Cosumnes River Streambed and Riparian Restoration Project

Project Information

1. **Proposal Title:**

   Cosumnes River Streambed and Riparian Restoration Project

2. **Proposal applicants:**

   Tina Lunt, Sloughhouse Resource Conservation District
   William (Bill) Mosher Jr., Sloughhouse Resource Conservation District
   Leland Schneider, Landowner
   Bill Hutchinson, Landowner

3. **Corresponding Contact Person:**

   Tina Lunt
   Sloughhouse Resource Conservation District
   9701 Dino Drive, Suite 170 Elk Grove, CA 95624
   916 714-1104 ext 112
   tina.lunt@ca.usda.gov

4. **Project Keywords:**

   Channel Dynamics
   Habitat Restoration, Riparian
   Monitoring

5. **Type of project:**

   Implementation_Pilot

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

   No

7. **Topic Area**:

   Channel Dynamics and Sediment Transport

8. **Type of applicant:**

   Local Agency

9. **Location - GIS coordinates:**

Latitude: 38.490

Longitude: -121.094

Datum:

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

One-mile stretch of the Cosumnes River channel, approximately 50 acres, immediately below the bridge at Highway 16, river mile 32, Carbondale 7 ½ minute USGS quadrangle, Section 4, Township 7 N, Range 8 E.

10. **Location - Ecozone:**

    11.1 Cosumnes River

11. **Location - County:**

    Sacramento

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:**

    11th District

15. **Location:**

    California State Senate District Number: 5

    California Assembly District Number: 10

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: 23

Total Requested Funds: 1,044,692

b) Do you have cost share partners already identified?

Yes

If yes, list partners and amount contributed by each:

Natural Resources Conservation Service 3,100

Leland Schneider 260

Sloughhouse Resource Conservation District 1,920

c) Do you have potential cost share partners?

Yes

If yes, list partners and amount contributed by each:

Wildlife Conservation Board Depends on cost share funds obtained

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:**

    Regard #18 - Have you previously recieved funding from CALFED for other projects not listed above? The Sloughhouse Resource Conservation District in cooperation with the Cosumnes River Task Force was recently approved for funding under the CALFED Watershed Program 2000-2001 PSP- Cosumnes River Watershed Inventory and Assessment - still awaiting contract negotiations.

Environmental Compliance Checklist

Cosumnes River Streambed and Riparian Restoration 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: Sacramento County
   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
   XNegative Declaration or Mitigated Negative Declaration
   -EIR
   -none

   NEPA
   -Categorical Exclusion
   XEnvironmental 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.

      Draft - April 2003 Final - June 2003

   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	Required
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	Required
Other	

PERMISSION TO ACCESS PROPERTY

Permission to access city, county or other local agency land. Agency Name: Sacramento County	Obtained
Permission to access state land. Agency Name:	
Permission to access federal land. Agency Name:	
Permission to access private land. Landowner Name: Leland Schneider/ Bill Hutchinson	Obtained

6. **Comments.**

Land Use Checklist

Cosumnes River Streambed and Riparian Restoration 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?**

   No

   If you answered no to #3, explain what type of actions are involved in the proposal (i.e., research only, planning only).

   The project is multifacted including research and demonstration-restoration and rehabilitation. Although physical changes will occur the land use will remain the same.

4. **Comments.**

Conflict of Interest Checklist

Cosumnes River Streambed and Riparian Restoration 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):

Tina Lunt, Sloughhouse Resource Conservation District
William (Bill) Mosher Jr., Sloughhouse Resource Conservation District
Leland Schneider, Landowner
Bill Hutchinson, Landowner

Subcontractor(s):

Are specific subcontractors identified in this proposal? Yes

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

Tim Horner	California State University Sacramento
Kevin Cornwell	California State University Sacramento
Mark Cocke	Natural Resources Conservation Service
Karen Fullen	Natural Resources Conservation Service

None	None
None	None
None	None
None	None

Helped with proposal development:

Are there persons who helped with proposal development?

Yes

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

Mark Cocke Natural Resources Conservation Service

Karen Fullen Natural Resources Conservation Service

Kevin Cornwell California State University Sacramento

Tim Horner California State University Sacramento

Comments:

Budget Summary

Cosumnes River Streambed and Riparian Restoration 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 fund source.

Independent of Fund Source

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 Cost**
1.1	Project Management	380	7600	1150						8750.0	2013	10763.00
1.2	Quarterly Reports	20	400	60						460.0	106	566.00
1.3	Updates	98	1960	294		900				3154.0	518	3672.00
2.1	CEQA/NEPA						50000			50000.0		50000.00
2.2	401 Certification						500			500.0		500.00
2.3	404 Certification						10			10.0		10.00
2.4	County Grading Permit						750			750.0		750.00
2.5	State Reclamation Board Encroachment Permit						0			0.0		0.00
2.6	Sacramento County Encroachment Permit						0			0.0		0.00
2.7	Section 7 Consultation National Marine Fisheries Service						0			0.0		0.00
2.8	Section 7 Consultation US Fish & Wildlife Service						0			0.0		0.00
2.9	Streambed Alteration Permit						1400			1400.0		1400.00
3.1	Pre-construction studies						80909	5000		85909.0		85909.00
3.2	Seismic survey					5700				5700.0		5700.00
3.3	Survey & stake						2086			2086.0		2086.00
3.4	Flag & fence					1760	3179			4939.0		4939.00
6.1	Tours	16	320	48		25				393.0	85	478.00
6.2	Harvest Days	8	160	24						184.0	62	246.00
6.3	Articles	6	120	18						138.0	32	170.00
		528	10560.00	1594.00	0.00	8385.00	138834.00	5000.00	0.00	164373.00	2816.00	167189.00

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 Cost
1.1	Projectmanagement	400	8400	1260						9660.0	2222	11882.00
1.2	Quarterly Reports	20	420	63						483.0	111	594.00
1.3	Updates	98	2058	309						2367.0	534	2901.00
1.4	Mid-project Evaluation	24	504	75			2064			2643.0	133	2776.00
4.1	Reshape channel						70053			70053.0		70053.00
4.2	Bank shaping						13725			13725.0		13725.00
4.3	Large woody debris						25155			25155.0		25155.00
4.4	Gravel cleaning and sorting						252000			252000.0		252000.00
4.5	Floodplain bench						344612			344612.0		344612.00
5.1	Replanting					11300	10316			21616.0		21616.00
5.2	Non-native vegetation removal					1188	2810			3998.0		3998.00
5.3	Maintenance and Monitoring					2570	9100			11670.0		11670.00
5.4	Post Construction Studies						42271	2000		44271.0		44271.00
6.1	Tours	16	336	50		25				411.0	89	500.00
6.2	Harvest Days	16	336	50						386.0	89	475.00
6.3	Articles	6	126	19						145.0	33	178.00
		580	12180.00	1826.00	0.00	15083.00	772106.00	2000.00	0.00	803195.00	3211.00	806406.00

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 Cost
1.1	Project Management	120	2640	396						3036.0	698	3734.00
1.2	Quarterly Reports	20	440	66						506.0	116	622.00
1.3	Updates	98	2156	323						2479.0	230	2709.00
1.5	End-year evaluation	24	528	79			2150			2757.0	139	2896.00
1.6	Draft Report	40	880	122						1002.0	230	1232.00
1.7	Final Report	20	440	66						506.0	116	622.00
5.2	Non-native species removal						3004			3004.0		3004.00
5.3	Maintenance and Management					2100	6969			9069.0		9069.00
5.4	Post construction Monitoring						44001	2000		46001.0		46001.00
6.1	Tours	16	352	53		25				430.0	93	523.00
6.2	Harvest Days	16	352	53						405.0	93	498.00
6.3	Articles	6	132	20						152.0	35	187.00
		360	7920.00	1178.00	0.00	2125.00	56124.00	2000.00	0.00	69347.00	1750.00	71097.00

Grand Total=1044692.00

Comments.

Budget Justification

Cosumnes River Streambed and Riparian Restoration Project

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

Project Manager Yr-1 = 528 hours; Yr-2= 580 hours ; Yr-3 = 360 hours

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

Project Manager Yr-1 = 20.00 Yr-2 = 21.00 Yr-3 = 22.00

Benefits. Provide the overall benefit rate applicable to each category of employee proposed in the project.

Project Manager Benefits = 15%

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

Travel to project site and all meetings is estimated to be within 60 miles. The Natural Resources Conservation Service will provide a vehicle for their employees and for the Sloughhouse RCD Project Manager.

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

Office = 975 Film (task 1.3 & task 6.1), CDs and display materials;Laboratory = 5,700 Seismic Survey (task 3.2); flags and fencing materials 1,760 (Task 2.8), $6,000 Fiber rolls, seed, hay and erosion control blankets (Task 4.2), $11,300 Plants, plant protectors, weed mats, fertilizer (Task 5.1), 1,188 herbacides and protective gear (Task 5.2), Irrigation water trailer rental and plant replacements yr-2 $2,100, yr-3 $2,570 (Task 5.3).

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.

California State University Sacramento - 32% overhead rate -Faculty, Tim Horner, Yr-1 (Task 3.1) 340 hours @ $32.74 + 10.47 benefits = 19,393; Yr-2 (Task 5.4) 340 hours @ $34.38 + 11.00 benefits = 20,367; Yr-3 (Task 5.4) 340 hours @ $36.09 + 11.55 benefits = 21,381; -Faculty, Kevin Cornwell, Yr-1 (Task 3.1) 400 hours @ $28.22 + 10.00 benefits = 20,180; -Graduate Students (2), Yr-1 (Task 3.1) 1,800 hours @ $15 + 1.80 benefits = $39,917; Yr-2 (Task 5.4) 900 hours @ $16 + 1.92 benefits = 18,924; Yr-3 (Task 5.4) 900 hours @ $17 + 2.04 benefits = 22,620. Natural Resources Conservation Service - 15% overhead rate -Construction Engineer, Yr-2 (Task 4.1) 100 hours = $4,891; (Task 4.4) 16 hours = $6,393; (Task 4.5) 100 hours @ $31.50 + 11.03 benefits = 4,891. -Civil Engineer, Mark Cocke, Yr-1 (Task 3.3) 80 hours @ $30.00 + 10.50 benefits = $486; Yr-2 (Task 4.1) 16 hours @ $31.50 + 11.03 benefits = $783. -Biologist, Karen Fullen, Yr-1 (Task 3.4) 40 hours = $1,419; (Task 3.1) 40 hours @ $22.85 + 8.00 benefits = $1,419; Yr-2 (Task 4.2) 40 hours = $2,980; (Task 5.1) 104 hours = $3,874; (Task 5.2) 40 hours = $1,490; (Task 5.3) 112 hours = $4,172; (Task 5.4) 80 hours @ $23.99 + 8.40 benefits = $2,980; Yr-3 (Task 5.2) 40 hours = $1,490, (Task 5.3) 80 hours @ $25.19 + 8.82 benefits = $3,129. General Labor Yr-1 (Task 3.3) 160 hours = $1,600; (Task 3.4) 176 hours @ $10 = $1,760; Yr- 2 (Task 4.1) 176 hours = $1,936; (Task 4.2) 200 hours = $2,200; (Task 5.2) 120 hours = $1,320; (Task 5.1) 648 hours = $7,128; (Task 5.3) 448 hours @ $11.00 = $4,928; Yr-3 (Task 5.2) 120 hours = $1,440, (Task 5.3) 320 hours @ $12.00 = $3,840. Put out to bid (Task 4.1) estimated

per job at approximately $2.25 cu/yard; (Task 4.3)(Task 4.4)(Task 4.5).

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.

No single purchase of equipment will be more than $5,000 per unit. CSUS will be purchasing equipment in year 1 = $5,000, year 2 = $2,000 and year 3 = 2,000.

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 presentatons, reponse to project specific questions and necessary costs directly associated with specific project oversight.

Year 1 - Task 1.1 Project Management- contract services, hire subcontractors, supervise, monitor, administer budget and finances and review all work performed to assure contract completion within budget, on schedule and in accordance with approved procedures, applicable laws and regulations. In year one 380 hours will be devoted to this task = $8,750 (salary and benefits); year 2- 400 hours = $9,660; year 3- 120 hours = $3,036. Developing quarterly reports (task 1.2), year 1- 20 hours = $460 (salary + benefits); year 2- 20 hours = $483; year 3 = 20 hours = $506. Providing updates (task 1.3) year 1 - 98 hours = $2,254; year 2 - 98 hours = 2,367; year 3 - 98 hours = $2,479. Mid-project evaluations (task 2.4) year 2- 24 hours = $579. End of year evaluation (task 1.5) year 3- 24 hours = $607. Draft report (task 1.6) year 3 - 40 hours = $1002. Final report (task 1.7) year 3- 20 hours = $506.

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

N/A

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.

Overhead Rate 23% includes: general office staff, general office supplies, workers comp insurance, tranings, auditor, advertisements, postage, delivery and equipment repairs.

Executive Summary

Cosumnes River Streambed and Riparian Restoration Project

The Cosumnes River Streambed and Riparian Restoration Project, a demonstration restoration project, will restore and rehabilitate a one-mile, 50-acre stretch along the Cosumnes River, just below the State Highway 16 bridge crossing. The project will use currently existing technology combined with environmentally sound natural resource conservation practices in a holistic approach to heal damage caused by unprecedented flood events in 1986 and 1997 exacerbated by poor land-use practices. Complementary to CALFED and CVPIA goals, this project will return the streambed in this stretch to a more natural meander, restore its connections to the adjacent floodplains, rehabilitate functional habitat and encourage large, healthy populations of native flora and fauna, both aquatic and terrestrial, improve water quality and flood management and share the information gained through the experience with both the public and private communities. The bank soils, in combination with the large flow events in 1986 and 1997 and prior land-use practices such as grazing in riparian area and dredging of the river channel, have lead to accelerated erosion on both banks. Additionally, the river channel in this stretch has been down-cut seven feet since 1952 (Philip Williams & Association, 1997). Excessive down-cutting has caused a narrowing of the channel with a corresponding increase in velocity and capacity for sediment transport, contributing to poor water quality and a reduction of functional natural habitat. The Cosumnes River demonstration restoration project will test the hypothesis that it is possible to use currently available technological models in combination with restored natural processes to create a channel with stable banks in a natural free-flowing system. The hypothesis will be tested using HEC-RAS, an "off-the-shelf" water surface model, CHANSTAB, a Natural Resources Conservation Service developed channel stability model and gravel gradation data developed by the California Department of Fish and Game.

Proposal

Sloughhouse Resource Conservation District

Cosumnes River Streambed and Riparian Restoration Project

Tina Lunt, Sloughhouse Resource Conservation District
William (Bill) Mosher Jr., Sloughhouse Resource Conservation District
Leland Schneider, Landowner
Bill Hutchinson, Landowner

A. Project Description

1. Problem

The Cosumnes River Streambed and Riparian Restoration Project, a demonstration restoration project, will restore and rehabilitate a one-mile, 50-acre stretch along the Cosumnes River. The project will use currently existing "off-the-shelf" technology combined with environmentally sound natural resources conservation practices in a holistic approach to heal damage caused by unprecedented flood events in 1986 and 1997 exacerbated by poor land-use practices. The project will return the streambed in this stretch to a more natural meander, restore its connections to the adjacent floodplains, rehabilitate functional habitat and encourage large, healthy populations of native flora and fauna, both aquatic and terrestrial, improve water quality and flood management and share the information gained through the experience with both the public and private communities.

The riverbank soils along this stretch of the Cosumnes River are sandy and non-cohesive. The bank soils, in combination with the large flow events in 1986 and 1997 and prior land-use practices such as grazing in riparian area and dredging of the river channel, have lead to accelerated erosion on both banks. Additionally, the river channel in this stretch has been down-cut seven feet since 1952 (Philip Williams & Association, 1997). Excessive down-cutting has caused a narrowing of the channel with a corresponding increase in velocity and capacity for sediment transport, contributing to poor water quality and a reduction of functional natural habitat.

A reconnaissance survey conducted for The Nature Conservancy (Philip Williams & Association, 1997) identified sixty bank erosion sites along the Cosumnes River between Michigan Bar Road and Wilton Road. Eleven of these erosion sites have been armored with concrete rubble, shotcrete or riprap. Unfortunately, these traditional hard engineered bank stabilization approaches have often lead to a reduction in habitat and water quality and do not allow for natural geomorphic processes to occur.

Of particular note, the accelerated bank erosion process is threatening a rookery site frequented by Great Blue Heron, Black-Crowned Night Heron and Great Egret on the south bank by undermining and toppling mature cottonwoods. In October 2000, Leland Schneider (landowner on the south bank) received an emergency permit from the CDF&G to move approximately 8,000 cubic yards of material to provide protection to the heron and egret rookery. Fortunately, the stream flows from November 2000 to present have been low enough (<1,400cfs) for that area to remain protected by this emergency repair. Higher flows still have the potential to further damage the two identified eroding areas. Excessive sedimentation is also reducing San Joaquin Chinook salmon spawning grounds by cementing channel gravel, adversely affecting the production of fry.

Although the Cosumnes River's headwaters are located in Amador and El Dorado Counties, the river descends through the project site's location in Sacramento County and on into the Sacramento-San Joaquin River Delta. The project will be located on a combination of private agricultural property and public property owned by the County of Sacramento Parks Department. The project will seek to restore natural channel processes by physically reshaping a one-mile stretch of the Cosumnes River channel immediately below the bridge at Highway 16, river mile 32, Carbondale 7 ½ minute USGS quadrangle, Section 4, Township 7 N, Range 8 E.

The Cosumnes River Streambed and Riparian Restoration Project will use a holistic approach, optimizing ecosystem benefits. The primary goals of the project are to:

- Restore and rehabilitate a one-mile stretch of the Cosumnes River
- Improve flood management by restoring and rehabilitating the associated floodplain benches
- Restore and enhance functional habitat for both aquatic and terrestrial flora and fauna

- Improve water quality through reduced erosion and sedimentation
- Increase private stakeholder and community awareness of natural ecological processes and sound land-use practices.

Specific objectives of the project will include: obtaining permits; conducting pre-construction studies to include sediment loading and plant inventories; conducting a seismic survey; surveying and staking access points and cut and fill locations; flagging of plants, shrubs and trees not to be disturbed including the placement of construction fencing around the perimeters of valley oaks; physically reshaping the river channel; bank shaping; installing large woody debris; cleaning, sorting and replacing various size gravels including returning spawning sized gravel to the streambed; reconstructing the floodplain benches flanking the previously down-cut area of the channel; replanting the floodplain bench and banks with native trees, shrubs, forbs and grasses; removing and controlling non-native vegetation; ongoing vegetation maintenance and management including providing for irrigation and replanting on an as-needed basis to ensure healthy native plant populations are reestablished; conducting annual tours; tribal harvesting; updating local watershed agencies and groups; developing articles for the local Cosumnes River Task Force newsletter; and conducting post-construction studies for comparison and assessment of successful completion of the various project goals.

The Cosumnes River demonstration restoration project will test the hypothesis that it is possible to use currently available technological models in combination with restored natural processes to create a channel with stable banks in a natural free-flowing system. The hypothesis will be tested using HEC-RAS, an "off-the-shelf" water surface model, CHANSTAB, a Natural Resources Conservation Service developed channel stability model and gravel gradation data developed by the California Department of Fish and Game.

Presently, the California State University, Sacramento (CSUS) Department of Geology is gathering pre-construction data on water chemistry and gravel flow characteristics. A monitoring plan developed by CSUS will be used to identify the project's level of success and also gaps in the model that might need to be addressed before large-scale restoration projects using this model are implemented in the Sacramento and San Joaquin River Systems. It is expected that implementation of the restoration designs based on sound modeling techniques and rehabilitation plans based on sound natural resources conservation land-use practices will reduce erosion and sedimentation, bring the floodplain back to life, accelerate riparian reforestation and improve both water quality and flood management.

2. Justification

The Cosumnes River, at a length of just 80 miles, is neither the longest nor largest river system in California. However, it retains a special significance as the last untamed, free flowing river system west of the Sierra Nevada Mountains. The river has a natural flow regime, drying up in drought years and flooding in wet years. Flora and fauna located along and in the river and on the associated floodplains have evolved to not only survive, but also actually depend on these fluctuations (American River Conservancy, 2000).

Over the past three decades, the health of the Cosumnes River has become a growing concern to agencies and individuals alike. And nothing could have brought this concern to the forefront more than the catastrophic flood event of 1997. On January 2, 1997 the Cosumnes River experienced the most extensive flood event in recorded history. Water flows exceeded the estimates of a 100-year event. Levees originally constructed in the early 1900s primarily of agricultural purposes failed to provide adequate protection for either agricultural property or new community development. Twenty-four levees breaks inundated eighty homes and 24,000 acres of agricultural land including orchards, vineyards, ranches and farms. Estimates of financial losses by the Agricultural Commissioner in Sacramento County alone reached $10.5 million to row, field and croplands, $2

million to orchards and vineyards and $.5 million to pasture and rangeland.

The U.S. Army Corps of Engineers conducted a Reconnaissance Study of the Cosumnes River system in 1999 to assess water and related land resource problems. Specific problems identified included erosion and channel incision; excessive sediment transport and deposition; degradation of the riverbed; constriction of the floodplain; isolation of the flood plain from the river channel; reduction of flows in summer and fall; loss of aquatic and riparian habitat; and levee failure and flooding. Additionally, the Environmental Protection Agency has identified the Lower Mokelumne-Lower Cosumnes watershed as having a "serious water quality problem" and the California Unified Watershed Assessment has listed it as having the "highest restoration priority" (Environmental Protection Agency, 2000).

In a healthy river system, the amount of sediment entering the river, on average, should equal the amount of sediment carried in the water flow until it flows into another body of water or deposited as alluvium. A healthy river channel should then exhibit typical bar-pool morphology. And indeed, aerial photographs from the 1930s demonstrate this bar-pool morphology existed along the Cosumnes. In particular, extensive bars are noted in the channel between Highway 16 and Wilton Road (U.S. Army Corps of Engineers, 1999).

More recently, however, the Cosumnes River channel has degraded significantly as a direct result of decreased water flow, changes in velocity and levee construction. Decreased water flow, exacerbated by increased agricultural usage and urban development, has lowered the groundwater table by approximately 60 feet, leading to increased sedimentation (U.S. Army Corps of Engineers, 1999). And although the overall water flow has decreased, the flow has been concentrated in the main channel, increasing its velocity and ability to incise the channel and transport even greater amounts of sediment.

"The degradation of the Cosumnes River has concentrated higher velocity flows within the main channel, resulting in excessive sediment transport capacity. The excessive transport capacity of the Cosumnes River has significantly altered the channel morphology; contributed to the loss of in-channel vegetation, and threatens the stability of bridges, top of bank vegetation, and streamside levees in many locations. Continued channel degradation on the Cosumnes River will cause further losses of natural resources values and require increasing levels of levee and bank maintenance, including structural reinforcement" (Philip Williams & Associates, LTD, 1997). Increased erosion and the river's capacity to transport sediment have basically eliminated the bars previously noted in the aerial photographs throughout this stretch of the river.

The Cosumnes River and its associated riparian habitat have historically supported a large number of aquatic and terrestrial species, both plant and animal. Of particular note, The Cosumnes River Streambed and Riparian Restoration Project will be located within the 14-mile stretch of river between Meiss Road and Latrobe Falls generally used by the Chinook salmon for spawning and rearing of fry. Due to the very small range of available habitat, each mile of restored habitat will be extremely important to the survival and enhancement of the Chinook.

In the recent past, the river has supported moderate-to-large Chinook salmon runs. Between 1953 and 1973, estimated salmon spawners exceeded 1,000 on several occasions and exceeded 4,000 twice. Since the mid-1970's fish counts only reached 1,000 once and were generally less than 200 (Snider and Reavis, 2000). Today, winter-run Chinook salmon are listed as Endangered and the Central Valley fall/late fall-run Chinook salmon are listed as a Species of Concern by the U.S. Fish and Wildlife Service. 580 Chinook salmon were estimated to be spawning in the Cosumnes River in 2000 (per. con. Keith Whitener, 2001). This number may be partially due to the Chinook salmon reared at the Nimbus Hatchery and releases in the Cosumnes. This number of spawners is probably nearing capacity for available habitat, according to Keith Whitener of The Nature

Conservancy. Reduced habitat has resulted as the "… abundance of fine sediment has apparently increased within the historic anadromous reach, reducing spawning and rearing habitat availability…" (Snider and Reavis, 2000).

Some of the other flora and fauna of concern, affected by the health of the Cosumnes River include the Delta smelt, splittail, the giant garter snake, Swainson's hawk, bank swallow, western spadefoot, tri-colored blackbird, bank swallow, the valley elderberry longhorn beetle (U.S. Fish and Wildlife Service, 2000), valley oak and elderberry. Additionally, there is a large heron and egret rookery, containing approximately 100 nesting sites, in a mature Cottonwood stand that is in danger of being undercut.

3. Approach

In September 1999 a local rancher, Leland Schneider, contacted the National Resources Conservation Service (NRCS) Elk Grove Field Office District Conservationist, requesting assistance with facilitating the permit process and the development of engineering and revegetation designs for a bank stabilization project along the Cosumnes River. The Sloughhouse Resource Conservation District (RCD) was contacted for help with the permitting process, the NRCS State Office was contacted for assistance with engineering designs and the NRCS Elk Grove Field Office was contacted for assistance with the development of revegetation plans.

Preliminary work on project design began in earnest when the NRCS Civil Engineer and the NRCS Elk Grove Field Office Wetlands Team surveyed the project site in August 2000. The survey data was used to create a HEC-RAS water surface model of the current conditions. Expanding on this data, the Civil Engineer developed a "Conceptual Model" using HEC-RAS to design cross-sections representing a "bankfull" channel size. This model used a meander wavelength and amplitude that would be typical in a C-3 channel. The model demonstrated it would be stable for a selected range of flows. Further analysis demonstrated the existing channel would be the most stable if reshaped into a parabolic cross-section that could contain the 1.5 year flow rate of 6,600 cubic feet per second (cfs) through this reach.

A California Department of Fish and Game (CDF&G) Geomorphologist added gravel gradation data for the project area and together with the HEC-RAS output plots of channel shear, velocity, volume, and depths were used as inputs to CHANSTAB, a computer program that evaluates the stability of a channel based on geometric and hydraulic parameters. Two meander alignments were then tested and the velocity analysis results were reviewed and discussed with California Department of Fish and Game (CDF&G) engineers and geomorphologists. The meander alignment supported by the CDF&G was a "Low Sinuosity" alternative. Selection of the "Low Sinuosity" alternative was further bolstered by the fact that this alignment is approximately the same as the alignment evidenced in the available photographs from 1930-1983. This alignment had basically been stable until the channel-upsetting event in 1986. A paper written by Rinaldi and Johnson also supports using empirical local channel alignments for restoration design.

Based on this preference, initial earthwork volumes were calculated. This initial alternative, while stable, yielded an excess of cut versus fill ratio (C/F ratio = - 2.6: 1). The "Low Sinuosity" alternative was modified to an acceptable design energy slope of 0.0015 ft./ft. through the study reach. This alignment has the added advantage of locating the "bankfull" channel as far as physically possible from the presently eroding areas, giving vegetation replanted in those areas longer to become fully established.

In order to develop a revegetation plan, the NRCS Biologist also surveyed the project site to first determine which native and exotic species are currently growing there. The RCD then consulted a Biologist from the U.S. Fish and Wildlife Services to ascertain whether or not other local native species could be beneficial. The NRCS

Biologist used that additional input in completing a draft of the vegetation management plan. The plan includes specifications regarding the protection and enhancement of the riparian vegetation with special attention paid to endangered and protected species, non-native species to be removed and a list of valuable species to be replanted along the banks and within the floodplain.

Monitoring will be an extremely important facet of the Cosumnes River Streambed and Riparian Restoration Project. A project of this magnitude also needs to be evaluated in terms of its effects on the ecosystem and cost-effectiveness to taxpayers, landowners and sponsoring agencies. In order to ensure adequate data is available to accurately evaluate the various project goals, significant effort will be devoted to quantifying physical and chemical conditions in the ecosystem before, during and after the restoration project.

In April 2001 the RCD and NRCS approached the California State University, Sacramento (CSUS) Department of Geology for assistance in monitoring the channel before, during and after construction. The Department of Geology had already been conducting some onsite monitoring within the project site and their knowledge of current conditions and information previously gathered would be invaluable to the development of a monitoring program for this project. Two faculty members from the Department of Geology have since developed a monitoring program to address the project's requirements.

Early monitoring will begin following funding approval. Early monitoring will be used to document conditions before any physical restoration steps are actually taken. Early monitoring will ensure the project will be able to provide quantitative information about the effectiveness of the project. Data collected before the start of streambed restoration will be especially important, providing a baseline for use in later comparisons and quantifying project success. Early monitoring will include stream sediment load, stream flow, upstream and downstream channel surveys, streambed permeability, flow through the hyporheic zone (shallow zone of groundwater/surface water interaction), temperature gradients, and pore water chemistry of streambed gravels (including dissolved oxygen content). These parameters have been identified as critical components of salmon spawning habitat, and are also important indicators of the general health of the ecosystem.

CSUS will also analyze the permeability of the present channel gravel and compare the results with post construction results. An opportunity to evaluate the potential benefits of variable levels of fine sediment removal could be explored in this project. Based on the pre-construction data, it would be possible to select areas for "variable" treatment ranging from no fines removed during construction to areas where two or more ranges of grain sizes are removed (i.e. <0.125 in., <0.25 in., <0.5 in.). The data could be used to evaluate the effectiveness of the treatments, and compare them to benefits from the velocity increase alone. This could point out either opportunities for cost savings or need of treatment in future restoration projects.

As the project moves towards the construction phase, access points and cut and fill locations will be surveyed and staked by an NCRS Civil Engineer. The main access points will be from an existing farm road paralleling the river and down a previously used road descending into the floodplain. The Biologist will walk the equipment access points prior to construction, identifying and flagging all plants, shrubs and trees not to be disturbed. The Biologist will also ensure the placement of construction fencing around the perimeters of valley oaks and elderberry bushes. Species that cannot be avoided will be documented and replaced after construction. The NRCS and contracts will require contractors to replace any flagged plants disturbed or destroyed at a 5:1 ratio.

The construction aspects of the project will be put out to bid. Following completion of a competitive bid and selection process, contracts will be let and stream reshaping will begin. It is estimated that 186,500 cu/yards will be cut during relocation of the channel and 156,000 cu/yards of earth fill will be used during restoration of

the floodplain benches. The channel will be reshaped using the cross-section models developed by the Civil Engineer and will be capable of containing water flows of at least 6,600cfs throughout the 5,800 linear foot reach.

The streambed and banks will be rebuilt using coarser materials while the finer material will be used for the floodplain benches. The finer material should provide a more suitable substrate for riparian plant establishment and growth. The toes of the floodplain benches will be located below the "ordinary high water" level in the channel and will be heavily reseeded to ensure quick reestablishment of erosion reducing vegetation.

The contractors will operate a screening plant onsite to clean and sort 60,000 cubic yards of gravel to be replaced in the lower reach of the project site. The cleaned gravel will provide vastly improved nesting sites for the spawning salmon and functional habitat for establishment of benthic communities, providing forage for the salmon as well. Large woody debris will be anchored along the outside curves of the reconstructed river channel for protection from flood events and to provide additional functional habitat.

Every construction project has the potential to impose some negative impact on the ecosystem. Prior planning can usually keep this impact to a minimal temporary condition, more than offset by overall project gains. It will be especially important to measure physical changes such as stream sediment load and sediment grain size during construction as variances in these parameters may impact downstream reaches of the river not under construction.

Monitoring during construction will include a site directly upstream from the construction and a site directly downstream from the construction. Sediment loading and flow velocity will be given special consideration, as gravel-sieving operations tend to suspend and redistribute sediment. Project managers will use data gathered through specifically designed monitoring techniques to document the amount of disturbance to the ecosystem during the construction phase in order to modify workloads and schedules, keeping disturbances to a minimum. Project administrators and regulatory agencies will use the monitoring data to evaluate the overall impact of the restoration project. Additionally, the Biologist will ensure that flagged plants are being retained as planned and areas designated with orange construction fencing are left undisturbed monitor construction by conducting site visits three to five days per week.

The newly reconstructed banks and floodplain benches will require replanting as part of the rehabilitation process. Replanting will be supervised by the Biologist to ensure specifications in the revegetation plan are followed. Plant material will be inspected to also ensure conformance with specifications. The Biologist will stake locations for placement of individual plants on site. Following NRCS guidelines as noted in the revegetation plan, 200 trees, shrubs and forbs will be planted per acre. The eroded banks and any banks disturbed by equipment access will be seeded and planted with native vegetation following NRCS Conservation Practice Specification: 643 – Restoration and Management of Declining Habitats and 342 – Critical Area Planting – Straw Mulch. Any invasive exotic plants found will be removed and controlled as part of the ongoing weed management plan.

The reestablishment of healthy native plant population will be ensured through the use of irrigation during dry months and replanting on an as-needed basis. The RCD will provide for irrigation through the use of a water trailer. Onsite investigations every two weeks between March and October and every four weeks between November and February for the first three years will assess plant survival rates and general health. Survival, health and vigor will be checked and documented in accordance with NRCS Conservation Practice Specification: 612C – Tree/Shrub Establishment Pole Plantings/Cuttings. Revegetation will be considered successful when a plant survival rate of 80 percent is achieved for each species planted. Replanting will be

required on an annual basis until the 80 percent survival rate is reached. Factors limiting survival rate will be identified and resolved before replanting.

In-stream monitoring will continue after the channel reshaping and floodplain restoration is complete. Continued monitoring, one of the strongest methods of evaluating the success of a restoration project, will provide a quantitative measure of the improvement affected by the project. Post-restoration monitoring will mirror early monitoring measurements (stream sediment load, stream flow, streambed permeability, hyporheic flow, groundwater/surface water interaction, temperature gradients, and dissolved oxygen content in streambed gravels). It will be necessary for post-restoration monitoring to continue for at least 30 months, allowing time for vegetation reestablishment and growth in the riparian zone, to establish benthic communities in the stream gravels and to allow the channel to stabilize over several seasonal cycles. Due to the time limitations imposed by this proposal, 21 months of post-restoration monitoring is proposed in this grant. Additional funding will be sought for monitoring beyond this period.

The Cosumnes River is the last un-dammed major river in California and is especially important in understanding the dynamics of natural, but impacted systems. As the effects from flood control structures are minimal, external variables affecting the Cosumnes River are limited primarily to agricultural, mining, and land use practices. Lessons learned on this project will allow future projects to expend resources in the most cost effective and efficient manner. Direct comparison of conditions before, during and after streambed restoration of this stretch will provide valuable insight into the use of adaptive management strategies compatible with the natural systems for future projects.

Throughout the grant period, the RCD will conduct public outreach and education activities. The RCD will provide monthly reports to the Cosumnes River Task Force (CRTF) and other interested watershed agencies and stakeholders. The RCD will compile a photo-documentary of the project including photographs before, during and after construction; conduct three site tours for interested watershed agencies and stakeholders; hold five harvest days for local Native Americans and create six articles for inclusion in the CRTF newsletter.

Additionally, the RCD, as grant administrator, will work with consultants to contract services, hire subcontractors, supervise, monitor, administer grant funds, prepare and submit all required reports, and review all work performed to ensure contract completion within budget, on schedule and in accordance with approved procedures, applicable laws and regulations. As a project monitoring and adaptive management tool for both the RCD and CALFED, the RCD will conduct a mid-project evaluation meeting with the consultants, key agency and academic personnel and landowners and other stakeholders to assess progress and evaluate project success.

4. Feasibility

The Cosumnes River Streambed and Riparian Restoration Project, with its use of relatively simple, time-tested techniques and procedures, has a high probability of successful completion within the grant period's allotted time constraints. The project, primarily a demonstration restoration project, also has much of the "science" already behind it with its restoration designs already developed using proven "off-the-shelf" computer modeling techniques. The project's vegetation management and maintenance plans will be developed based on simple empirical studies.

The project, revolving around a short construction period, will require an extended permitting process, a number of pre-construction studies using proven methodologies and techniques to establish data baselines for the ongoing monitoring program, a seismic survey, channel, bank and floodplain reshaping, revegetation of banks

and floodplains, vegetation maintenance and post-construction monitoring. Once the extensive permitting process and pre-construction monitoring studies and surveys have been completed, a short restoration construction period of approximately 5 weeks will be needed to reshape the one-mile, 50-acre project stretch using heavy equipment. The construction phase will be followed by a short, but intense revegetation period. Vegetation maintenance and relatively routine post-construction monitoring will complete the project.

The primary obstacle to successful, timely completion of the project will be obtaining the required permits prior to construction. To expedite these processes, the Sloughhouse RCD has already conducted pre-submittal meetings with many of the permitting agencies keeping them informed of the proposal's progress and consulting with them during the development of the engineering designs. When the initial design drafts were completed, a meeting was set with the various agencies to determine what, if any, additional questions or concerns might arise and if those could be mitigated prior to submittal. Those unable to attend were sent copies of the engineering designs and plans. Answers to questions and concerns raised have already been incorporated into the designs whenever appropriate.

Upon funding approval, the RCD will provide assistance in completing the permitting process. The RCD will supply all necessary information to the Lead Agencies, so they can complete the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) review as quickly and efficiently as possible. The RCD will also work with the County of Sacramento to apply for and obtain the following permits: Regional Water Quality Control Board 401 Certification, U.S. Army Corps of Engineers 404 Permit, Sacramento County Encroachment Permit, a County Grading Permit, a State Reclamation Board Encroachment Permit, Section 7 consultation, a CDF&G Streambed Alteration Permit. Once specific dates for access have been established, Sacramento County will issue a formal "encroachment permit" for the period of time required by the project. Caltrans has also been approached because of the project's close proximity to the Hiway 16 bridge. Caltrans does not foresee any problems with project as proposed. Permission to access the properties involved and implement all facets of this proposal has been granted by Sacramento County and the two private landowners involved, Leland Schneider and Bill Hutchinson.

5. Performance Measures

It is often impossible to determine the overall success or failure of a restoration type project such as the Cosumnes River Streambed and Riparian Restoration Project within the confines of the usual and customary time limits covered by a grant period. It is quite possible that certain environmental conditions, such as excessive rainfall, necessary to truly judge the project's overall degree of success may not occur within the grant period.

It may not be known for some time how well the reshaped river channel in combination with the restored and enhanced floodplain benches will resist the possible damaging effects of a severe flood event. Will the high-water flows ease over the banks and spread across the floodplain benches, slowing and depositing their cargo of excess sediment as described by the engineering models? Or will the higher velocity flows operate outside the scope of the engineer's models, again downcutting the channel and isolating it from the floodplain benches?

It is also quite likely restoration of the streambed will not allow sufficient time within the grant period time constraints for the establishment of large, healthy benthic communities that will attract and support a larger salmon spawning population. Likewise, while it is expected that allowing high water to once again routinely inundate the restored and enhanced floodplain benches will provide relatively high levels of nutrients, new plantings of trees, shrubs, forbs and grasses, which although they might be well on their way to establishing new communities of healthy, functional habitat, will in all probability need a longer time frame than the grant

period allows to provide substantial barriers to high velocity water flows. Thus, the full impact of the project on decreasing sedimentation, improved flood management, enhanced functional habitat and improved water quality may not be known for years beyond the grant period.

Given the grant period's time constraints, there are no currently available monitoring procedures or techniques capable of providing for these kinds of definitive overall performance measurements. However, all the major restoration and rehabilitation aspects of the project required to promote natural rehabilitation will be in place well in advance of the grant period's end, as well as many forms of monitoring allowing the study of this stretch to provide a wealth of knowledge for future projects along the Cosumnes for many years to come.

Certain aspects of the project performance measurements will, on the other hand, be quite matter-of-fact. Several special permits of the utmost importance to the project and requiring a great deal of information and support will simply have to be obtained. The project simply will not be able to move forward without them. There can be no 75%. No 80%. Assessment will be either pass or fail. Obtained or not obtained. A passing assessment will be awarded for timely completion if all required permits are in-hand prior to the proposed construction begin date of August 2003. Note that all time periods referenced are predicated on the grant period commencing in July 2002.

Several pre-construction studies will be conducted concurrently with the permit process during July 2002-July 2003. Monitors from the California State University, Sacramento (CSUS) Department of Geology will collect water samples to determine sediment load. Monitoring will include measuring the suspended and dissolved load in order to characterize the nature of fine sediment (silt and clay) transport along the project reach. Suspended sediment concentrations will be determined using National Water Well Association (NWWA) Method 2540 D (NWWA, 1989).

Three sediment samples will be collected from three locations crossing the width of the channel (essentially in each third of the channel) at each of six locations stretching along the length of the reach. The 18 samples collected per sampling event should generate good insight into sediment load fluxes and assist in determining channel morphology. In order to ensure returning to the exact same locations for later samplings, all geochemical and sediment load sample sites will be surveyed and flagged for X-Y locations and elevations using the TOTAL station theodolite. Reference points provided by the NRCS will be used as benchmarks for the project. Results of these sampling studies will be used in determining overall project success.

Flow rates will also be important in the analysis of sediment loading. As there are no significant tributaries between the USGS Michigan Bar gaging station #11335000 located just two miles upstream from the project site and the only significant in- or out-fluxes to the system result from channel bed losses, it is proposed that these flow rates can be used. A preliminary study will be conducted to ensure that in fact no significant differences in the flow rate measurements are occurring between the gaging station and the project site. If no significant difference exists data recorded at the gaging station will be utilized in sediment loading studies. If significant differences are apparent, then a stage height rod will be installed into the streambed during the first gaging exercise to facilitate subsequent discharge measurements. Completion of these studies and the installation of the stage height rod if necessary prior to August 2003 will be considered successful.

To a spawning salmon, streambed permeability is one of the most critical parameters in determining stream gravel quality. In many cases, fine grain size and corresponding lack of permeability are the main factors degrading salmon spawning habitat. CSUS will document variability in streambed permeability before the restoration project begins. Streambed permeability will be measured using modified slug-testing equipment. This is a standard test for hydrogeologists, and is used to determine in-situ permeability by displacing a volume

of water in a standpipe or piezometer (Bower and Rice, 1976). In the event that the summer water table is too low for the slug-test technique, an alternate approach documented by Barnard and McBain (1998) will be used to measure streambed permeability.

Slug tests and standpipe tests are valid for a very limited area (a square meter) immediately surrounding the sampling point. For this reason, permeability will be measured in many locations along the 5,800-ft stretch of river. Permeability will also be measured at different depths, with special emphasis on the 0.3m to 0.6m depth range preferred by spawning salmon. A variety of stream channel and channel-margin environments will be sampled if the water table is high enough to permit this type of testing. Lateral transects and replicate samples will be used to determine variability in the system. The exact number of permeability tests performed will depend on substrate conditions.

Fall-run Chinook salmon bury their eggs up to 0.3 m deep in stream gravels. The eggs hatch and emerge over a 90-120 day period, and during that time rely on inter-gravel pore water to remove waste products and deliver a fresh supply of dissolved oxygen. A critical factor for the survival and healthy development of the eggs is the pore water chemistry, especially the dissolved oxygen content (Bjorn and Reiser, 1991). Low oxygen conditions do not provide suitable habitat for spawning or egg development. In many cases low oxygen content is linked to low permeability and the lack of communication with surface waters.

A standard suite of geochemical measurements will be used to provide a broad indication of water quality conditions before and after the restoration project. Quarterly sampling runs will be used to monitor dissolved oxygen content, temperature, pH, conductivity, and pore water chemistry from different depths in the gravel bar without exposure to atmospheric conditions. Turbidity will be measured in the outflow line of the flow-through cell, and additional filtered samples will be collected for laboratory analysis of dissolved organic carbon content and anions, including nitrate.

In order to ensure appropriate and accurate baselines are established, the initial run of all streambed permeability, geochemical, and dissolved oxygen content tests must be completed prior to start construction in August 2003 and performance will be assessed accordingly.

The Biologist will conduct an initial plant inventory throughout the 50-acre project site to determine which plants require protection during construction, what non-native species will require removal and which plants will be added or enhanced during the revegetation process.

The Biologist will flag plants, shrubs and trees not to be disturbed during construction and ensure construction fencing is placed around the perimeters of all valley oaks and elderberry bush.

All construction contracts will specify that all flagged or fenced plants, shrubs and trees disturbed during construction will be replaced by the contractor at a 5:1 ratio. The Biologist will visit the site three or five times a week during construction to inspect the vegetation and to ensure any plants destroyed or disturbed are replaced at the specified ratio. The RCD will receive notification from the NRCS when the flagging and fencing has been completed. The performance measurements for this Objective will be the for one complete plant inventory, plant flagging and fencing and the revegetation plan will be completed prior to August 2003.

CSUS will also conduct a seismic survey (to determine if fine-tuning modifications to the construction design will be required. The seismic survey will be used to determine the relative depth to a high velocity layer (bedrock ideally) beneath the floodplains that flank the river on both sides. The seismic survey is an important early aspect of the project and will also be used to identify site locations to be used during later samplings.

Ten 46 m - 76 m surveys will be performed along the floodplains running adjacent to the river on both the north and south sides. The survey lines will run parallel to the river channel and be kept far enough back on the floodplain to ensure operator safety and good seismic connection with the surface soils. A 12-channel seismograph utilizing a hammer energy source will generate and record seismic data along each survey line. Data will be collected in the field for each survey and processed in the lab to determine the relative depth to a high velocity layer (bedrock). The survey location points will be offset from each other as they traverse the river's course, with downstream spacing between survey lines ranging approximately 30 meters. The results of each survey will be plotted on topographic maps and a "depth to bedrock" map will be generated. Completing the ten surveys and the “depth to bedrock” plot map prior to August 2003 will be considered timely completion of this Objective.

The final Objective to be completed prior to beginning reconstruction of river channel will be for the Civil Engineer to survey and stake the construction equipment access point and all cut and fill locations along the 5,800 linear feet of the river channel in accordance with design specifications. The RCD will be notified by the NRCS upon completion of the surveying and staking process and if all other prior-to-construction Objectives have been met, the contractor will be notified that construction may begin. It is expected that surveying and staking will be completed prior to August 2003.

Construction activities will include reshaping of the main river channel and its banks; placement of large woody debris along 4 outside curves; cleaning, sorting and replacing gravels; and relocating and elevating the floodplain benches as necessary. Monitoring activities will include resurveying the channel to ensure construction is being carried out in accordance with design specifications and conducting samplings in order to study any resulting changes in channel morphology.

The channel will be reshaped into parabolic cross-sections capable of containing 6,600cfs throughout the project reach. The NRCS Construction Engineer, further referred to as Construction Engineer, will be on site during construction to ensure the channel is being reshaped per engineering specifications in accordance with HEC-RAS modeling studies. The Civil Engineer will resurvey the channel near construction completion to verify the channel has indeed been shaped according to project design. This milestone Objective will be reached by October 2003.

CSUS will also monitor channel morphology throughout the project. CSUS will monitor fluxes in discharge and sediment load resulting from changes to the channel's cross-sectional shape. To effectively evaluate the impact of this project on channel morphology, six different localities on the Cosumnes River would be surveyed using a TOTAL surveying station (with 0.003 m resolution) to generate channel profiles at those locations. These locations will be surveyed periodically before, during and after construction activities to evaluate channel morphology variations. Specifically, two locations upstream (one within 100 m of the upstream end of the restoration activity, the second within 1000 m of that end) will provide upstream records of change over time in a part of the river system that will be unaffected by the restoration project. Two sections will be surveyed in the restored section to evaluate pre- and post-construction changes and finally, two locations downstream of the restored section (one approximately 100 m downstream and a more distal site approximately 1000 m downstream).

Mechanical bank shaping will be kept to a minimum to avoid disturbing bank swallows and other at risk species. The lower ends of excessively eroded areas will be heavily planted, seeded and in some areas erosion control blankets and bio-logs will be used to slow the accelerated erosion to a more normal level.

Large woody debris will be anchored along four outside curves of the reconstructed river channel. The large woody debris will provide needed shelter missing in this stretch of river for salmon and other aquatic species. The Civil Engineer will work with the CDF&G on the best location for placement of the large woody debris and the engineer will be on site during placement. All in-stream activities will be completed by October 2003.

Sixty thousand cubic yards of spawning sized gravel will be cleaned, sorted and returned to the streambed. The Construction Engineer will be on site during construction to ensure that properly sized gravel is returned to the streambed at locations specified in the project plans. Finer sediments will be placed on the floodplain bench. This Objective will be completed by October 2003.

It has been estimated by modeling techniques and potential bidders that approximately 186,500 cu/yards of earth will need to be cut. Of those 186,500 cu/yards, 156,000 cu/yards of earth will be redistributed as fill for elevating and relocating the floodplain benches along the previously excessively down-cut length of the channel. The Construction Engineer will be on site during restoration to ensure the floodplain bench is constructed to specifications. The floodplain benches will be resurveyed by the Civil Engineer to verify their construction has indeed been to design specifications. This Objective will be completed prior to October 2003.

The revegetation process will begin immediately following construction completion. Revegetation will include the removal of non-native species; stabilizing the banks, planting new tree, shrubs, forbs, and grasses; providing irrigation as needed; and replanting on an as-needed basis. Ongoing monitoring and maintenance of the non-native and native species as well will occur routinely to ensure the healthy reestablishment of the riparian area.

Non-native plants such as Yellow Starthistle found onsite will be removed through mowing, hand-weeding and limited herbicidal applications. The Biologist will develop an ongoing weed management plan for their control. All weed control on the project site will be in accordance with Specification 595 – Pest Management. The Biologist will submit a report to the RCD upon completion of the weed management plan and the RCD will include the information with the next quarterly report to CALFED. This Objective will be completed by January 2004.

It is estimated that 31 of the 50 acres will need to be revegetated. Following the specifications in the NRCS Field Office Technical Guide, 200 trees, shrubs and forbs will be planted per acre. Banks requiring added protection will be seeded, fertilized at 40 lbs./acre and straw covered. It is estimated the equivalent of three acres will require this treatment. The Biologist will be on site during the revegetation process to ensure the proper distribution and planting of the various species. The first round of planting will take place between October and February 2004 after which time the Biologist will submit a report to the RCD on specie numbers and treatment. This milestone Objective will be reached by February 2004

The Biologist will conduct onsite monitoring every two weeks between March through October and every four weeks between November and February each year for at least three years. Replantings will be conducted on an as-needed basis to ensure healthy native plant populations are reestablished. Factors limiting survival rate will be identified and resolved before replanting. The RCD will be responsible for irrigating the plants, using a water trailer during the dry months, under the Biologist supervision. Revegetation will be considered successful when a plant survival rate of 80 percent has been achieved for each species planted.

The RCD will conduct a mid-project evaluation by holding a meeting with all participants. If the project is on time no action will need to be taken; if the project is not on time activities will be adjusted to ensure timely completion. Also, discussed will be how to make the project more efficient in the future and what the project

may have been missing that would have been useful. Comments will be documented by the RCD and turned in with the quarterly reports and made available for watershed workgroups.

The RCD will hold three (3) site tours for approximately 40 stakeholders, with an overall rating of good or better on evaluation forms to be distributed on the tours. The tours will provide increased stakeholders' awareness and knowledge by sharing things that worked and things to avoid. The tours will be held one immediately following construction in the fall, October 2003, and two spring tours, April 2004 and April 2005. Most of the restoration focus has been in the lower watershed on the Cosumnes River Preserve. The RCD would like to show the importance of restoration activities upstream.

The RCD will conduct five (5) harvest days for the local Native Americans over the three-year period of the grant. Approximately 20 people are expected to attend each of the five events. The RCD will notify Sacramento County in writing two weeks prior to the date(s) of the gathering including whom, when, and quantities to be gathered. Currently, Native Americans have little access to plants used for basketry in this area. The RCD would like to increase the number of plants and the access to plants used by Native Americans. Harvest days will be held in the fall and the spring of each year.

The RCD will routinely update local watershed agencies and groups of progress on the project by verbally sharing information and through photo-documentation. Representatives from the RCD will attend monthly Cosumnes River Task Force (CRTF) meetings, approximately thirty-six (36) meetings in total; attend quarterly Mokelumne Cosumnes Watershed Alliance meetings, approximately twelve (12) meetings; and other watershed meetings as appropriate.

The RCD will provide the CRTF with six (6) articles for their newsletter to be distributed to a minimum of 325 stakeholders within the Cosumnes River Watershed. The article will give an update on project progress, successes, problems and tour dates.

The RCD will hold and end of project evaluation meeting with all participants to discuss how to make the projects more efficient in the future and what project proponents may have been missing that should have been included, if any. Comments will be documented and turned in with the final reports and made available for other watershed workgroups.

6. Data Handling and Storage

All data collected pre- and post-construction will be available to CALFED and other interested agencies. Master's student theses will be available for review at the California State University, Sacramento library. Also, copies of all of the data will be available at the Sloughhouse RCD office in Elk Grove, California.

7. Expected Products/Outcomes

Careful monitoring of the Cosumnes River restoration project presents a unique opportunity to test theories about channel design in a natural setting. Insights about channel stability, sediment load, permeability, and pore water quality will lead to better understanding of natural and modified stream systems and eventually lead to more effective restoration projects. Direct comparison of conditions before, during and after this proposed project will produce models that can be adapted to other stream restoration projects. The Cosumnes River is the last un-dammed river in California with flows having natural rather than controlled variability. Flood control structures are also minimal earthen levees rather than armored levee walls. These factors are significant, and

reduce the number of variables in the natural system. Human interference often increases the complexity of a stream system, making it more difficult to isolate the effects of a restoration project.

Deliverable products will include two Masters of Science theses, technical talks or poster presentations at CALFED conferences, a report to the IEP newsletter, and a technical talk at a national meeting that could include the Geological Society of America or other similar venue. Results will be published in a peer-reviewed journal when longer-term trends or effectiveness of the project are evident. Some of these products may not be ready in time for the final report but will be delivered as soon as they become available.

Additional products will include six articles will be created for inclusion in the Cosumnes River Task Force newsletter; three tour attendance lists; five harvest day attendance lists; vegetation survival rates for each species planted; and photo documentation of the channel and vegetation before, during and after restoration.

8. Work Schedule

The focus in year one will be on obtaining all necessary permits, pre-monitoring by California State University, Sacramento (CSUS) to determine the baseline data needed for post project comparison and a seismic survey to determine where survey marks should be and to fine tune the project designs. Obtaining all the permits will be the first major milestone and only after those permits are obtained may the construction phase be implemented (July 2003). Completing the seismic survey will also be a major milestone and will require a significant payment. If only partial funding is receive than permits may be granted without the rest of the project but the rest of the project may not be granted without the permits.

The focus in year two will be on restoring the river channel, banks and floodplain benches, the continuation of monitoring and surveying of channel morphology, sediment and geochemical sampling, and the installation of instrumentation (in the "restored" section of the river). If only a portion of the project is funded than monitoring could be considered a separable item. However, without monitoring the projects true effects, valuable information will be lost. Two major milestones will be accomplished in year two: completion of the reconstructed channel, flood plain and banks (October 2003) and completion of the re-vegetation process (February 2004). These two milestones comprise the largest expenditures of the project. After the construction is complete, re-vegetation will be key in stabilizing the floodplain and banks and should not be separated if only partial funding is available.

In year three the focus will be on monitoring the channel and vegetation survival rate. Baseline data collected in year one and two will be compared to that of year three to see if there are any initial improvements in water quality and overall habitat for both aquatic and terrestrial species. Future monitoring will be required to see the long-term effect of the restoration project.

The Sloughhouse Resource Conservation District (RCD) will provide all necessary administrative support. The RCD will provide management and administrative services for the proposed project. The RCD will contract services, hire subcontractors, supervise, monitor, administer budget and finances and review all work performed to assure contract completion within budget, on schedule and in accordance with approved procedures, applicable laws and regulations. The RCD will provide monthly reports to the Cosumnes River Task Force and Quarterly Status Reports to the CALFED Contract Manager. Additionally, as a project monitoring and adaptive management tool for both the RCD and CALFED, the RCD will conduct a mid- and end-project evaluation meeting of our consultants, and key agency, academic, and landowner stakeholders to assess progress, evaluate project success, and potentially revise project direction if necessary. The final major milestone will be the submittal of the final report to CALFED.

1.0 ADMINISTRATION

1.1 July 2002 – August 2002 The RCD will contract services, hire subcontractors, supervise, monitor, administer budget and finances and review all work performed to assure contract completion within budget, on schedule and in accordance with approved procedures, applicable laws and regulations.

1.2 Quarterly from October 2002 – April 2005 Quarterly reports and invoices will be submitted to CALFED.

1.3 July 2002 – June 2005 The RCD will provide verbal and written updates to the local watershed agencies and groups.

1.4 February 2004 The RCD will require all participants to participate in a mid-project-evaluation.

1.5 May 2005 The RCD will require all participants to participate in an end-of-project evaluation.

1.6 May 2005 The RCD will submit a draft final report to CALFED.

1.7 June 2005 The RCD will submit a final report to CALFED

2.0 OBTAINING PERMITS AND OTHER NECESSARY CLEARANCES

July 2002-July 2003 The RCD, with assistance from Sacramento County, will obtain each of the following permits or receive a determination that no permit is required.

2.1 CEQA/NEPA

2.2 Regional Water Quality Control Board 401 Certification

2.3 US Army Corps of Engineers 404 Permit

2.4 County Grading Permit

2.5 State Reclamation Board Encroachment Permit

2.6 Sacramento County Encroachment Permit

2.7 Section 7 Consultation with National Marine Fisheries Service

2.8 Section 7 Consultation with U.S. Fish and Wildlife Service

2.9 Department of Fish and Game Streambed Alteration Permit.

3.0 PRE-CONSTRUCTION

3.1 *July 2002 - July 2003* Pre-construction studies will be conducted including: sediment loading, streambed permeability, field geochemistry, dissolved oxygen content and plant inventories.

3.2 *May 2003 – June 2003* A seismic survey will be conducted by CSUS to determine depth to bedrock. The depth to bedrock will help fine-tune the channel designs and locate sampling sites.

3.3 *July - August 2003* Prior to construction the Civil Engineer will survey and stake the access points and cut and fill locations.

3.4 *July - August 2003* Plants, shrubs and trees not to be disturbed will be flagged and construction fencing will be placed around the perimeters of all valley oaks and elderberry.

4.0 CONSTRUCTION

4.1 *August – September 2003* Following the project designs and specification the river channel will be physically reshaped into cross sections that will contain 6,600cfs.

4.2 *August – September 2003* Mechanical bank shaping, although necessary, will be kept to a minimum to reduce disturbing at-risk species such as bank swallows.

4.3 *August – September 2003* Large woody debris will be placed on four of the outside curves of the reconstructed channel.

4.4 *August – September 2003* Sixty thousand cubic yards of spawning sized gravels will be cleaned, sorted and replaced to the riverbed.

4.5 *August – September 2003* The floodplain bench will be reconstructed flanking the previously down-cut area of the channel.

5.0 POST-CONSTRUCTION

5.1 *October-January 2003-2004 for container stock planting, and December-February 2003-2004 for tree and shrub planting from cuttings* The floodplain bench and banks will be replanted with native trees, shrubs, forbs and grasses.

5.2 *November 2003-2004* Non-native vegetation will be removed through mowing, hand weeding and herbicidal application.

5.3 *March 2004-June 2005* Maintenance and management of vegetation including irrigating and replanting will be implemented on an as-needed basis to ensure healthy native plant populations are reestablished.

5.4 *May 2005* The RCD will conduct post-construction studies for comparison and assessment of successful completion of the various project goals.

6.0 OUTREACH AND EDUCATION

6.1 *October 2003, May 2004, May 2005* The RCD will conduct annual tours to enhance stakeholders' awareness and knowledge.

6.2 *Semiannually from April 2003- April 2005* The RCD will conduct tribal harvesting days in the spring and fall.

6.3 *Semiannually from October 2002 through May 2005* The RCD will develop articles for the local Cosumnes River Task Force newsletters to share project progress with the stakeholders and watershed agencies.

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

1. ERP, Science Program and CVPIA Priorities

The Cosumnes River Project is in the CALFED designated "Eastside Tributary" zone. This project addresses CALFED's "Restoration Priorities for the Delta and Eastside Tributaries Region", DR-1 by restoring habitat corridors; DR-2 by restoring and rehabilitating floodplain habitat; DR-3 by restoring upland wildlife habitat and supporting wildlife-friendly agriculture; DR-4 by restoring habitat that would specifically benefit one or more at risk species and improve knowledge of optimal restoration strategies for these species; and DR-5 by implementing actions to prevent, control and reduce impacts of non-native invasive species.

Additionally, this project complements CALFED's goals region-wide including: "Restoration Priorities for the Bay Region" BR-3, BR-4, BR-5, BR-7, BR-8; "Restoration Priorities for Multi-Regional Bay-Delta Areas" MR-2, MR-3, MR-4, MR-6; "Restoration Priorities for the Sacramento Region" SR-1, SR-2, SR-3, SR-4 and; "Priorities for the San Joaquin Region, SJ-1, SJ-2, and SJ-3.

The CVPIA section 3406 1b lists doubling the population of anadromous fish in the Central Valley as a primary goal. This project will take steps to reach this goal by increasing the population of San Joaquin fall run Chinook salmon in the Cosumnes River. Furthermore, the project proponents will use the success of this project to encourage the application of similar techniques in other reaches of the river.

2. Relationship to Other Ecosystem Restoration Projects

Monitoring work proposed for this project has been partially addressed in a CALFED fishery research proposal by Dr. Tim Horner, California State University, Sacramento, titled "Physical, geochemical and biological influence on spawning site selection and egg and alevin development by fall-run Chinook salmon. There is overlap on some geochemical and physical monitoring activities proposed on the Cosumnes River for these two

proposals. In the event that both proposals are funded, Dr. Horner will shift his field area on the Cosumnes River so that it does not overlap with the present project.

The Nature Conservancy has used grant monies from CALFED, the David and Lucile Packard Foundation, the Wildlife Conservation Board, the State Land Commission, U.S. Bureau of Land Management, the Environmental Protection Agency, the County of Sacramento, the Department of Fish and Game, Department of Water Resources, Ducks Unlimited, have allowed for the creation of wetlands; reforestation to reestablish riparian forests of cottonwoods, willows, and valley oaks; floodplain management by dismantling the Preserve's levees and allowing the river more access to its historic floodplain; compatible land uses demonstrating the compatibility of human uses with the natural environment; and recent land acquisitions brought the Preserve's total holdings to 37,042 acres. This project will be consistent with their restoration goals for the Cosumnes River Watershed.

The Fisheries Foundation of California received a grant from CALFED in 1998 to improve upstream passage Chinook salmon on the Cosumnes River. The improved passage provided by the fisheries foundation project would make it even more critical to provide improved spawning habitat in the system.

3. Requests for Next-Phase Funding

This project is not an extension of a previously funded project.

4. Previous Recipients of CALFED Program or CVPIA funding

The Sloughhouse Resource Conservation District (RCD) has received confirmation it will be the recipients of a grant from the 2001 implementation of CALFED's watershed program for the "Cosumnes River Watershed Inventory and Assessment."

5. System-Wide Ecosystem Benefits

This project has the potential to provide several benefits to the Cosumnes River System and the Bay-delta. This project will potentially led to the reduction in sediment entering the system, improved riparian habitat which will led to improved water quality, therefore improved salmon spawning habitat as well as increased habitat for terrestrial animals. If the project is successful, similar measures could be implemented in other parts of the watershed. If problems are encountered they can be mitigated prior to the next implementation project.

6. Additional Information for Proposals Containing Land Acquisition.

This proposal does not contain a land acquisition component.

C. Qualifications

The Sloughhouse Resource Conservation District (RCD), established in 1956, is a special district (Government Code 1627 [d]) governed by five directors empowered to lead their community's resource conservation programs. District boards function independently of county government and derive their powers and purposes from state law Division 9. Under Division 9 RCDs are allowed to manage district operation including day-to-day business, its budget and other financial matters. RCDs can also receive funding from various sources to spend on resource conservation activities. The RCD is currently successfully administering a 204 State Water Resources Control Board grant.

The RCD was successful in starting the Cosumnes River Task Force after the flooding of 1997 as well as obtaining 5 million dollars for repairs. They are committed to addressing erosion and sedimentation problems within the Cosumnes river basin. The RCD has a long history of providing conservation-related services to landowners. RCD Board members are selected on their strengths as active partners in the conservation community. They are primarily private landowners, ranchers or farmers with a personal stake in the conservation of natural resources in their local areas. The commitment of the RCDs Board of Directors is evident from their long tenure with current members averaging 15 years!

Mark Cocke, Civil Engineer, with the USDA-Natural Resources Conservation Service (NRCS) Watershed Planning Team-State Office, Davis CA., 1987-present. Team leader for the McCoy wash flood control project and wrote the Morro Bay enhancement plan and involved in the Upper Penitencia floodplain restoration project in San Jose, which involved surface profile modeling similar to the methods used for this project. Bachelors of Science in Civil Engineering from *California Polytechnic State University, San Luis Obispo* and is a registered civil engineer in the state of California.

Karen Fullen, Biologist, with the USDA-NRCS Wetland Team, Elk Grove, CA Service Center, 1994-Present. NRCS employee in California for nine years, including two years as a Soil Conservationist and seven years as a Biologist. Bachelors of Science degree in Biology with an emphasis in Ecology from *California State University, Fresno* and an Associates of Science degree in Forestry from *Kings River Community College*. She is a member of the Society for Ecological Restoration.

Dr. Kevin J. Cornwell is an assistant professor in the Department of Geology at *California State University, Sacramento* where he has been teaching and conducting research in surficial processes since 1998. Dr. Cornwell received a Master's Degree in Geology *from Texas Tech University* in 1984 and his doctorate from the Department of Geology, *University of Nebraska, Lincoln* in 1994 specializing in surficial processes and hydro-geology. His active research projects include the assessing of sediment transport conditions and denudation rates of mountainous environments (Cornwell et al., 2000, Cornwell et al., 2001) and evaluating the impact of flood events in small drainage basins of the Sierra Nevada (Cornwell 1999 and Cornwell 2001). His understanding of the issues, methodologies, data needs and collection techniques are well founded (Cornwell et al., 2001, Horner et al., 2001 and Cornwell et al., 2000) and position him well to accomplish this task as well as manage graduate student involvement.

Dr. Timothy Horner is an Associate Professor in the Department of Geology at *California State University, Sacramento* (CSUS), and has been a member of the department since 1993. Dr. Horner graduated from *The Ohio State University* in 1992 with a Ph.D. in Geology, and specializes in groundwater/surface water interaction, field instrumentation and near-surface water geochemistry. He teaches undergraduate and graduate hydrogeology classes at CSUS, and has advised 33 senior thesis projects that deal with local hydrogeology and sedimentology. Dr. Horner is currently the graduate coordinator for the Department of Geology, and has three M.S. students working on local projects that deal with groundwater/surface water interaction. He has also been a short course instructor for the U.S. Army Corps of Engineers and co-organizer for several Groundwater Resources Association short courses and seminars. Dr. Horner's experience extends to grant writing, and he has authored and managed several successful hydrogeology projects: 2001/2003: Key participant and contributing author for $400,000 grant from W.M. Keck Foundation for *Proposal to establish the W.M. Keck Foundation Facilities for applied hydrogeology at California State University, Sacramento;* 1999/2001: Lead author on NSF CCLI A&I grant for $105,152 titled *Water quality and stream flow as teaching tools in geology.* 1996/97: Co-author on $221,000 grant from W.M. Keck Foundation to *Establish Laboratories for hydrogeologic studies.*

Although the project has been discuss with various consulting firms and estimates made, the contract will go out to bid once funding is approved. Only those consulting firms with previous experience in this type of work will be asked to put in a bid.

D. Cost

Considerable time and resources have been expended over the past two years in developing detailed designs, the vegetation management and monitoring plans, and conducting emergency repair work. Leland Schneider, private landowner, the Natural Resource Conservation District (NRCS) and Sloughhouse Resource Conservation District (RCD) are committed to seeing this project through and will be providing in-kind contributions. Mr. Schneider will pay for the cost of pumping water to irrigate the vegetation. Approximately 500 gallons of water will be needed 15 times over 3 dry seasons. For this grant period timeline, that equates to 26 times or 13,000 gallons of water. Based on what local contractors are paying for water, two cents per gallon, Mr. Schneider will be contributing $260. The NRCS will be contributing $3,100 of in-kind support. The NRCS will lend the Project Manager a computer, scanner, copier, camera, some office supplies, phone, vehicle for daily travel, vans for tours and office space. The RCD will provide 160 labor hours at $12/hour, equating to $1,920.

E. Local Involvement

Cattle Rancher, Leland Schneider, first approached the Sloughhouse Resource Conservation District (RCD) and the USDA-Natural Resources Conservation Service (NRCS) requesting technical assistance in October 1999. The riverbanks on both sides of the Cosumnes River just below Highway 16 had been rapidly eroding causing his irrigation pump site to fill with sand and other fine sediments and established cottonwood trees to uproot and fall into the river, endangering a large heron and egret rookery. Sloughhouse RCD and the NRCS agreed to help design the engineering and restoration plans, obtain permits and funding, and find project supports.

As part of their outreach efforts to gain project support, Sloughhouse RCD and the NRCS brought this project and the Reconnaissance Study by the U.S. Army Corps of Engineers in 1998, which identified this area as an excellent opportunity "…to change the geomorphology of the channel…establish defined point bars and associated habitats," to the attention of the Cosumnes River Task Force (CRTF). The CRTF, created at the recommendation of the Governor's Flood Emergency Action Team following the major flood of 1997, has a mission to "develop a long term strategy that will encourage restoration of watershed health and improve flood management. The CRTF has given this project a high priority in their Strategic Plan. The CRTF fully supports this project and looks forward to being involved in its implementation.

As an active member of the CRTF, the RCD will give monthly updates on the progress of the project. After construction activities and revegetation activities have been conducted a tour of the project site will be held for watershed agencies and stakeholders. The RCD will also hold an annual tours for year two and three. The CRTF has agreed to post monthly updates on their web site and will include project updates in their newsletter.

Other landowners include Bill Hutchinson and Sacramento County. Bill Hutchinson and Ron Suter with the Sacramento County Parks Department have signed permission to access letters and are in full support of the project.

Other project proponents include: Don Nottoli, Supervisor, Sacramento County, 5th District, The Nature Conservancy and Rancho Murieta Community Service District.

F. Compliance with Standard Terms and Conditions

The RCD is prepared to comply with the standard State and Federal contract terms and conditions associated with the contracting and administration of the proposed grant.

G. Literature Cited

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U.S. Fish and Wildlife Service. Endangered and Threatened Species that May Occur in or be Affected by Projects in the Selected Quads, Quad 495A Carbondale, May 2001.

Letters of Support

&

Temporary Access Permits

BOARD OF SUPERVISORS
COUNTY OF SACRAMENTO
700 H STREET, SUITE 2450 - SACRAMENTO, CA 95814

October 2, 2001

DON NOTTOLI
SUPERVISOR, FIFTH DISTRICT
(916) 874-5465
FAX (916) 874-7593

Ms. Tina Lunt, Project Manager
Sloughhouse RCD
9701 Dino Drive, Suite 170
Elk Grove, CA 95624

Dear Ms. Lunt:

I am pleased to provide this letter of support for the Sloughhouse Resource Conservation District's (RCD) proposal to provide enhancements to the Cosumnes River riparian habitat below Highway 16. The project is designed to protect and restore critical Cosumnes River habitat while addressing the erosion problems which continue to impact the riverbanks and adjacent properties.

Sacramento County has generally been very supportive of projects which entail collaboration among multiple stakeholders, agencies and interest groups. In my opinion, collaboration on a project such as this could result in positive watershed improvements for our natural resources and landowners.

As you will note, this project would address many critical habitats including riparian and shady riverine habitats, heron and egret rookery habitat and Chinook salmon spawning and rearing habitat. Bank erosion and the associated habitat loss and sediment deposition is a threat to many of the critical processes that ensure the continuing health of the river. Demonstration projects of this nature can also assist in providing important tools for addressing the problem of bank erosion and its resulting impacts.

We would welcome the opportunity to continue working with the Sloughhouse RCD and other community partners in their riparian enhancement project and I would ask for your favorable consideration of this funding proposal.

Sincerely,

Don Nottoli

Don Nottoli, Supervisor
Fifth District

COUNTY OF SACRAMENTO

Department of Regional Parks, Recreation and Open Space

RONALD D. SUTER
Director

DEPUTY DIRECTORS
Gary Kvistad, Rangers & American River Parkway
Thom Oliver, Golf & Contract Maintenance
Jill K. Ritzman, Regional Parks

October 5, 2001

Bill Mosher, President
Sloughhouse Resource Conservation District
9701 Dino Drive, Suite 170
Elk Grove, California 95624-4025

Dear Mr. Mosher,

The County of Sacramento, Department of Regional Parks, Recreation and Open Space is in support of the proposed Consumnes River Streambed and Riparian Restoration Project to stabilize the banks, better manage river flows and improve habitat on the Consumnes River Preserve near Rancho Murieta.

The County owns 120 acres of land, known as the Ranch Mureita Recreation Area, located in the proposed project area. Specifically, the Recreation Area is located on the west side of the Consumnes River downstream from the Jackson Highway, adjacent to the Rancho Murieta Airport. Access to this open space area is allowed by permit only, for interpretive or research use.

The restoration project is consistent with the County's objectives to protect open space for wildlife habitat. Preserving the crane and heron rookeries located near the river, and also improving in-stream habitat for salmonids will be a great benefit to many.

Thank you for this opportunity to support the work of the Resource Conservation District. We look forward to working with you.

Sincerely,

Jill K. Ritzman
Deputy Director

Copy: Ron Suter, Director

3711 Branch Center Road, Sacramento, CA 95827

SACRAMENTO COUNTY SERVICE CENTER
USDA NATURAL RESOURCES CONSERVATION SERVICE
9701 DINO DRIVE SUITE 170 ELK GROVE CA 95624
PHONE: 916-714-1104 EXTENSION 3 FAX: 916-714-1117

October 3, 2001

Tina Lunt
Sloughhouse Resource Conservation District
9701 Dino Drive, Suite 170
Elk Grove, California 95624

RE: Cosumnes River Streambed and Riparian Restoration Project Grant Proposal

Dear Ms. Lunt:

On behalf of the USDA-Natural Resources Conservation Service, Elk Grove Field Office, I am writing to express our support for the Cosumnes River Streambed and Riparian Restoration Project proposal.

The NRCS has been and will continue to be involved in this project. We will contribute to this program our skills as well lending the Project Manager the use of a computer, scanner, copier, fax, camera, some office supplies, phone, vehicle for daily travel, vans for tours and office space. The NRCS will be contributing $3,100 of in-kind support.

The NRCS looks forward to working with the Sloughhouse Resource Conservation District, Sacramento County and the local landowners on this very worthwhile project.

Sincerely,

Surjit S. Toor
District Conservationist
Elk Grove Service Center

The Nature Conservancy

Cosumnes River Preserve
13501 Franklin Boulevard
Galt, California 95632

TEL 916 683-2142
FAX 916 683-1702

International Headquarters
Arlington, Virginia

September 28, 2001

Tina Lunt
Project Coordinator
Sloughhouse RCD
9701 Dino Dr., Suite 170
Elk Grove, CA 95624

Dear Ms. Lunt,

I am writing on behalf of The Nature Conservancy's Cosumnes River Project to express our support for Sloughhouse RCD's Cosumnes River Streambed and Riparian Restoration Project. This project will address two issues that The Nature Conservancy has attempted to further through its involvement in the Cosumnes River Preserve; the protection and restoration of critical habitats along the Cosumnes River and the continuing collaboration and cooperation of a wide range of stakeholders working together to ensure the biological and hydrological health of the Cosumnes River.

Starting in 1984, The Nature Conservancy began a focused plan along the Cosumnes River to protect endangered ecosystems while accommodating appropriate growth and sustainable economic development within the region. Today, the Cosumnes River Preserve encompasses approximately 40,000 acres and includes partnerships with state and local agencies, local landowners, businesses and other private partners. TNC's involvement is this very fruitful partnership has shown how collaboration of the nature described in this proposal can ensure positive results that can benefit all stakeholders.

From a habitat restoration perspective, this project addresses many of the critical habitats that TNC has focused on including riparian and shady riverine habitats, heron and egret rookery habitat and chinook salmon spawning and rearing habitat. Bank erosion and the associated habitat loss and sediment deposition is a threat to many of the critical processes that ensure the continuing health of the river. Demonstration projects of this nature will aide in providing important tools for dealing with bank erosion and can determine the future uses of such restoration along the Cosumnes River by TNC and our partners.

An enhanced Cosumnes River corridor brought about by restoration throughout the watershed will continue to multiply the efforts made by TNC and our partners on the Cosumnes River Preserve.

We look forward to participating in the continuing efforts of Sloughhouse RCD in their Cosumnes River Streambed and Riparian Restoration Project.

Sincerely,

Keith Whitener
Project Ecologist

Rancho Murieta Community Services District
15160 Jackson Road • P.O. Box 1050 • Rancho Murieta, CA 95683 • (916) 354-3700 • Fax (916) 354-2082
www.ranchomurietacsd.com

October 1, 2001

Tina Lunt
Sloughhouse Resource Conservation District
9701 Dino Drive, Suite 170
Elk Grove, CA 95624

SUBJECT: COSUMNES RIVER STREAMBED AND RIPARIAN RESTORATION PROJECT

Dear Ms. Lunt:

The District understands the RCD is working with Sacramento County Parks Department on the stream restoration project on the Cosumnes River downstream of the Jackson Highway. Recently, Sloughhouse RCD has joined with Natural Resources Conservation Service Engineers to enhance project designs and to create a restoration management plan. The District is supportive of this stream restoration project.

This letter is also sent to express our support for the Sloughhouse RCD's effort to secure grant funds from CALFED to undertake this stream restoration demonstration project on the Cosumnes River.

We believe that this stream restoration demonstration project will help to solve the riverbank erosion and habitat degradation problem we are experiencing at this location, aid in fisheries habitat enhancement, while also benefiting adjacent landowners, such as Sacramento County Parks Department. Please let us know how we can assist in the process.

Thank you for pursuing this important project.

Sincerely,

Edward R. Crouse
General Manager

ERC/cmt

cc: D. Nottoli, J. O'Farrell, R. Suter

SLOUGHHOUSE RESOURCE CONSERVATION DISTRICT
9701 Dino Drive, Suite 170 Elk Grove, CA 95624

Temporary Entry Permit

Permission is hereby given to the Sloughhouse Resource Conservation District and its officers, employees, agents and persons under contract therewith, further referred to as Sponsors, to enter property owned by Leland Schneider, further referred to as landowner, described as follows:

Section 4, T 7N, R 8E Carbondale 7 ½minute USGS quadrangle.

Assessors Parcel No. 128-070-59

FOR THE PURPOSE OF:
Restoring the river channel, riparian vegetation, and monitoring and maintaining the project site.

1. Reasonable precautions will be exercised to avoid damage to persons or property.

2. The Landowner assumes no liability for loss or damage to property or injuries to or deaths of agents, contractors, or employees of the Sponsors by reason of the exercise of privileges conferred herein.

3. The Sponsors agrees to indemnify and hold harmless the Landowner and agrees to repair or pay for reasonable damages proximately caused by reason of the uses authorized by this permit, except those caused by the gross negligence or intentional conduct of the Landowner.

4. This permit shall expire on August 30, 2005.

Owner: Leland Schneider Date: 10/1/01

Signature: Leland A. Schneider

Address: 15024 Jackson Road City: Rancho Murieta State: CA Zip: 95683

Phone: (916) 354-2884 Fax: (916) 354-1654

Notification Prior to Entry: Yes / No
Special requests?

Permit Accepted by Sloughhouse Resource Conservation District

By: William Mosher Jr.
Title: President, Sloughhouse Resource Conservation District

SLOUGHHOUSE RESOURCE CONSERVATION DISTRICT
9701 Dino Drive, Suite 170 Elk Grove, CA 95624

Temporary Entry Permit

Permission is hereby given to the Sloughhouse Resource Conservation District and its officers, employees, agents and persons under contract therewith, further referred to as Sponsors, to enter property owned by Bill E. Hutchinson, further referred to as landowner, described as follows:

Section 4, T 7N, R 8E Carbondale 7 ½ minute USGS quadrangle.

Assessors Parcel No. 128-080-09

FOR THE PURPOSE OF:
Restoring the river channel, riparian vegetation, and monitoring and maintaining the project site.

1. Reasonable precautions will be exercised to avoid damage to persons or property.

2. The Landowner assumes no liability for loss or damage to property or injuries to or deaths of agents, contractors, or employees of the Sponsors by reason of the exercise of privileges conferred herein.

3. The Sponsors agrees to indemnify and hold harmless the Landowner and agrees to repair or pay for reasonable damages proximately caused by reason of the uses authorized by this permit, except those caused by the gross negligence or intentional conduct of the Landowner.

4. This permit shall expire on August 30, 2005.

Owner: Bill E. Hutchinson Date: 10-3-04

Signature: Don Hutchinson

Address: 15020 Jackson Road City: Rancho Murieta State: CA Zip: 95683

Phone: _____ Fax: _____

Notification Prior to Entry: Yes / No
Special requests?

Permit Accepted by Sloughhouse Resource Conservation District

By: William Mosher Jr.
Title: President, Sloughhouse Resource Conservation District

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Engineering Designs with Detailed Cross-Sections are too large to be included. However, they are available from the Elk Grove Service Center

9701 Dino Drive, Suite 170
Elk Grove California 95624
Phone: (916) 714-1104 ext. 112
Fax: (916) 714-1117
E-mail: tina.lunt@ca.usda.gov