved an additional 600 feet downstream. Diving surveys in May 2001 showed that the riverbed aggraded approximately 5 feet relative to past surveys at the City of Chico diffuser, and 2 of the 7 diffuser nozzles were buried by sediment (Sierra View Divers 2001). A similar survey conducted in May 2001 at the M & T/Llano Seco pumps revealed that the channel bed was encroaching on the fish screen. These surveys noted that sediment deposition reduced the clearance under the intake from 6 feet to 2–3 feet. The date of the previous survey was not given in the report, but the divers estimated that the screens would stop functioning normally within two years if the current rate of deposition continues (Sierra View Divers 2001). (**Attachment 2** illustrates the migration of the bed from 1997 to 2001.)

The Sacramento River Conservation Area (SRCA) Program (SB 1086) reviewed this problem and, with funding from CALFED, commissioned Stillwater Sciences to identify a short-term alternative to maintain operation of the pumps and outfall. (See **Attachment 3**) The upstream reach of the pump location was examined for evidence that upstream changes (including hard points in the channel) are contributing to planform changes at the pumping plant and City outfall. CDWR maps of historical bank location obtained from aerial photographs between 1923 and 1999 from the pumping plant to river mile 195 (approximately 2 miles upstream) were examined. These maps have not been checked for accuracy, and quantitative measurements of channel migration rates cannot be made. These maps do indicate, however, that river migration historically occurred upstream of the pumping plant. Historical river migration upstream of the pumping plant is also evident from the current photographs that show old meander channels along the west bank of the river. Based upon available information, the effects of upstream hard points on the bar that is threatening the pumping plant cannot be assessed. It is important to note, however, that the Sacramento River will continue to migrate within its historical meander corridor at the pumping plant site.

The deposition of the gravel bar at the pump intake and the City outfall is not the result of localized processes. Rather, the deposition of the gravel bar is the result of large-scale channel migration processes. As such, measures that address only short-term, local conditions or processes

will likely provide only short-term, stop-gap benefits. **Larger-scale measures that address longer-term, larger-scale processes will likely provide more persistent benefits.**

In addition to long-term considerations, the fish screen facility will be significantly at risk due to potential high flows anticipated by winter runoff in the Sacramento River. This situation would cause continued migration of sediment deposition that would then completely engulf the facility. Since the time of this proposal submission, a partial excavation of the gravel bar has been completed to eliminate the immediate threat to the operations and function of the M&T/Llano Seco Fish Screen and Pumping Facility, as well as the City of Chico Wastewater Treatment Plant outfall. As a result of natural riverine dynamics, it is recognized that the future encroachment of the gravel bar will continue to exist causing a substantial threat to the operation of the pumping facility, the fish screens and the outfall.

In conclusion, due to the riverine processes a problem exists for the M&T/Llano Seco Facility to continue to divert water from the Sacramento River in a fish friendly manner and meet expectations for the river to meander. An innovative solution must be developed to maintain the river meander and protect fish from the impacts of water diversion, as well as protect the pumping requirements of M&T/Llano Seco and the City of Chico's Wastewater Treatment Plant.

*Past Studies: Stillwater Sciences, 2001, Technical Memorandum: Prepared for M&T Chico Ranch, Llano Seco Ranch and the Sacramento River Conservation Area, (August 13, 2001), HDR Engineering, Inc., 2001, Initial Study and Proposed Mitigated Negative Declaration M&T Ranch/Llano Seco Ranch & Refuge/City of Chico Sacramento River Water Intake: Prepared for CDFG and the City of Chico (August 2001).*

## **2. Justification**

**Conceptual Model:** The conceptual model (shown in **Attachment 4**) illustrates the goal of the project to protect threatened and endangered fish populations and pumping requirements for adjacent agriculture, managed wetlands (federal, state and private), and the City of Chico's Wastewater Treatment Facility without a significant impact upon river meander. The model demonstrates the decision-making path that establishes a dual approach to analyzing alternatives based on meeting objectives of fisheries and fish screen requirements, pumping requirements and river meander, as well as meeting final engineering and economic feasibility.

**Underlying Basis for Work:** Protection of pumping requirements and water demands of M&T/Llano Seco and the City of Chico's Wastewater Treatment Plant while maintaining fish-friendly water diversion and river meander.

**Hypothesis:** It is possible to protect threatened and endangered fish populations from entrainment while meeting pumping requirements for adjacent agriculture, managed wetlands (state, federal and private) and City of Chico Wastewater Treatment Facility, and have no significant impacts on river meander.

### **Hypothesis Testing:**

River modeling will be utilized to test the hypotheses for all developed design alternatives. In combination with the river modeling, as determined by the Steering Committee, additional investigations, conceptual designs and evaluations will be conducted for submission to test hypotheses.

**Assumptions:** Future excavation of the gravel bar encroachment will return flow patterns to those that occurred when the project was first constructed in 1997 and will provide adequate sweeping flows to maintain fish screen operational criteria. It is assumed that previous gravel bar removal practices will apply to future excavation. The river meander and sediment deposition will

continue at an uncertain rate. The pumping requirements and water demands are established based upon existing water rights.

**Key Uncertainties:**

- Rate of sediment deposition.
- River meander and hydrology.
- Proven applied fish screen technologies.
- Proven applied water diversion technologies.

**Reduce Uncertainties by:**

- Monitoring and modeling of river dynamics.
- Elimination of immediate threat of encroaching gravel bar.
- Extensive literature and existing data search.
- Comprehensive search and evaluation of proven and applied technologies.

River modeling falls under the “Undertake Targeted Research to Provide Necessary Knowledge” on the Healey Ladder of the Adaptive Management process. The scientific uncertainty is too great to allow resolution in the context of a pilot or other implementation project. Project implementation of a long-term solution cannot be taken until a better of understanding of river dynamics is understood. This information tool is critical to choosing an appropriate solution to on-going sediment deposition that threatens the functionality and operation of the M&T/Llano Seco Fish Screen Facility.

**3. Approach**

**SHORT-TERM PROTECTIONS:**

This project will consider a short-term protection plan in order to protect the functionality and delivery of water supplies to the fish screen and pumping facility, respectively, from the threat of deposition of alluvial sediment until a preferred alternative has been chosen and implemented. In 2001, a partnership between the City of Chico, U.S. Fish and Wildlife Service, California Dept. of Fish and Game, California Dept. of Parks and Recreation, and M&T/Llano Seco Ranches successfully setback the encroaching gravel bar to protect the pumping facility, as well as the City of Chico outfall. This project would continue to maintain the position of the gravel bar in order to protect the facilities until a solution is in place. It is anticipated that the continued removal of the gravel bar may need to be conducted before a solution has been developed and implemented. This risk-management measure will continue to ensure protection of the existing investment in the fish screen facility made by CALFED to guarantee upstream and downstream migration of anadromous fish populations.

Future Work Plan for Gravel Bar Set Back: Depending upon future sediment depositions by the riverine process, a partial or entire excavation of the gravel bar may be necessary to eliminate a potential threat to the operations and function of the M&T/Llano Seco Fish Screen Facility and City of Chico outfall. This solution has been discussed with resource agencies and stakeholders at SRCA meetings. Excavation of a future encroachment of the gravel bar would guarantee the return flow patterns to those that occurred when the project was first constructed in 1995. Based on previous knowledge of sediment deposition at the project site and engineering

evaluations, it is anticipated that up to 100,000 cubic yards of sand and gravel may need to be excavated in order to guarantee river currents to maintain functionality of the fish screens and on-going operations of the pumping facility.

The removal of the gravel bar would be a 3-step process:

- 1) A temporary stream crossing over Big Chico Creek will be constructed to provide heavy equipment access to the site. The crossing would extend from an existing access road on the M&T Chico Ranch across Big Chico Creek to the gravel bar. This crossing would include one or more 24-inch diameter by 18-foot long corrugated metal culverts (CMP) covered with clean gravel fill. The crossing will be approximately 15-feet wide roadbed on the top and will extend approximately 60 feet across the span of Big Chico Creek. The crossing is to be removed after construction activities have been completed and the original contours restored. On the bar, the stream crossing will extend to the construction site in the center of the bar via a compacted gravel pathway. This pathway will require some brush and small tree removal for a short distance from the crossing to the open bar. Upon project completion, this pathway will be restored to its original state including any necessary grading and replanting within the pathway.
- 2) The 8-acre excavation area inside on the gravel bar will be excavated to approximately 5 feet below the fall low-flow (4,000 cfs Sacramento River flow) water surface elevation. During excavation, a 5 to 10-foot berm will be left on the outer edge of the dry bar to separate the Sacramento River and Big Chico Creek from the construction activities. This technique will reduce and/or eliminate any turbidity caused by re-suspension of sands and silts during construction. This buffer would isolate turbid seep water in the excavation area from the Sacramento River and Big Chico Creek during construction. Silt will settle in the excavation area and would be subject to resuspension when high flows capture the area during the winter-spring period.
- 3) Winter flood flows will complete the reconfiguration of the bar by capturing the excavated area and scouring the outer berm.

The gravel removed from the bar would be hauled to an approved off-site area. Convenient spoils sites have already been taken up with sand and gravel from the previous gravel bar removal. Future gravel and sand would continue to be available for river and floodplain restoration activities of the SRCA at any future date.

Once the gravel bar has been removed, an assessment would be performed and documented to evaluate the new size and outer boundaries of the bar.

**Gravel Bar Monitoring:** Divers will continue to inspect the existing gravel bar annually and collect necessary data on the southern migration of sediment deposition. A general monitoring plan will be detailed and initiated to supplement existing data and augment ongoing monitoring. A physical monitoring plan will be developed to establish a firm understanding of existing conditions and enable informative assessment of current gravel bar encroachment and post-project performance should the bar need to be excavated. (See Performance Measures #2 and #4)

## LONG-TERM SOLUTION:

This project proposes to prepare a Long-Term Planning Study to determine and prioritize alternative actions to address long-term protection of the pumping requirements and water demands and have no significant impacts on river meander functions and threatened and endangered anadromous fish. The Long-Term Planning Study will be prepared by Montgomery Watson Harza and will summarize the findings of determining a beneficial long-term solution to the sediment deposition that threatens the functionality and operation of the M&T/Llano Seco Ranch Fish Screen Facility, as well as the City of Chico Outfall.

The Long-Term Planning Study process will consist of gathering existing data, convening a Steering Committee comprised of stakeholders and recognized experts, researching existing conditions in the river, understanding fluvial geomorphology, monitoring the gravel bar, gathering data from surveyors, hydrologists, and geo-technical engineers, and preparing a river model to assist in determining an appropriate long-term solution. The approach associated with the Long-Term Planning Study is explained below.

- 1) Gather existing studies and reports on the Sacramento River's fluvial geomorphology to obtain a general understanding of the river and its processes. Determine what information that was used to place the pumps in the current location and compare this data to the compiled data and the existing conditions. Review and analyze proposed alternatives presented by Stillwater Sciences in their report entitled, "Final Draft of M&T Ranch and Llano Seco Wildlife Refuge Pump Intake." Conduct an exhaustive literature search pertaining to research and development of innovative technologies of fish-friendly water diversion technologies/engineering that are designed to operate in or around a dynamic river system. (See Performance Measure #5)
- 2) Convene a Steering Committee comprised of stakeholders, recognized experts and CALFED representatives to review and evaluate existing data, identify data gaps, and to identify alternatives to be examined and developed in order to reach a long-term solution. This process will be facilitated by Ducks Unlimited, Inc. (See Performance Measure # 1)
- 3) Ayres Associates and Montgomery Watson Harza will work closely with the Steering Committee to determine the objectives of maintaining an effective, fish-friendly diversion while maintaining a river meander and the concerns of those affected by the project. Performance and model development meetings will be held with the Steering Committee to develop a river model and to receive input for a Long-Term Planning Study. Stakeholders include M&T Chico Ranch, Llano Seco Ranch, City of Chico, Bidwell State Park, Sacramento River National Wildlife Refuge, U.S. Fish and Wildlife Service, California Dept. of Fish and Game, California Dept. of Water Resources, National Marine Fisheries Service, landowners Walter Stiles Jr., and Val Shaw, M.D., and the Sacramento River Conservation Area. This will likely be an iterative process where various sets of promising project elements are combined, simulated, and brought back for consideration. (See Performance Measure #5)
- 4) As a short-term protection measure, gravel bar monitoring will be performed to document the current size and outer boundaries of the existing gravel bar. Divers will inspect the gravel bar annually and collect necessary data on the southern migration of the gravel bar.

A general monitoring plan will be detailed and initiated to supplement existing data and augment ongoing monitoring. A physical monitoring plan will be developed to establish a firm understanding of existing conditions and enable informative assessments of pre and post-project performance with respect to natural processes in the Sacramento River. (See Performance Measure #3)

- 5) Collect various data such as hydraulic and geotechnical information to compile a list of design criteria to be used in developing a river model and in the final design of the preferred alternative. (See Performance Measure #5)
- 6) Develop a river model to analyze the hydraulic effects of implementing various alternatives. Ayers Associate will prepare the model. (See Performance Measure #6)
- 7) Using the river model, develop conceptual designs of selected alternatives to determine a cost efficient and feasible alternative that will be recommended as the long-term solution to the sediment deposition at M&T/Llano Seco Pumping Station while maintaining and protecting native habitat. (See Performance Measure #8)
- 8) Conduct a Biological Assessment to determine the environmental effects on the natural habitat within the Sacramento River. (See Performance Measure #7)
- 9) Prepare the Long-Term Planning Study. The study will explain the problem, list the alternatives, justify the preferred alternative, and summarize the benefits associated with implementing the preferred alternative. The Long Term Planning Study will be reviewed by Steering Committee, City of Chico Public Works, and CALFED Technical Committees (See Performance Measures #9 and #10)

#### **4. Feasibility**

Short-Term: Project feasibility for gravel bar excavation is excellent since a removal of the bar has already been successfully completed in 2001. Groundwork has been laid through an established collaborative partnership that can successfully duplicate environmental compliance and permitting, as well as a complete removal.

Long-Term: Project feasibility for developing a long-term solution is excellent due to the commitment to bring in outside technical expertise that will participate in a exhaustive and comprehensive process to study alternatives that will maintain river meanders and protect fish from the impacts of water diversion. In addition, modeling technology exists to build design scenarios based on project objectives for peer review by the leading experts and stakeholders.

**Table 1** lists the various agencies with applicable permit requirements for future gravel bar excavation. The applications for the permits listed in the table will be submitted to their respective agencies. The necessary permits will be secured by the time of construction. No other constraints that could prevent the execution of the project or impact the schedule such as zoning regulations or county planning ordinances are expected.



**Table 1. Required Permits and Authorizations for Short-Term Gravel Bar Excavation**

Agency/Permit	Applicability	Requirements for Application	Status
COE of Engineers Section 404 Nationwide and Section 7 Individual Permits	Required when working in natural streams and rivers	<ul style="list-style-type: none"> <li>- Section 401 Water Quality Certification</li> <li>- COE Application 4345</li> <li>- NEPA Compliance</li> <li>- National Historic Preservation Section 106 Coordination</li> <li>- CDFG Section 1600 Stream Alteration Permit</li> </ul>	Future Application
Central Valley Regional Water Quality Control Board Section 401 Water Quality Certification	Required when working in natural streams and rivers if the construction area is less than 5 acres	<ul style="list-style-type: none"> <li>- Responsible Agency pursuant to CEQA</li> <li>- Application Form and Fee</li> <li>- Section 1600 Stream Alteration Agreement or note contact with CDFG</li> <li>- Copy of COE Application 4345</li> </ul>	Future Application
CDFG Section 1600 Stream Alteration Permit	Required when natural streambed is to be altered by construction	<ul style="list-style-type: none"> <li>- Environmental Documentation</li> <li>- Application Form and Fee</li> </ul>	Future Application
State Historic Preservation Officer (SHPO) and National Historic Preservation Section 106 Coordination	Required for construction	<ul style="list-style-type: none"> <li>- Archeological Inventory Survey and Report</li> </ul>	Future Application
California Endangered Species Act (CESA) Consultation	Required for construction	<ul style="list-style-type: none"> <li>- Threatened and endangered biological review</li> </ul>	Future Application
Endangered Species Act (ESA) Compliance	Required for construction	<ul style="list-style-type: none"> <li>- Lead agency =NEPA</li> <li>- Threatened and endangered biological review</li> </ul>	Future Application
Reclamation Board Compliance	Required when under jurisdiction of Reclamation Board (flood control areas)	<ul style="list-style-type: none"> <li>- Description of work and location</li> <li>- Environmental questionnaire and environmental review documents</li> <li>- Complete plans and specifications</li> <li>- Names and addresses of adjacent landowners</li> </ul>	Future Application
National Environmental Policy Act (NEPA) Compliance	Required for construction	<ul style="list-style-type: none"> <li>- Lead agency =COE</li> <li>- Prepare EA/FONSI</li> </ul>	Future Application
California Environmental Quality Act (CEQA)	Required for construction	<ul style="list-style-type: none"> <li>- Lead agency =CDFG</li> <li>- Prepare Negative Declaration</li> </ul>	Future Application .
California State Parks and Recreation	Required for access to perform the construction	<ul style="list-style-type: none"> <li>- Letter of Permission or Right of Entry</li> </ul>	Future Application

The Long-Term Planning Study will be prepared by Montgomery Watson Harza (MWH). MWH was the lead engineer on the design of the M&T Fish Screen Facility and prepared the O&M manual for the operation of the pumping facility. MWH has experience with the staff at M&T

Chico Ranch and comprehensive knowledge of their existing facility. MWH has considerable expertise in collecting data and preparing similar reports. This background knowledge and previous involvement with the project will enable MWH to develop a long term planning study that addresses the concerns of all interested parties while finding a suitable solution to the sediment deposition at the M&T/Llano Seco Fish Screen facility.

The river model to determine a long-term solution to the sediment deposition will be prepared by Ayres Associates and reviewed and evaluated by the Steering Committee. This model will be prepared using previous data collected by California Dept. of Water Resources (CDWR). Ayres offers extensive experience in modeling and understands the fluvial geomorphology of the Sacramento River. The preparation of the model will coincide and depend on the excavation of encroaching gravel bar.

**Authorities:** This project has full support from the Sacramento River Conservation Area, the Butte Creek Watershed Conservancy, Sacramento Valley Landowners Association, the City of Chico, U.S. Fish and Wildlife Service, California Department of Parks and Recreation (Bidwell Park), CDFG, CDWR, and key landowners. Accessibility has been given by all landowners/operators and public agencies that have jurisdictions within the project area.

## 5. Performance Measures

A list of project-specific performance measures for each of the general indicator categories defined in Attachment G of the 2002 PSP are listed in **Table 2**. These performance measures will be used to assess the project’s success in relation to its goals and objectives.

**Table 2. Performance Measures**

<b>Performance Measure</b>	<b>Metric</b>	<b>Target</b>	<b>Baseline</b>
1. An acceptable list of participates with expertise and authorities for the Steering Committee.	Sufficient expertise to meet the goal of the project.	A long-term solution for a fish-friendly diversion with no significant impact to river meander	Fish-friendly pumping facility threatened by river meander.
2. Gravel bar extraction to 1995 size and location.	Area and Volume.	Finalize Engineering Design and Construction with approval of interested parties.	2001 Area and Volume of Gravel Bar.
3. Development of Baseline Monitoring/Assessment/Priorities Report.	Number of steps to finish the report and number of documents to be issued to M&T Chico Ranch.	Complete Baseline Monitoring Plan.	Not Applicable.
4. Assessment of gravel bar migration and stream flow dynamics and concurrent evaluation of deposition of sediment and any impacts on fish screen operations.	Area, Volume, Location	Annual report on gravel bar for the duration of the project.	Post gravel bar reduction.
5. Completion of comprehensive data collection from resource agencies, and geo-technical investigations to develop river modeling.	Number of agencies having relevant data and the steps to collect data.	Sufficient information to judge alternatives.	Known Data

6. Completion of the River Modeling Report that summarizes the analysis performed, impacts of the alternatives, conclusions and recommendations for implementation of the preferred alternative.	Sufficiently comprehensive to analyze the alternatives.	Comprehensive analysis of recommended alternatives and preferred alternative.	Compiled existing data.
7. Completion and distribution of Environmental Documentation and necessary permits for construction. Completion of Biological Assessment for the Long-Term Planning Study	Meets NEPA and CEQA requirements.	Identification of environmental issues at project site.	Not Applicable.
8. Development and approval of Preliminary Alternatives and recommendations for the Preferred Alternative or No Action Alternative.	Steps to develop Preliminary Alternatives and the recommendation criteria for a Preferred Alternative.	Full approval of Preliminary/Preferred Alternative(s) by Steering Committee and other review committees.	No Action Alternative.
9. Development and approval of the Draft Long-Term Planning Study.	Adequate description of all steps to identify alternatives and to reach final recommendation.	A report that is acceptable to the Stakeholders and CALFED.	Compiled Data.
10. Finalize Long-Term Planning Study; incorporate all review comments from the draft submittal.	All comments received and documented.	Final review and adoption by Stakeholders and CALFED.	Draft Long-Term Planning Study

## 6. Data Handling and Storage

All paperwork and electronic data collected pertaining to project assessment, evaluation and implementation of any recommended construction actions will be handled and store on a secure network and compiled on CD ROM at Montgomery Water/Harza and M&T Chico Ranch. Permanent files will be kept at M&T Chico Ranch and made available to CALFED upon request.

## 7. Expected Products/Outcomes

- This project will provide a valuable opportunity to advance the science and practice of river restoration and management that can be applied to future fish screen projects and public utilities on the Sacramento River.
- This project would engineer and conduct a short-term solution of dredging and excavating the gravel bar down to the 1995 location and size if the gravel bar begins to threaten the pumping facility and outfall. This action would provide insurance to the parties that the fish screens and outfall would not be rendered inoperable before the long-term solution could be implemented.
- Environmental compliance and all permit documentation and certification will be prepared and completed for gravel bar extraction.
- A Long-Term Planning Study will be conducted and published to determine recommendations for a long-term solution. River modeling will be conducted to facilitate the identification of alternatives and a preferred alternative.

- A Preferred Alternative for a long-term solution will be identified and selected from a range of alternatives recommended by the Steering Committee that will meet the concerns of the stakeholders.
- Annual presentation and site visit to inform and update CALFED Technical/Science/BDPAC Committees about project progress and findings.
- Continued elimination of fish entrainment and mortality from the operation of the M&T/Llano Seco Pumping Plant.
- Continued improvement of in-stream flow conditions in Butte Creek for spring-run Chinook salmon.
- Continued assurance of a reliable water supply to the M&T Chico Ranch and Llano Seco Ranch and state and federal wildlife refuges.

## 8. Work Schedule

Potential excavation of the gravel bar, river modeling, and preparation of the Long Term Planning Study will begin shortly after grant funds are available upon contract execution. Based on information provided by CALFED staff a reasonable starting date for the work is assumed to be July 2003. The work schedule can be adjusted according to the actual execution date. The individual tasks for the M&T Fish Screen Facility Short/Long Term Solution Project are identified below. Tasks 1 and 2 will last the duration of the project. Tasks 3 and 4 (*deliverable: excavation of the gravel bar*) will be conducted as necessary, keeping in mind that Tasks 1 and 2 will be involved. Tasks 5-12 (*deliverable: Long-Term Planning Study*) are inseparable and should be completed concurrently with Tasks 1 and 2. A summary of the tasks and their start and finish dates are included in **Table 3**.

**Table 3. Work Schedule**

Tasks	Start Date	End Date
1.0 Project Management	7/01/03	6/30/06
2.0 Public Outreach and Local Involvement	7/01/03	6/30/06
3.0 Gravel Bar Reduction Engineering	7/01/03	9/30/05
4.0 Gravel Bar Reduction	9/30/03	12/31/05
5.0 Gravel Bar Monitoring	7/01/03	6/30/06
6.0 Compile Existing Data	7/01/03	12/31/03
7.0 Steering Committee	7/01/03	6/30/06
8.0 Data Collection	1/01/04	6/30/04
9.0 River Modeling	11/01/03	12/31/04
10.0 Develop Project Alternatives	11/01/03	6/30/04
11.0 Environmental Investigations	1/01/05	1/30/06
12.0 Conceptual Design	7/01/04	6/30/05
13.0 Long-Term Planning Study/Preferred Alternative	1/01/05	6/30/06

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

## 1. ERP, Science Program and CVPIA Priorities

### CALFED Program Goals:

**GOAL 1: At-Risk Species** –This project will ensure the continuation of promoting the recovery of at-risk species, in particular spring-run and winter-run chinook salmon, steelhead trout, and splittail. The project also contributes to the reversing of the downward population trends of non-listed native species, by reducing or eliminating delay and injury to Butte Creek and Big Chico Creek adult fish by improving passage conditions and reducing entrainment in diversions for juvenile and larval fish.

**GOAL 2: Ecosystem Processes and Biotic Communities** – This project is expected to continue to support natural ecological processes that sustain natural aquatic and terrestrial biotic communities and life-cycle requirements by supporting a reliable stream-flow in Big Chico Creek. Stream-flows support important ecological processes such as riparian corridors and invertebrate production and fish spawning, nutrient and organic transport and sediment transport and decomposition that replenish riverine aquatic habitats. This project also presents the opportunity to comprehensively assess and evaluate channel dynamics and the river meander on an upper reach of the Sacramento River.

**GOAL 4: Habitats** - This project will continue to support essential conveyance of flows acquired for in-stream use in Big Chico Creek and Butte Creek that continues to support a mosaic of natural habitats. Additional, this project supports considerable flow to support valuable seasonal and permanent wetlands located on state, federal and private refuges.

**ERP Multi-Species Conservation Strategy for the Sacramento River Basin:** This project accomplishes specifically listed milestones for Stressor Reduction by providing unimpeded upstream and downstream passage for salmon and steelhead and by reducing or eliminating fish stranding under Water Diversions for the Sacramento Region – Sacramento River – **E034701. (MILESTONE)**

### CALFED Science Program Goals:

- *Developing performance measures* that will track the success of the actions taken. Monitoring and data collection will provide the information to evaluate the effectiveness of the upgraded structures in reducing fish passage problems in the Butte Sink.
- Apply an *Adaptive Management* approach by monitoring riverine channel changes including gravel bar movement. Monitoring results will be incorporated into the River Model to better understand long-term solutions for the protection of pumping requirements and water demands, river meander functions, and threatened and endangered fish. Hydraulic evaluations will also be included in modeling efforts to maximize fish screen operations. Comparisons of the relative effectiveness of different restoration strategies will guide management decisions.
- *Compare relative effectiveness of different restorations strategies* by bringing together recognized experts to contribute to a modeling effort that will assess and evaluate constraints and opportunities associated with the issue of protecting pumping requirements and water demands, river meander functions, and threatened and endangered fish.
- *Take advantage of existing data.* This project will combine resources of key resource managers such as U.S. Fish and Wildlife Service, CDFG, and CDWR. Each of these

participating agencies have initiated and are continuing to gather pertinent data on this specific issue as well as private efforts to monitor and assess the current threats associated with this project. This project will continue to compile, develop and disseminate valuable data that can be applied to future facilities facing the same threats.

### **CALFED Implementation Plan Multi-Regional and Regional Priorities:**

REGIONAL IMPLEMENTATION– Sacramento Valley Region: This project address and fulfills Restoration Priorities for the Sacramento Region in the following ways:

**SR-1** Develop and implement habitat management and restoration actions in collaboration with local groups such as the Sacramento River Conservation Area Non-Profit Organization.

M&T Chico Ranch is actively involved in the SB 1086 process and participated in the formation of the organization now known as the Sacramento River Conservation Area (SRCA). This project will continue to participate and be coordinated with the SRCA. In addition, Les Heringer, Jr., Farm Manager – M&T Chico Ranch, is a member of the Board of Directors of the Butte Creek Watershed Conservancy (BCWC). His participation in this watershed organization will ensure that the actions taken by this project will not be in conflict with the restoration efforts and watershed management efforts being coordinated by BCWC. Additionally, M&T Chico Ranch, Llano Seco Ranch, USFWS and CDFG will continue to participate and coordinate with the Sacramento Valley Landowners Association who is active in the protecting private property rights of farmers and ranchers along the Upper Sacramento River area.

- *Riparian habitat and channel meander.* This project intends to focus on Sacramento River channel meander and the connection between protection activities to pumping requirements and water demands and the protection and enhancement of riparian habitat. This will be accomplished by conducting a comprehensive Long Term Planning Study and modeling riverine processes to determine appropriate protection activities on the river. (Strategic Goal 1 – At-Risk Species, Strategic Goal 4 – Riparian Habitat)

**SR-2** Restore fish habitat and fish passage particularly for spring-run chinook salmon and steelhead trout and conduct passage studies.

- *Fish passage improvements and fish passage programs.* This project will continue to ensure fish passage commitments on Butte and Big Chico Creeks that were made at the time the M&T/Llano Seco Fish Screen project was completed. Continued operations of the pumping facility will guarantee the investment for upstream and downstream migration.

**SR-3** Conduct adaptive management experiments in regard to natural and modified flow regimes to promote ecosystem functions or otherwise support restoration actions.

- *Mechanistic models as restoration tools.* This project will develop a comprehensive river model to evaluate and analyze recommended alternatives and a preferred alternative proposed by the Steering Committee. The model will simulate physical measurements to

evaluate flow, sediment transport and other fluvial processes. (Strategic Goal 2, natural flow regimes)

**SR-4** Restore geomorphic processes in stream and riparian corridors.

- *Intensive process and mechanistic studies.* This project will address geomorphic processes of the confluence of Big Chico Creek and the Sacramento River at this location by compiling existing data and gathering current physical data to develop a comprehensive simulation model. This important evaluation will help determine a long-term solution to the protection of pumping requirements and water demands while maintaining, to the extent possible, the natural meander and habitat values of the riverine system. (Strategic Goal 2 – Riparian Habitat)

**SR-6** Continue major fish screen projects and conduct studies to improve knowledge of implications of fish screens for fish populations.

- *Continue and complete ongoing fish screen construction projects* and maintain existing investments currently supported by CALFED and/or CVPIA, including the following (Strategic Goal 1, At-Risk Species). **This project was a major program investment.**

**M&T Ranch/Llano Seco Pumping Plant** (one of eleven facilities names under this objective)

The costs associated with relocating the M&T/Llano Seco Pumping Facility and constructing state-of-the-art fish screen was \$4.7 million shared by a partnership between M&T Chico Ranch, Llano Seco Ranch, U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation and Ducks Unlimited, Inc. (MILESTONE)

- *Comprehensive studies* - This project will directly address this objective by compiling and assessing valuable information to gain an understanding of appropriate placement, protection of pumping requirements, water demands, while maintaining, to the extent possible, the natural river meander. The proposed Long Term Planning Study and river modeling will have a potential to contribute to other similar projects facing the same threat of natural river channel dynamics to the proper operations of important fish protection investments.

**SR-7** Develop conceptual models to support restoration of river, stream and riparian habitat.

- *Compare conceptual models and develop restoration performance measures for tributary streams and rivers.* This project will contribute to the need for compiling systematic knowledge of restoration activities on Sacramento River. The information gathered and compared to the project conceptual model and the overarching CALFED model will assist in evaluating the progress of the CALFED Bay-Delta Program.

**Central Valley Project Improvement Act Goals:** This project addresses the following Sections in TITLE 34, PUBLIC LAW 102-575; Section 3402(a): To protect, restore and enhance fish, wildlife, and associated habitats in the Central Valley...of California; for spring-run, winter-run chinook salmon, steelhead trout and splittail and their associated habitats in the CVPIA focus area

of the Sacramento River; Section 3406(b)(21) – To avoid losses of juvenile anadromous fish at unscreened or inadequately screened diversions.

Applicability to the Anadromous Fish Restoration Program Section 3406(h)(1) objectives:

- *Improve habitat for all life stages of anadromous fish* by providing flows of suitable quality, quantity, and timing, and improved physical habitat; This project improves fish passage and flow management in Big Chico Creek and the Sacramento River that greatly increases the spawning success and survival of fall, late-fall, and spring-run chinook salmon and steelhead.
- *Improve survival rates* by reducing or eliminating entrainment of juveniles at diversions; The state-of-the-art fish screens constructed at the M&T/Llano Seco diversion result in the elimination of a source of mortality to spring and winter-run chinook salmon in the Sacramento River.
- *Improve the opportunity for adult fish to reach their spawning habitat* in a timely manner: The relocation of the M&T/Llano Seco diversion from Big Chico Creek to the mainstem Sacramento River has greatly increased the opportunity for adult anadromous fish to reach their natal spawning and rearing habitat in Big Chico Creek. As part of the facility relocation, reliable transportation flows were dedicated to Butte Creek to ensure timely access to spawning and rearing habitat in that tributary system.
- *Involve partners in the implementation and evaluation of restoration actions.* This project involves private, state and federal refuge managers. The pumping plant supplies water to 15,000 acres of farmland and refuge land, including over 4,000 acres of wetlands owned and managed by the U.S. Fish and Wildlife Service and CDFG. Llano Seco Ranch also owns and manages seasonal and permanent wetlands that rely on water delivery from the pumping facility. Each of these partners has contributed to the relocation, constructions and protection of the M&T/Llano Seco Pumping Facility. In addition, the City of Chico joins the partnership to minimize impacts to the pumping facility, as the City's wastewater treatment outfall is vulnerable to the same impacts.

Applicability to the Anadromous Fish Screen Program (AFSP) – Section 3406(b)(21): This project fulfills the goal of eliminating or minimizing the entrainment and impingement of juvenile chinook salmon (all runs), steelhead trout, green and white sturgeon, American shad, and striped bass in the Sacramento River at the M&T/Llano Seco Fish Screen Facility.

## **2. Relationship to Other Ecosystem Restoration Projects.**

This project is an integral part of an overall ecosystem restoration program for Butte Creek and the Butte Creek Watershed. Upland restoration activities are critical to provide the connectivity to upper watershed spawning and rearing of anadromous fish species making their way to and from the Bay-Delta. Considerable investments have been made in the lower, middle and upper reaches of Butte Creek to ensure this life history connection. **Upper Butte Creek:** Five dams have been removed, five dams have been modified with state-of-the-art fish ladders, and four dams modified with state of the art fish screens. Dedicated in-stream flows of 45 cfs have been acquired for fish passage. M&T Chico Ranch and Llano Seco Ranch dedicated 40 cfs of the total in-stream flows. **Butte Sink:** Upgrades have been made to 1 water control structure, 2 fish ladders, and 2 fish exclusion barriers. **Lower Butte Creek:** Ten real-time internet accessible telemetry stations have



been installed to protect and manage the in-stream flows from the headwaters to the Sacramento River at the lower end of the Sutter Bypass. Nine technical and environmental evaluations have been completed for future projects. Sanborn Slough Bifurcation Structure to enhance fisheries and waterfowl in lower Butte Creek. Construction of an adult fish exclusion barrier to prevent fish entrainment in an agricultural drain at Drumheller Outfall has been completed. Costs associated with these project are estimated at approximately \$40 million.

In the same way, this project provides critical protection to upstream and downstream anadromous fish species to Big Chico Creek. Downstream Sacramento River efforts would lose value if the connection to the upper reaches of Big Chico Creek was compromised or lost.

**3. Requests for Next-Phase Funding.** N/A

**4. Previous Recipients of CALFED Program or CVPIA funding.** - None

**Note:** Construction for the M&T/Llano Seco Fish Screens and relocation of the pumping facility was delivered by Ducks Unlimited, Inc. (DU) – CALFED No. 96-M22

Financial Status: Expenditure: \$4,749,845.92 Income: \$4,530,556.71 DU: \$ 219,289.21

**5. System-Wide Ecosystem Benefits**

To reach the habitat goals of the CALFED Ecosystem Restoration Plan and the Anadromous Fish Restoration Plan for all salmonid species, connectivity to upstream spawning and rearing habitat in Butte and Big Chico Creeks is essential to the sustainable populations of spring-run, winter-run, fall and late fall-run salmon and steelhead trout. Restoring this critical pathway is vital to the downstream restoration efforts (Sacramento River and the Delta) as well as upper watershed activities (See B.2 Relationship to Other Ecosystem Restoration Projects, above).

**6. Additional Information for Proposals Containing Land Acquisitions.** N/A

**C. Qualifications**

**Ducks Unlimited, Inc.**

For over six decades, Ducks Unlimited, Inc. (DU) has maintained a singleness of purpose that guided the organization to become the leading waterfowl and wetlands conservation entity in North America. DU believes that solutions to conservation problems must be anchored in the most up-to-date scientific understanding and is involved in programs from the arctic tundra of Alaska to the tropical wetlands of Mexico. Throughout the continent, DU has been involved in conserving over 10 million acres of wetlands and associated upland habitat. Currently, the Western Regional Office in Rancho Cordova has also managed over \$20 million in fisheries upgrade projects on Lower Butte Creek that includes construction of fish screens, fish ladders and water control structures. The organization has a expertise and experience in facilitating and managing all aspects of this project.

**Olen C. Zirkle, Jr.** is the Agricultural Programs Coordinator for Ducks Unlimited Inc. (DU). Mr. Zirkle earned a Bachelor of Science degree in Ag-Production/Agronomy at U.C. Davis and has spent a lengthy career working with agriculture on operational and management issues. As the

Agricultural Programs Coordinator for DU, Mr. Zirkle manages the Lower Butte Creek Project, The Sutter Basin Agricultural Easement Project and the Agricultural Water Quality Outreach Program. He has spent his entire career working in agriculture in managerial and technical positions. Since 1995, Mr. Zirkle has worked extensively on fish passage issues. Mr. Zirkle has managed the Lower Butte Creek Project since its inception and been responsible for overall project management as well as onsite project management in the Sutter Bypass area. His experience with agricultural producers and knowledge of the area and its varied stakeholders has resulted in bringing all parties together in a successful cooperative effort. His role in this project will be to facilitate and manage the overall project process.

### **Montgomery Watson Harza**

Montgomery Watson Harza, MWH, is a full service civil and environmental engineering firm specializing in a variety of services including water and wastewater engineering, energy and infrastructure engineering, flood control, waste remediation, fisheries design, and environmental assessment and mitigation. The firm also works in a number of other industry sectors such as construction, finance, information technology, applied research, project management, laboratory services and government relations.

MWH - the result of a recent merger between Montgomery Watson and Harza Engineering Company – brings to the industry expertise in fish screen and water structure design and construction. With more than \$721 million in revenue, MWH has 5,500 specialists in more than thirty nations and more than 231 years of combined experience. MWH is successful in delivering progressive environmental solutions that reflect the latest scientific and technological developments while recognizing the importance of protecting the environment and the quality of life in local communities. MWH is a recognized leader in water resources and environmental planning. MWH has been present in Northern California for many years and continues to provide engineering service to many local private and public clients. The company has expertise and the capability to perform all phases of a project from the planning phase to the construction and operation of the completed project.

### **Montgomery Watson Harza Engineers:**

**Neil W. Schild** is a Principal Engineer with 41 years of experience in operation and maintenance of dams, water supply reservoirs, and power generation projects. He earned a B.S. in Agricultural Engineering from Kansas State University and is a Professional Agricultural Engineer in California. During 20 years with the U.S. Bureau of Reclamation, he has proven his ability to provide reasonable and practicable solutions to even the most complex situations. His background includes design and construction of fish protection facilities, application of environmental regulations, management of water and land resources, transfer of water rights, water resource planning, project management, and administration of personnel. Mr. Schild was Project Manager for M&T Chico Ranch Fish Screen Facility, Gorrill Land Company Fish Screen and Ladders Project, and Banta-Carbona Irrigation District Fish Screen Feasibility Study. He is currently the Project Manager for various Fish Screen Feasibility Studies in Northern California.

**Wayne C. Dahl** is a Principal Engineer with 23 years of experience in large civil engineering projects including planning, design, and construction management of water resources projects, including flood control and water supply. He received a B.S. in Civil Engineering from North Dakota State University, and completed graduate course study in Hydrology from Arizona State

University. He is a Professional Civil Engineer in California and Arizona, and a Land Surveyor in California. Mr. Dahl has expertise in the design and construction of water distribution systems; hydrology and drainage projects; canals, channels, pipelines, and pumping stations; reservoir design; and bridges and roadways. Mr. Dahl is experienced in all phases of project and program implementation, including planning, analysis, design, plans and specifications, bidding, and construction management. He is the Project Manager for the American River Pump Station Project, and for Arcade Water District's Capital Improvement Program.

**Dennis E. Dorratcague** is a Principal Engineer and the water resources director in Montgomery Watson Harza's Northwest Region. He earned a B.S. from University of Notre Dame and his M.S. in Civil Engineering at Colorado State University. He is a Professional Civil Engineer in Washington, Oregon, Alaska, and California. He has been working in the field of hydrology and hydraulics since 1972, primarily concentrating on hydraulic structures and fisheries engineering. He has served as Technical Manager for the Banta-Carbona Irrigation District Fish Screen Feasibility Study and for the preliminary and final design for a fish screen, ladder, and tailrace barrier in Western Oregon. Mr. Dorratcague was also Project Manager for the development of the Feature Design Memorandum for the Surface Bypass Spillway Project; the hydraulic modeling, preliminary and final designs, and construction services of a fish screen on the White River in Western Washington; the preliminary and final design of a fish screen facility for Pacific Power and Light Company; and the Salmon Falls Fish Passage Project.

**Amy L. Wade** is an Associate Engineer with experience in civil, environmental, and water resource engineering. She received a B.S. in Civil and Environmental Engineering from Brigham Young University. Ms. Wade has been involved with the preliminary and final engineering design of pump stations, fish screens, pipelines, and canals; preparation of environmental documentation and consultations; and engineering support during construction. Ms. Wade has served as Project Engineer on several major water resources projects including the Pleasant Grove-Verona Fish Screen Feasibility Study and Placer County Water Agency American River Pump Station.

**Kathy Vanderwal Dubé** is a Senior Geologist with 16 years of experience in conducting river and hillslope geomorphology and erosion/sedimentation studies to assess the environmental impacts and engineering feasibility of various water control and watershed development projects. She earned a B.S. in Environmental Sciences and Resource Management from Lehigh University and a M.S. in Geological Sciences from the University of Washington. Kathy Vanderwal Dubé is a Professional Geologist in Oregon and a Qualified Watershed Analyst in Washington. Her background includes evaluating the effects of both past and proposed projects on watershed characteristics, developing appropriate mitigation measures to protect aquatic and terrestrial habitats, determining changes in gravel composition, calculating sediment transport rates, and analyzing the effects of changes in gravel supply on fish and aquatic habitat. Her expertise in fluvial geomorphology and sediment transport in gravel-bedded rivers has allowed her to work on various projects in the Northwest. For example, Ms. Dubé was Project Geologist on the Lewis River Project, Cedar River Delta Project, Cowlitz River Project, and the Cushman River Project.

**Owen Ayres & Associates, Inc.**

Ayres Associates is a full-service architect/engineering firm with highly specialized water resources engineering capabilities. From offices in Sacramento, California and Fort Collins, Colorado, Ayres Associates provides expert capabilities in hydrology and hydraulics, river

mechanics, sediment yield and transport, and fluvial geomorphology. Services are provided by a full-time staff of hydraulic and civil engineers, hydrologists, geologists, and scientists who are experienced in hydraulic analyses and design, control of surface water runoff, floodplain management, floodplain modeling, and sediment transport and channel stability analyses.

#### **D. Cost**

- 1) Budget \$ 2,159,850 (See Form)
- 2) Cost-Sharing – No present commitments.

#### **E. Local Involvement**

**Outreach Plan:** Key stakeholders and partners involved in this project include Walter Stiles, Jr. and Dr. Val Shaw, M.D. (adjacent river property owners from the project), the City of Chico, the California Dept. of Parks & Recreation – Bidwell State Park (CDPR), the Sacramento River National Wildlife Refuge (NWR), managed by the U.S. Fish and Wildlife Service, California Dept. of Fish and Game, (CDFG) the Sacramento Valley Landowners Association, and the Sacramento River Conservation Area (SRCA). SRCA is fully apprised of the present circumstances and has written a letter of support for the previous actions described in this proposal. (See **Attachment 3** – Letter from SRCA) The City of Chico is not a property owner, however, they are responsible for the Wastewater Treatment Plant Outfall located adjacent from the fish screen facility and owns an easement through the M&T Chico Ranch to the Sacramento River. Bidwell State Park is key to the stakeholder process, as the gravel bar has accreted onto parkland property and is directly across the river from the property owned by the NWR. A successful partnership of all participants was formed in order to conduct the gravel bar excavation. This partnership will continue to be involved in the Long-Term Planning Study described in this proposal. Local government, other interested individuals and conservation groups will be included in regular updates of the project at the Sacramento River Conservation Area meetings held once a month. Two presentations per year will be given to the Butte County Board of Supervisor and the City of Chico City Council. Presently, Les Heringer, Jr. Farm Manager – M&T Chico Ranch, is a member of the Board of Directors of the Butte Creek Watershed Conservancy. The watershed group has been actively involved in this project and has given M&T Chico Ranch a letter of support for proposal solicitation. Mr. Heringer, Jr. will continue to report to BCWC Board of Directors at their monthly organizational meetings.

#### **F. Compliance with Standard Terms and Conditions**

M&T Chico Ranch has reviewed the standard State and Federal contract terms described in Attachments D and E included in the CALFED Ecosystem Restoration Program 2002 Proposal Solicitation Package and agrees to the standard clauses. M&T Chico Ranch finds no disagreement in the proposal or the standard terms.

#### **G. Literature Cited**

CALFED Bay-Delta Program. Guide for Regulatory Compliance for Implementing CALFED Actions, Volume 2: Environmental Regulatory Processes, June 2001.

Central Valley Anadromous Fish Annual Run-Size, Harvest and Population Estimates, 1967 through 1991, CDFG, August 1994 Revision.

Central Valley Project Improvement Act, Title 34 of PL 102-575, Sections 3402, 3406 and 3407. Approach and Focus for Implementing the CVPIA 1999-2004.

Department of California Fish and Game, Projects Upstream on Merced and San Joaquin Rivers, Personal knowledge of Fish and Game staff.

Department of California Fish and Game, National Community Conservation Planning Act, Sections 2800-2840, 1991.

Final Endangered Species Act Section 7 Consultation Handbook, March 1998.

HDR Engineering, Inc., 2001, Initial Study and Proposed Mitigated Negative Declaration of M&T Ranch/Llano Seco Ranch/City of Chico Sacramento River Water Intake Stream Channel Maintenance: Prepared for CA Department of Fish and Game, September 2001.

McMillen, M.D., and W. Porter, White River Fish Screen Project Planning and Design. Proceedings of Waterworks '97, 1997.

Schild, Neil W., M&T/Parrott Pumping Station and Fish Screen. Presented at Fish Passageway Workshop, Sacramento, California, March 26, 1998.

*Stillwater Sciences, 2001, Technical Memorandum: Prepared for M&T Ranch, Sacramento River Conservation Area, and California Department of Water Resources, August 2001.*

## ATTACHMENTS:

The following attachments have been deleted from the original proposal in order to save space and reduce the size of the proposal to meet email requirements:

1. Attachment 1. Project Location and Vicinity
2. Attachment 2. Gravel Bar Location and Size at various dates
3. Attachment 3. SRCA Support Letter

The Conceptual Model and Conceptual Model explanation remain as part of the proposal.

**CONCEPTUAL MODEL: M&T Llano Seco Fish Screen Facility – Short-Term/Long-Term Protection Project**

The following graphic conceptual model illustrates how the proposal proponents will conduct their study. The fine black line illustrates the functions of the Steering Committee, *i.e.*, to develop preliminary alternatives and to collect and develop criteria for fisheries, pumping requirements and river meander that meet the stated Goal. The model illustrates two routes to a final recommendation. The red line indicates the steps required for a preliminary alternative that meets the Project Goal and all of the Project criteria (Preferred Alternative). In the event that none of the preliminary alternatives meet the Preferred Alternative protocol, then the blue line illustrates the protocol that will result in a “Non-Goal Alternative”. Both the Preferred Alternative and the Non-Goal Alternative will have to meet a final engineering and economic feasibility analysis before being reviewed by the Steering Committee and gaining a final recommendation for implementation.

# Goals

To protect threatened and endangered fish populations and pumping requirements for adjacent agriculture, managed wetlands (federal, state and private), and City of Chico wastewater treatment facility without a significant impact on river meander.

