

Bobcat Flat Instream Restoration 2

Project Information

1. Proposal Title:

Bobcat Flat Instream Restoration 2

2. Proposal applicants:

David Boucher, Friends of the Tuolumne, Inc.

3. Corresponding Contact Person:

David Boucher
Friends of the Tuolumne, Inc.
2412 Hilo Lane Ceres, CA 95307
209 537-7533
dboucher@netfeed.com

4. Project Keywords:

Anadromous salmonids
Channel Dynamics
Habitat Restoration, Riparian

5. Type of project:

Implementation_Full

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:

Private non-profit

9. Location - GIS coordinates:

Latitude: 37.378

Longitude: -120.325

Datum:

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

This instream and riparian restoration project is at Tuolumne River mile 44, located 12 miles east of Waterford and 8 miles downstream from LaGrange. Bobcat Flat is 303 acres, 1.6 miles of riverfront. This channel project is on the upstream approximate 1/3 mile.

10. Location - Ecozone:

13.2 Tuolumne River

11. Location - County:

Stanislaus

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:

16 th

15. Location:

California State Senate District Number: 12 th

California Assembly District Number: 25 th

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: 0

Total Requested Funds: \$2,055,000

b) Do you have cost share partners already identified?

No

c) Do you have potential cost share partners?

No

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

No

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

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

Yes

If yes, identify project number(s), title(s) and CALFED program (e.g., ERP, Watershed, WUE, Drinking Water):

114200J100 Tuolumne River Bobcat Flat Floodplain Acquisition Project ERP

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

Yes

If yes, identify project number(s), title(s) and CALFED program.

**114209J041 Co-applicant for Grayson River Ranch Perpetual
Conservation Easement & Restoration CALFED ERP
and AFRP**

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?

Yes

If yes, identify project number(s), title(s) and CVPIA program.

113328G121

**Grayson River Ranch Perpetual Conservation
Easement and Restoration**

**AFRP Note:
\$377,200**

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)

Kris Vyverberg California Department of Fish and Game 916-653-8711

Wilton Fryer Turlock Irrigation District 209-883-8316 wbfryer@tid.org

Mathias Kondolf 510-644-8381 kondolf@uclink.berkeley.edu

21. Comments:

Environmental Compliance Checklist

Bobcat Flat Instream Restoration 2

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: It will depend on the funding source since we are a non-profit land trust.

NEPA Lead Agency (or co-lead:) It will depend on the funding source since we are a non-profit land trust.

NEPA Co-Lead Agency (if applicable):

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

CEQA

-Categorical Exemption

☒ Negative Declaration or Mitigated Negative Declaration

-EIR

-none

NEPA

-Categorical Exclusion

☒ Environmental Assessment/FONSI

-EIS

-none

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

4. CEQA/NEPA Process

a) Is the CEQA/NEPA process complete?

No

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

We will begin the process after CALFED funding and expect to complete with one year.

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

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

LOCAL PERMITS AND APPROVALS

Conditional use permit

Variance

Subdivision Map Act

Grading Permit

General Plan Amendment

Specific Plan Approval

Rezone

Williamson Act Contract Cancellation

Other

STATE PERMITS AND APPROVALS

Scientific Collecting Permit

CESA Compliance: 2081

CESA Compliance: NCCP

1601/03 Required

CWA 401 certification Required

Coastal Development Permit

Reclamation Board Approval Required

Notification of DPC or BCDC

Other

FEDERAL PERMITS AND APPROVALS

ESA Compliance Section 7 Consultation Required

ESA Compliance Section 10 Permit Required

Rivers and Harbors Act

CWA 404 Required

Other

PERMISSION TO ACCESS PROPERTY

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

Agency Name:

Permission to access state land.

Agency Name:

Permission to access federal land.

Agency Name:

Permission to access private land.

Landowner Name:

6. Comments.

Land Use Checklist

Bobcat Flat Instream Restoration 2

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?**

No

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).

A small portion (approx 14 acres) of this project has been used for marginal cattle grazing. Grazing will be discontinued during construction and for a few years during vegetation planting establishment. Quality of the resultant grazing on the affected 14 acres is unknown, but in light of its current poor quality, any potential loss would be of negligible impact, and it is possible this project may actually have a positive impact on grazing quality. This project will involve mostly low floodplain on which there has been no activity whatsoever. One of the two channels will be filled where the river flows around a small island. Downstream of the island the channel will be moved northward onto the low floodplain to reduce the channel gradient, add sinuosity, and increase total channel length/surface area. Fill material will be removed from the previously mentioned 14 acre piece currently owned by the Friends of the Tuolumne. It is a high elevation graveled floodplain. Removing the fill will allow it to experience seasonal flooding.

4. **Comments.**

Conflict of Interest Checklist

Bobcat Flat Instream Restoration 2

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):

David Boucher, Friends of the Tuolumne, Inc.

Subcontractor(s):

Are specific subcontractors identified in this proposal? Yes

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

Scott McBain McBain & Trush

Carl Mesick

Stillwater Sciences

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):

Scott McBain McBain & Trush

Comments:

Budget Summary

Bobcat Flat Instream Restoration 2

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	Hydraulic modeling, permitting, environmental documentation						75,000			75000.0		75000.00
2	Survey, design, and bid documents						150,000			150000.0		150000.00
3	Project management						19,500			19500.0		19500.00
4	Supplies					5,000				5000.0		5000.00
		0	0.00	0.00	0.00	5000.00	244500.00	0.00	0.00	249500.00	0.00	249500.00

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
5	Fencing						15,000			15000.0		15000.00
6	Construction implementation						750,000			750000.0		750000.00
7	Revegetation						225,000			225000.0		225000.00
8	Construction management						80,000			80000.0		80000.00
9	Project management						39,000			39000.0		39000.00
10	Contingency						310,000			310000.0		310000.00
11	Supplies					2,000				2000.0		2000.00
		0	0.00	0.00	0.00	2000.00	1419000.00	0.00	0.00	1421000.00	0.00	1421000.00

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
12	Monitoring						362,000			362000.0		362000.00
13	Project mangement						19500.			19500.0		19500.00
14	Supplies					3,000				3000.0		3000.00
		0	0.00	0.00	0.00	3000.00	381500.00	0.00	0.00	384500.00	0.00	384500.00

Grand Total=2055000.00

Comments.

Budget Justification

Bobcat Flat Instream Restoration 2

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

None

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

None

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

None

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

None

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

Chain saw \$500 Herbicide \$500 Misc maintenance small tools \$200 Auto expense (mileage) \$5800
Presentations, reports, etc. \$3,000

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.

Hydraulic modeling, permitting, environmental documentation average \$60/hr x est 1250 hrs = \$75,000; Survey, design, and bid documents average \$80/hr x est 1,875 hrs = \$150,000; Fencing \$4/foot plus two gates estimated \$15,000; Construction implementation \$7/yd x estimated 88,000 yd = \$616,000; Construction implementation average \$60-80/hr x 2,000 hrs = \$134,000; Vegetation and irrigation estimated \$12,000/acre x est 19 acres = \$225,000; Construction management 8% of construction and vegetation costs = \$80,000; Monitoring and reporting average \$60-80/hr x estimated 5,000 hrs = \$362,000.

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.

None

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

Estimated hours 1,700 x \$45/hr = \$78,000

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

None

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.

Included in project management.

Executive Summary

Bobcat Flat Instream Restoration 2

Bobcat Flat Instream Restoration 2 River Mile 44 Channel Restoration Project CALFED recently granted funding to the Friends of the Tuolumne to acquire 303 acres of riparian floodplain, known as Bobcat Flat. Located at river mile 44 on the Tuolumne River, Bobcat Flat is in the Dredger Tailing Reach, 12 miles east of Waterford and 8 miles downstream of La Grange Dam. The Conceptual Restoration Plan for Bobcat Flat is being produced for the public outreach program. CALFED and the Service will review the Conceptual Plan and we will then proceed to the final restoration plan. This proposal is for Phase 2 of the original Bobcat Flat Floodplain Acquisition Project. It is an instream channel restoration project focused on increasing spawning habitat for Chinook salmon and steelhead trout. The terraced floodplain will be lowered and planted with native woody plants increasing naturally self-sustaining habitat for birds and mammals. The proposed restoration project would reverse impacts of dredge mining and return the river to a complex single thread channel with a reduced gradient. The restoration would also lower the terraced floodplain allowing seasonal flooding. Gravel located on site will be used for fill and coarse sediment instream. The middle section of channel may be located north of the existing channel to increase channel length, reduce gradient, and increase sinuosity and complexity. This will create a natural pool-riffle morphology. Hypothesis: 1. Additional spawning habitat downstream of the river's most heavily used spawning habitat will attract increased spawning, especially in years of good escapement, helping to reduce superimposition at the upstream spawning riffles. 2. Improved physical habitat by channel and riffle reconstruction will improve rearing conditions for salmonid. 3. Reconstruction of riffles for salmonid habitat will increase aquatic invertebrate density in the project reach. 4. Planting riparian areas will result in increased diversity of native riparian species. Channel and floodplain reconstruction will create riparian and wetland habitat through natural recruitment following flood events. 5. Channel relocation and gravel augmentation will provide an alternate bar morphology with lower gradient spawning riffles and deep pools; and allow fluvial processes of bed transport, scour and deposition. This project addresses San Joaquin Region priorities of continuing habitat restoration actions in collaboration with local groups; restoring geomorphic processes in stream and riparian corridors; improving rearing and spawning habitat for Chinook salmon and steelhead trout; and improving understanding of at-risk species.

Proposal

Friends of the Tuolumne, Inc.

Bobcat Flat Instream Restoration 2

David Boucher, Friends of the Tuolumne, Inc.

A. Project Description: Project Goals and Scope of Work

Introduction The Tuolumne River and its floodplain have a history of modifications that have affected geomorphic and ecological conditions and processes in the river. These modifications have contributed to the decline of the river's Chinook salmon and steelhead trout populations. Major modifications to the river have included flow regulation and diversion, gold and aggregate mining, and land use conversion. Despite these extensive impacts, the Tuolumne River still supports the largest population of Chinook salmon in the San Joaquin River Basin and a small population of steelhead trout.

Several ongoing and planned restoration projects are underway on the Tuolumne River, primarily to meet objectives set forth in the 1995 FERC Settlement Agreement to relicense the Don Pedro Dam, as well as to meet target salmon production goals established by the Anadromous Fish Restoration Program (AFRP). Despite these efforts, a large stretch of river referred to as the Dredger Reach (approximately 5 miles long) has received relatively less attention, and remains severely degraded. The Habitat Restoration Plan for the Lower Tuolumne River Corridor (McBain and Trush 2000) identified the Dredger Reach as a high priority area for restoration. If restored, this reach could provide extremely productive Chinook salmon and steelhead trout spawning and rearing grounds, and thus help attain target population levels as well as improve channel and floodplain conditions.

CALFED recently granted funding to the Friends of the Tuolumne (FOT) to acquire Bobcat Flat--303 acres of riparian floodplain on the Tuolumne River from river mile 42.7 to 44.3 (1.6 miles of riverfront property). This property, located 12 miles east of Waterford and 8 miles downstream of La Grange Dam, is within the Dredger Reach. See Attachment 7, County Map. Included in the land acquisition was approximately 10,920,000 tons of valuable dredger tailings that are an essential ingredient for restoration of this reach. A considerable portion of that volume is useable for restoration purposes. The estimated cost to restore channel morphology and improve salmon and steelhead trout habitat is \$1,693,000. The cost to monitor this project is \$362,000.

1. Problem The upper reaches of the Tuolumne River below La Grange Dam were severely degraded by gold dredgers in the mid-1900's as the river bottomlands were turned upside down in search for gold. The dredging operation left behind large rows of gravel piles without regard for the river channel or landscape. Much of the dredger tailings were removed in the late 1960's and used to construct the New Don Pedro Dam. Following removal of the tailings, Davis-Grunsky Act funds were used in the early 1970's to begin reconstructing a defined channel through the chaos of multiple channels left by the gold dredgers and subsequent dredger tailing reclamation. Unfortunately, that reconstruction ended at River Mile 47.5 (3.5 miles upstream of Bobcat Flat) and left the Dredger Reach unchanged and only marginally useful for fishery

purposes. Spawning, rearing, and feeding habitat deficiencies have made this section of river relatively non-productive compared to the reconstructed channel upstream.

In general, dredge mining converted the natural pool-riffle channel morphology to a “lake-cascade” morphology. This conversion removed the natural sequence of low-gradient riffles that provided high quality salmon and steelhead trout spawning and rearing habitat, and replaced them with much fewer high-gradient riffles separated by long backwater pools. See Attachment 1, Dredger Mining Impacts on Channel prepared by McBain and Trush. Many of these high gradient riffles have water surface slopes greater than 1% during spawning flows (<300 cfs), and thus create higher water velocities than are preferred by spawning anadromous salmon and steelhead trout. Not only are habitat conditions within riffles less suitable, but the total surface area of riffles was also reduced. In the Dredger Reach, the density of riffle surface area is only about one-third of the riffle area in the spawning reach upstream of river mile 47.5, and average “high” redd counts are consequently much lower. See Attachment 5, Comparison of Spawning Riffle Areas.

The severely altered morphologic conditions left by the dredge mining are additionally compounded by flow and sediment regulation from the upstream dams, which has essentially prevented the channel from recovering a more natural channel morphology by natural processes. Within these current physical constraints, the Dredger Reach cannot recover natural channel and floodplain features and habitats without some initial mechanical intervention. Because of its strategic location in the upper gravel-bedded zone, however, this reach offers extraordinary potential to restore physical processes, associated habitats, and dramatically increase the salmon and steelhead trout production potential from the Tuolumne River. Restoring a more natural distribution of slope and channel morphology throughout the entire reach would greatly increase the quantity and quality of spawning habitat, and improve fry and juvenile rearing habitat.

When the dredger tailings were removed for the New Don Pedro Dam, the floodplain was left with an unnaturally high terrace in this stretch of the river. With the current flow regime, considerable floodplain is not allowed to seasonally flood. This has negatively impacted the germination and establishment of riparian woody plants and prevents natural stream meander.

2. Justification This is a Full scale restoration implementation project. Reversing the impacts of the dredge mining will require a restoration project to convert the “lake-cascade” morphology back to a more natural pool-riffle morphology. This can only be accomplished by redistributing the elevation drop in the short, steep riffles to re-create low gradient riffles with a slope less than 0.2%. This will result in a longer more sinuous channel route than currently exists. The redistribution of slope will not only improve the hydraulic conditions (water velocities) within each riffle to

increase spawning habitat, but it will also greatly increase the total amount of potential spawning habitat by increasing total riffle surface area. See Attachment 3, Strategy B: Channel Reconstruction; Attachment 4, Potential Improvements in Spawning Habitat; and Attachment 6, Aerial Photo, Proposed Dredger Reach Restoration.

By reducing the elevation of the terrace, seasonal flooding will be restored in moderate to wet years, thus restoring the natural riparian habitat functionality and making channel meander possible.

Hypotheses:

- 1) Spawning habitat: Creation of additional salmonid spawning habitat in the project area, which is downstream of the river's most heavily used riffle areas, will attract increased spawning, potentially reducing redd superimposition at the upstream spawning riffles.

Document Hypothesis 1) by mapping and observational surveys of spawning utilization and redd counts.

- 2) Rearing Habitat: Improved physical habitat by channel and riffle reconstruction will improve rearing conditions for Tuolumne River salmonid.

Document Hypothesis 2) by surveys and mapping of: a) changes in physical habitat criteria (i.e. substrate, water depth, velocity); and b) changes in habitat utilization from non-natives to salmonid species.

- 3) Food Resources: Reconstruction of riffles for Tuolumne River salmonid habitat will increase aquatic invertebrate density in the project reach.

Document Hypothesis 3) by invertebrate surveys and changes in density within mapped riffle areas upstream, downstream and in the project reach before and after construction.

- 4) Riparian and Planting:
 - a) Planted riparian zone: Planting of riparian areas will result in increased diversity of native riparian species.
 - b) Natural recruitment: Channel and floodplain reconstruction in the project reach will create riparian and wetland habitat through natural recruitment following flood events.

Document Hypothesis 4) by sampling and measurement, statistical analysis of before and after surveys.

- 5) Geomorphic Function: Channel relocation and gravel augmentation will provide an alternate bar morphology with lower gradient spawning riffles and deep pools; and allow fluvial processes of bed transport, scour and deposition.

Document Hypothesis 5) by cross section and Thalweg surveys after threshold high flow event; tracer rocks and scour core monitoring; aerial photograph interpretation; and hydraulic measurements and modeling at spawning flows.

The key uncertainties include:

- a. What flows are needed to mobilize the spawning substrate in this channel design?
- b. How will the mobilization affect the designed spawning habitat? Will it enhance or degrade salmonid habitat within the riffle?

The proposed work will test the usage of the riffles pre- and post-construction and post flooding (or high water years) to determine the degree and type of fishery usage. The proposed work will test the design for steelhead spawning riffles and provide valuable information for upstream channel restoration.

The proposed work will monitor and evaluate the channel and riffle designs for effectiveness at creating additional spawning and rearing habitat for Chinook salmon and steelhead trout and for effective natural morphology during flooding. Analysis of this design and its results will provide information for future channel restoration projects on the Tuolumne River, and other similar Central Valley tributaries.

3. Approach The proposed restoration area lies on the eastern edge of the Bobcat Flat parcel, from RM 44.2 to 44.7. See Attachment 6, Aerial Photo and Attachment 8, Draft Conceptual Restoration Plan. Recent spawning habitat data and salmon redd surveys have shown that the upstream portion of this reach consists of a short, disjointed, split-channel with very little salmon spawning habitat. There are several off-channel ponds and shallow backwater areas adjacent to the channel that may serve as refuge for warm water predator species. The middle segment of the reach is a straight, steep riffle-run sequence that is severely encroached and channelized by riparian vegetation. Below this straight reach, the channel then makes a steep, 90 degree left-bend, that ends in a large pool and left-bank backwater. Salmon habitat in the lower portions of the reach is also very poor quality.

The proposed restoration project would remove portions of encroached vegetation, reduce the elevation of selected terrace surfaces to generate fill material and create floodplains, and re-create a gently meandering channel. The

right split-channel in the upper segment would be filled to re-create floodplain and concentrate flow into a complex single-thread channel. The middle section of the channel may be relocated into the slough to the north of the existing channel to increase channel length, reduce slope, and increase sinuosity and complexity. The sharp left-bend at the lower end of the reach would be straightened slightly to achieve a more gentle meander bend. This restoration approach would achieve a longer channel length, more riffle surface area, and gentle lowflow slope. The relocated channel would rejoin the existing channel at the upstream end of the 90 degree bend. Several backwater and off-channel pond areas would be filled to reduce the potential for juvenile salmon and steelhead trout stranding.

On the reduced elevation floodplain, native trees and shrubs will be established to rehabilitate the riparian habitat. The riparian forest would be largely valley oak, cottonwoods, willows, and Oregon Ash, which are the dominant species in this section of the river corridor.

Overall project objectives include:

- Rebuild a natural channel morphology scaled to the current flow regime that converts short and steep riffles into a more natural and low gradient pool-riffle morphology;
- Ensure the floodway will convey floods of at least 15,000 cfs, consistent with the goals in the Tuolumne River Restoration Plan;
- Increase salmon and steelhead trout spawning and rearing habitat quantity and quality by restoring an alternate bar (pool-riffle) morphology, and by introducing clean spawning gravels within the channel;
- Eliminate salmon and steelhead trout stranding and predation problems associated with backwaters and sloughs, and in floodplain “traps” accessed during moderate flows;
- Rebuild the floodplain removing the terrace surface and lowering the elevation to allow seasonal flooding;
- Establish a riparian forest to enhance avian and mammal habitat.

Anticipated benefits will be dependent on the amount of additional spawning habitat created and the year’s escapement. The project will provide a much greater benefit during years with high Chinook salmon escapement as spawner density (and associated superimposition losses) in the Basso Reach (river mile 47.5 – 52.2) is reduced by redistributing spawning into the Bobcat Flat restoration site. Spawning is presently concentrated upstream because it has a more

natural channel morphology and therefore higher quality spawning habitat. See Attachment 5, Comparison of spawning riffle areas. Implementing restoration in the Dredger Reach RM44 will restore the channel to a more natural morphology, similar to the upstream reach (Basso Reach). This should allow more spawning in the Tuolumne River, particularly during high escapement years.

Anticipated benefits are also contingent on flow regimes. In moderate to wet years, riparian germination and natural establishment should occur. Avian and mammal habitat enrichment should result. We expect increased neo-tropical song bird counts for both nesting and feeding.

Monitoring is a key element of this project because the results of this channel restoration can be directly applied to future channel restoration projects in the San Joaquin basin tributaries. Therefore, monitoring will evaluate fisheries, geomorphology, and vegetation. Avian monitoring will be incorporated into the Bobcat Flat monitoring package. The results will be measurable and demonstrate the effectiveness of the channel design in attracting spawners and creating a natural morphology given the regulated flows. The results will also measure and evaluate the effectiveness of the designed vegetation planting given the regulated flow regime.

The fishery monitoring includes direct observation and mapping to determine habitat availability and utilization under pre-project and post-project conditions. Protocols will include comparison of habitat availability for various life history stages of steelhead, Chinook salmon, and predator species; evaluation of utilization by snorkel surveys and redd counts; evaluation of predator species by seining and standardized statistical methods.

The geomorphology monitoring includes cross section surveys and thalweg profile surveys after a threshold high flow event; pebble counts for particle size distribution; tracer rocks and scour core monitoring on cross sections; air photo interpretation; and hydraulic measurements and modeling at spawning flows to evaluate changes in channel geometry and longitudinal profile. See Attachment 9, Monitoring Plans for Geomorphology and Fisheries prepared by McBain and Trush and Stillwater Sciences.

Feasibility This restoration project is feasible. The subcontractors have experience with similar construction and revegetation projects of this size or larger on the Tuolumne, Merced and Stanislaus Rivers. No permitting constraints are expected. No construction constraints are expected. The project will be limited to in-stream work during the summer months, but this is not expected to cause unusual delay. Planting will be scheduled during the winter months to better ensure successful establishment.

Permits identified as required include CEQA/NEPA, Stream Bed Alteration, Reclamation Board, and Army Corps. No difficulties are expected since similar

projects have been permitted recently on the Tuolumne. If further permits are required, consultants will secure them. When funding is obtained, the permitting process will begin.

No other constraints should impact the schedule and implementability of the project. There is no levy on the site. No zoning regulations or county planning ordinances affect this project. Because Friends of the Tuolumne own Bobcat Flat, there are no outstanding landowner concerns.

6. Data Handling and Storage Monitoring reports will be maintained by Friends of the Tuolumne. Monitoring reports will be forwarded to the Tuolumne River Technical Advisory Committee and CALFED designee and made available to any other interested person or agency.

7. Expected Products/Outcomes Monitoring reports will include: PRBO Avian monitoring results; Stillwater Sciences biological monitoring results for the instream habitat; McBain and Trush monitoring results of fluvial geomorphic changes; and H.A.R.T. Habitat & Restoration Team vegetation results.

8. Work Schedule

This project will begin as soon as the CALFED contract is signed. It can be completed as soon as two years from start. Channel work can be done during the summer after permitting is completed. Vegetation planting would be done in the cool winter months following construction. Monitoring would be done to establish pre-project data and continue for several years after construction and planting. Project management will be on-going.

Each step builds on the previous step. Step 1 could be funded separately. Steps 2 and 3 must be considered together because construction will require subsequent vegetation planting. Step 4, Monitoring and Reporting, could be funded separately and subsequent to the project implementation. Monitoring could be either reduced or intensified based on funding availability.

Year 1. Begin as soon as CALFED contract releases funding:

Hydraulic modeling, permitting, environmental documentation
Survey, design, and bid documents
Monitoring

Year 2. Proceed the summer after permits are in place:

Construction implementation

Year 2. Proceed during the cool months after construction is complete:

Revegetation

Years following. Monitoring and Reporting

Monitoring for vegetation, geomorphology, and biology

Payments will relate to each individual aspect of each of the above steps as performed by subcontractors and project management.

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

The Tuolumne River and its floodplain have a history of modifications that have affected geomorphic and ecological conditions and processes in the river and have contributed to the decline of the river's Chinook salmon population. Major modifications to the river included flow regulation and diversion, gold and aggregate mining, and land use conversion. Despite these extensive impacts, the Tuolumne River still supports the largest population of Chinook salmon in the San Joaquin River Basin.

1. ERP, Science Program and CVPIA Priorities

This proposal is located in the San Joaquin region of this CALFED PSP. It addresses issues of both the **Multi-Regional Bay-Delta Areas Priorities; San Joaquin Region Priorities; Program Goals; Science Goals; CVPIA/AFRP Goals; and Strategic Goals**. A listing of the Priorities and Goals that apply to this project are:

MR-1 Prevent the establishment of additional non-native species and reduce the negative biological, economic, and social impacts of established non-native species in the Bay-Delta estuary and its watersheds.

MR-6 Ensure recovery of At-Risk Species by developing conceptual understanding and models of processes that cross multiple regions.

SJ - 1 Continue habitat restoration actions including channel-floodplain reconstruction projects and habitat restoration studies in collaboration with local groups.

SJ - 2 Restore geomorphic processes in stream and riparian corridors.

SJ - 3 Improve rearing and spawning habitat and downstream fish passage on tributary streams and the main stem San Joaquin River, particularly for Chinook salmon, steelhead trout and splittail.

SJ - 4 Implement actions to improve understanding of at-risk species in the region.

Program Goal 1 - At-Risk Species

Program Goal 2 - Ecosystem Processes and Biotic Communities

Program Goal 3 - Harvestable Species

Program Goal 4 - Habitats
Program Goal 5 - Non-native Invasive Species

Science Program Goals:
Performance Measures
Advance Process Understanding
Coordinate and Extend Existing Monitoring

CVPIA sections 3402 (a) – Protect, Restore, and Enhance fish, wildlife and associated habitats in the Central Valley and Trinity River Basins.
CVPIA sections 3402 (c) – to contribute to the State of California's interim and long term efforts to protect the San Francisco Bay and Sacramento-San Joaquin Delta Estuary.

AFRP – section 3406 (b) (1) – Develop within three years of enactment and implementation a program which makes all reasonable efforts to assure that by the year 2002, natural production of anadromous fish in the Central Valley rivers and streams will be sustainable on a long term basis, at levels not less than twice

AFRP – section 3406 (b) (1) other – (2) Stabilize and improve populations of native species affected by CVP ... Initial focus to Federal listed, proposed candidate species ... migratory birds, and other native wildlife species associated with habitat types listed above.

Strategic Goal 1 - At-Risk Species recovery
Strategic Goal 2 - Ecosystem Processes and Biotic Communities
Strategic Goal 3 - Harvestable Species
Strategic Goal 4 - Habitats: Protect and/or restore functional habitat types....
Strategic Goal 5 - Non-native Invasive Species

Stressors this project addresses are: Channel straightening, bank hardening, in-stream gravel mining (gold dredging), flow modifications affecting sediment transport and spring germination, and loss of sediment and bedload from upstream watershed sources upstream of dams.

Friends of the Tuolumne, Inc. is a local grass roots non-profit 501 (c) (3) land trust. We specialize exclusively in lower Tuolumne River issues. We have been very active for seven years in river and fishery policy and habitat restoration. See Attachment 10. This is a next phase Bobcat Flat project. See Attachment 8, Draft Conceptual Restoration Plan.

The proposed project is a channel-floodplain reconstruction project. One half (1/2) mile of river channel and its associated floodplain will be reconstructed to provide improved habitat for Chinook salmon, steelhead trout, riparian dependant birds, mammals and increased floodwater capacity.

Channel restoration will provide essentially untapped potential for fishery production. The site currently offers marginal habitat due to combined circumstances of river development in past years. It is anticipated that the increase in spawning/rearing habitat will not only increase production originating from this site, but contribute to the success of production at other sites.

Chinook salmon and steelhead trout have habitat characteristic preferences that differ. This spawning habitat restoration is designing a restoration to accommodate the habitat needs of Chinook salmon and steelhead trout within the same river reach. It will increase the understanding of how to improve habitat used by both species and will have application in other regional river systems. Success in achieving habitat for both species in this site will be evaluated in the monitoring phase.

This in-stream restoration will restore a more natural distribution of slope and channel morphology throughout the entire reach and greatly increase the quantity and quality of spawning and fry and juvenile rearing habitats.

The river channel will be modified. A two-strand channel will be converted to a complex single strand in the upstream portion of the construction. The downstream section of hardened channel will be moved to an alignment through the low floodplain. The excessively steep and straight gradient that currently exists will be spread over a greater linear distance. Total spawning habitat and total channel surface area will be increased as a result of the sinuous reconstruction routing.

Floodplain function will be improved by lowering the high graveled terraces that are out of scale with today's regulated flows. The lowered terraces will create floodplains that will be periodically inundated during periods of high flow and accommodate higher flood flows (addressing spring germination and sediment transport). This will result in improved natural floodplain function including an expanded floodwater capacity, improved natural establishment of self-sustaining woody plants, and provide an available meander corridor with access to coarse sediment stores of the floodplain.

Coarse sediment supplies on site will be used to fill off-stream ponds and for gravel augmentation in appropriate sizing.

The restoration of this site will eliminate ponded areas that harbor predatory non-native fish (bass) and the plant species water hyacinth and purple loosestrife. When river flows rise, these pond populations currently transform to river born populations.

Rainbow trout inhabit the Tuolumne River. This project will create more dynamic river flow and smaller particle size than normally used for pure salmon projects. It is anticipated that steelhead trout will be attracted to this restoration.

Steelhead trout life history differs in some respects to that of the Chinook salmon. This project and its monitoring and construction plan will specifically address steelhead trout. Conditions thought desirable to steelhead trout will be incorporated in the construction design. Monitoring will evaluate steelhead trout use at various life stages. Steelhead trout feed during their residence in the river. Food sources and relative abundance pre- and post-project will be investigated. This project will entail a full suite of project performance evaluation components.

Evaluation of hydraulic, biologic, and vegetative results will be conducted by consultants including McBain and Trush, Stillwater Sciences, and H.A.R.T. Habitat and Restoration Team. Explicit quantitative mechanistic and process studies will be performed to help understand how these restoration actions affect environmental processes, eco-system processes, and life histories of at-risk species. See Attachment 9, Monitoring Plan for Geomorphology and Fisheries.

Methodologies to be used to monitor the site:

GIS habitat maps will be used to quantify habitat availability and utilization under existing pre-project conditions and after project completion, modeled after existing protocols used in other Tuolumne River projects.

Fish habitat utilization surveys will be conducted to document: a) changes in physical habitat criteria; and b) changes in habitat utilization.

Invertebrate surveys will be used to document changes in density within mapped areas upstream, downstream and in the project reach before and after the construction.

Spawning surveys will measure spawning utilization before and after channel reconstruction. Redd counts will be conducted.

Aerial photography interpretation will be done before and after high flow events to monitor the channel planform location.

Cross section surveys after threshold high flow event (>4,500 cfs) for planform adjustment and aggradation/degradation.

Thalweg profile surveys after threshold high flow event (>4,500 cfs) for aggradation/degradation, and longitudinal adjustment of slope.

Pebble counts for particle size distribution; tracer rocks and scour core monitoring on cross sections for bed mobility thresholds.

Hydraulic measurements and modeling at spawning flows will be done to evaluate changes in channel geometry and longitudinal profile.

Survey natural vegetative recruitment on lowered and restored floodplain.

Plantings will be monitored for implementation and maintenance/establishment.

Survey vegetative bank encroachment/colonization and the impact of channel scour.

The monitoring will improve understanding of the physical processes affecting the use of this site by At-Risk Species. The site will be carefully assessed before and after restoration to determine effectiveness of the restoration as measured by utilization of its features by steelhead trout and Chinook salmon. See Attachment 9, Monitoring Plan Fisheries.

A focus of CALFED and many projects is protection and expansion of Endangered species populations. Target-species may be introduced onto this project. The Riparian brush rabbit and the riparian wood rat are two candidates. Dispersing these species to new locations would help ensure their survival and expand their population.

2. Relationship to Other Ecosystem Projects.

This project will not produce any negative impacts on past or future projects. It is complementary to other projects on the river; it shares common goals and will provide and receive mutually beneficial results from other restoration actions.

This project will restore the river channel, floodplain, and riparian zones. It is significantly directed toward **At-Risk Species**. Target aquatic species include Chinook salmon, steelhead trout, and native rainbow trout. Terrestrial target species include the longhorn elderberry beetle, riparian brush rabbit and migratory songbirds. The longhorn elderberry beetle is currently present onsite. We have had discussions with the Endangered Species Recovery Program about potential introduction of the riparian brush rabbit. This project will relate favorably to other projects through their interest in increased species populations and to dispersing their target species geographically.

Restoration successes and failures on the lower Tuolumne River and other streams have played an important role in the design of this project. Information is well shared by all parties undertaking restoration projects in this basin. The Tuolumne River Technical Advisory Committee is a very active river management group on the Tuolumne River that includes all groups currently working on the Tuolumne River, including Friends of the Tuolumne. **Taking Advantage of Existing Data** has provided information useful to design and monitor this restoration. A great deal of data has been collected for use in channel and floodplain design. Past spawning surveys also provide detailed information about historical use and density patterns.

The Tuolumne River historically experiences migratory fish population Boom and Bust cycles. Due to a lack of adequate quantities of spawning habitat during Boom years, substantial numbers Chinook salmon do not optimally reproduce. Superimposition creates lost salmon spawning potential and may impact genetic diversity by causing destruction of early spawning redds in favor of fish that spawn later.

This project will increase spawning habitat and generate increased total production during Boom years by providing new spawning areas that will relieve pressure and superimposition on existing sites. It is expected to assist with quicker population recoveries from Bust cycles by contributing increased numbers of graduates from the Boom years. Other projects on the river will benefit by experiencing less superimposition in Boom years and improved seeding in Bust years.

Other restoration projects on the Tuolumne River have largely focused on fall-run Chinook Salmon. This project complements them by adding some focus on steelhead trout issues. Construction will incorporate design elements and monitoring that will increase the knowledge base about this river.

Recent theory is suggesting there may be genetic diversity issues related to spawning site location. This project will provide significant spawning habitat that is 3.5 miles downstream of the next significant site. This could be enough distance to provide for some genetic security.

3. Requests for next phase funding.

CALFED awarded funding for the acquisition and limited restoration of Bobcat Flat in the 2000 CALFED PSP. Funding provided was for purchase and limited riparian restoration. The purpose of the first phase was preservation and riparian restoration. The site was in significant danger of being pit mined. The original proposal suggested that future projects for in-stream restoration would be appropriate to restore the floodplain and spawning/rearing habitat. Attributes of the acquisition were: imminent danger of development, the prime floodplain, potential for in-stream restoration and available coarse sediment stores. This proposed project will extend the initial project scope to include in-stream and floodplain restoration. See #4 below for project status. See Attachment 8, Draft Conceptual Restoration Plan.

4. Previous Recipients of CALFED Program or CVPIA funding.

Recipient as Co-applicant with East Stanislaus Resource Conservation District for Grayson River Ranch Perpetual Conservation Easement and Restoration CALFED #11420-9-J041 1998 CALFED PSP \$732,000. Total Project cost was approximately \$1,200,000.

Project is physically complete. We expect to close the contract in the next few months. This project acquired a 138 acre easement on bare agricultural land. It

was excavated to establish improved hydraulic function for fishery and wetlands/riparian establishment. Native riparian plantings are being established.

Recipient of Tuolumne River Bobcat Flat Floodplain Acquisition Project CALFED # 114200J100 2000 CALFED PSP \$1,984,320. Total project cost approximately \$2,200,000. Project acquisition is nearly complete. The remainder will be acquired in early October 2001 when Stanislaus County completes its lot line adjustment process. This 303-acre project is comprised of three parcels. A Draft Conceptual Restoration Plan has been completed. See #3 above and Attachment 8, Draft Conceptual Restoration Plan.

5. System - Wide Ecosystem Benefits

This project takes an ecosystem approach. It will restore the river channel, floodplain, and riparian zones. It is significantly directed toward **At-Risk Species**. Target aquatic species include Chinook salmon, steelhead trout and native rainbow trout. Terrestrial target species include the longhorn elderberry beetle, riparian brush rabbit and migratory songbirds. The longhorn elderberry beetle is currently present onsite and we have had discussions with the Endangered Species Recovery Program about potential introduction of the riparian brush rabbit. The goal is to create healthy self-sustaining populations benefiting by the restoration and preservation.

Steelhead trout are an ecosystem target species requiring more specific consideration throughout the Bay-Delta system. This restoration will evaluate if the channel restoration implemented at this site is effective at attracting spawning steelhead trout. This project will assist with establishing healthy self-sustaining populations.

This project will provide significant Chinook salmon spawning habitat that is 3.5 miles downstream from the next significant site. This could be enough to provide for some genetic security to help assure species survival by maintenance genetic variations. Superimposition should be reduced in other heavily used spawning areas of the river.

The new in-stream habitat will provide improved rearing habitat to juvenile fish that migrate downstream from upstream sites.

Floodplain restoration will provide self-sustaining communities of native plant species that make biotic contributions to the watershed.

This project will enhance floodplain performance and increase floodwater capacity providing benefits downstream.

Floodplain restoration will eliminate ponded water where fish stranding may occur. This should decrease the risk of survival to juvenal Chinook salmon, rainbow trout and steelhead trout.

Floodplain restoration will eliminate ponded water in the floodplain containing water hyacinth and prevent its distribution to downstream habitats.

Avian habitat will be increased and enhanced to complement avian habitat restoration at existing sites elsewhere in the San Joaquin Basin providing broader habitats for migratory and resident species.

This project is consistent with CALFED and CVPIA ecosystem approach for addressing a systematic problem. The ecosystem approach will not only help this project to be better, but assist others through its contributions.

6. N/A

C. Qualifications

The Friends of the Tuolumne, Inc. (FOT) is a local grass-roots group. We are incorporated as a nonprofit 501 (c) (3) land trust. The organization focuses exclusively on riverine issues of the lower Tuolumne River. This narrow scope allows us to be intensely focused and well informed about issues of the Tuolumne River. Years of focus on the Tuolumne River in many different forums has made us effective proponents for the river. See Attachment 10, "Highlights of the Friends of the Tuolumne" and Attachment 11, "Board of Directors Brief Bio-Sketches."

Dave and Allison Boucher, Co-Project Managers, prepared and submitted Bobcat Flat Floodplain Acquisition Project, CALFED Project 114200J100, 2000. Bobcat Flat has completed purchase of 150 acres. The remaining 150 acres is proceeding well through the County lot-line adjustment process and should close escrow October 2001. The Conceptual Restoration Plan is being finalized and subcontractors for design, permitting, construction, planting, and monitoring are being interviewed. This proposal is an integral part of the restoration and will keep the momentum moving forward.

Dave Boucher, Co-Project Manager, is President of Friends of the Tuolumne. Recent experience includes completing restoration of Grayson River Ranch Perpetual Conservation Easement and Restoration, CALFED Project 11420-9-J041, 1998. Serving as Project Restoration Manager, Boucher organized and supervised various subcontractors for design, permitting, construction, planting, irrigation, adaptive management, and monitoring. Restoration is complete (138 acres) and Grayson River Ranch has progressed to adaptive management and monitoring. Friends of the Tuolumne prepared the CALFED proposal as Co-applicant with the East Stanislaus Resource Conservation District (ESRCD). Boucher is an Associate Director of the ESRCD.

Dave Boucher was Co-Project Manager for the Stanislaus Flyfishermen projects “Stanislaus River Goodwin Canyon Spawning Habitat Restoration Projects, Phase I and Phase II, Years 1997 and 1998. These projects successfully added spawning gravel at two locations.

Allison Boucher, Co-Project Manager, is Project Manager for Waterford Perc Ponds Paradise. The Waterford project will rehabilitate 9 acres along the Tuolumne River by planting native trees, shrubs, and grasses. This project has been designed and is currently proceeding through the permit process. This is not a CALFED project; funds are being acquired from various national and local sources. Perc Ponds Paradise is a collaborative effort with the City of Waterford and will include significant volunteer efforts from the local community. Education is an integral part of the plan.

Consultants and sub-contractors for this proposal, Bobcat Flat Instream Restoration 2, RM 44 Channel Restoration include McBain and Trush, Stillwater Science, H.A.R.T. Habitat & Restoration Team, and PRBO. Other sub-contracts will be used as necessary.

McBain and Trush will design the channel construction and perform the geomorphic studies. McBain and Trush have extensive knowledge and experience focusing on restoring river ecosystems, gravel bed transport and deposition processes, and channel morphology. McBain and Trush works closely the Tuolumne River Technical Advisory Committee and prepared the Habitat Restoration Plan for the Lower Tuolumne River Corridor.

Stillwater Sciences will be responsible for monitoring of the fishery biological elements of this proposal restoration. They have worked directly with the Tuolumne River Technical Advisory Committee (TRTAC) and the Turlock and Modesto Irrigation Districts to implement the 1995 FERC Settlement Agreement monitoring program. In addition to expertise in comparing abundance and diversity of macroinvertebrates upstream and downstream of hydroelectric projects, Stillwater Sciences has successfully implemented many peer-reviewed studies of juvenile chinook salmon survival, adult spawning, substrate permeability and incubation conditions in the Tuolumne and Merced Rivers.

H.A.R.T. Habitat & Restoration Team will provide planting design, plants, and vegetation monitoring. H.A.R.T. has provided plants, planting, and vegetation monitoring for Grayson River Ranch, a CALFED Project. He has also provided plants and planting for the Tuolumne River Technical Advisory Committee restoration projects in the gravel mining reach and SRP 9. (These projects satisfy the terms of the FERC Settlement Agreement 1995.)

PRBO will provide restoration advice and avian monitoring. PRBO has begun the baseline studies for the entire Bobcat Flat Acquisition Project and has committed to full avian project monitoring. PRBO is also monitoring our previous

project, Grayson River Ranch, and the combined studies will add value to Tuolumne River avian scientific knowledge.

All administrative and project management roles will be filled by Friends of the Tuolumne Project Managers.

D. Cost

The CALFED project, Bobcat Flat Floodplain Acquisition, includes gravel reserves that will be used by this project for the channel rehabilitation and the floodplain contouring. One dredger slough will be filled, thus eliminating stranding. These on-sight gravel reserves represent a cost-share for this CALFED proposal. The on-sight gravel will allow cost-effective construction, and capitalize on the previous CALFED investment.

Avian and vegetative monitoring will be folded into the monitoring program for the Bobcat Flat Floodplain Acquisition restoration. This efficiency of cost will benefit both CALFED projects.

E. Local Involvement

The Friends of the Tuolumne are active participants in the Tuolumne River Technical Advisory Committee and the Tuolumne River Coalition. This project complements projects of other members of both organizations. The letters of support are available.

Watershed Group Support:

Tuolumne River Technical Advisory Committee (TRTAC)
Tuolumne River Coalition
San Joaquin River Management Group Action Team (SJRMP)

Participants to the Watershed Groups listed above include the agencies and groups listed below.

Stanislaus County, City of Modesto, City of Waterford, City of Ceres, California Department of Fish and Game, U.S. Fish and Wildlife Service, Turlock and Modesto Irrigation Districts, Yokuts Group of the Sierra Club, Stanislaus Audubon Society, Tuolumne River Preservation Trust, and the East Stanislaus Resource Conservation District.

All participants are supportive of this project. The progress of Bobcat Flat is discussed at each meeting.

Other support:

The Stanislaus Fly Fishermen support this project. Their letter of support is available.

A letter of support from SJRMP is expected in October.

This project is an integral part of the Bobcat Flat Floodplain Acquisition Restoration project (CALFED Project 114200J100). It will build on the previous CALFED investment. The Conceptual Restoration Plan is being finalized. Jeff Hart of H.A.R.T. Habitat & Restoration Team is producing the conceptual plan and will participate in its presentation to the public. This conceptual plan will coordinate with the Tuolumne River Technical Advisory Committee goals and objectives as presented in the Habitat Restoration Plan for the Lower Tuolumne River Corridor prepared for the Tuolumne River Technical Advisory Committee.

The public and appropriate agencies will be invited to the public presentation with news releases, a newsletter mailing, announcements at appropriate public and organization meetings, and by personal contact when appropriate. Public comments will be evaluated and a final conceptual restoration plan will be prepared. CALFED staff and the U.S. Fish and Wildlife Service will review the conceptual plan before finalization is complete. After this review, a restoration plan and engineering will be prepared, coordinated with the Tuolumne River Technical Advisory Committee, and reviewed by CALFED and U.S. Fish and Wildlife Service. The restoration plan is expected to be finalized next year allowing restoration to proceed as soon as CALFED funds are released for this Instream Restoration 2, RM 44 project.

All adjacent landowners have been kept informed about the goals of the Bobcat Flat restoration plan. Several have discussed the possibility of selling additional land in order to enlarge the footprint of Bobcat Flat and provide a longer and more contiguous riparian floodplain and flood refugia. These offers will be further evaluated. Adjacent landowners are supportive of the ecological goals and no opposition has been expressed. Each adjacent landowner will be personally contacted and invited to the public presentation of the Conceptual Restoration.

Coordination with Stanislaus County, the only local government with jurisdiction on the project, is ongoing. Appropriate departments have been kept informed since the proposal was originally prepared and presented to CALFED for funding.

No third party impacts have been identified.

F. Compliance with Standard Terms and Conditions

The applicant will comply with the standard State and Federal contract terms described in 2002 PSP Attachment D, Terms and Conditions for State Funds, and Attachment E, Federal Contracting Forms.

G. Literature Cited

Tuolumne River Corridor Restoration Plan, Stanislaus County, CA
prepared for Tuolumne River Technical Advisory Committee (Don Pedro
Project, FERC License No. 2299) by McBain 7 Trush, June 1998.

Additional references are cited in the monitoring plans.

Attachment
Application section B (3)

Tuolumne River Bobcat Flat Floodplain Acquisition Project
CALFED #114200J100
CALFED 2000 PSP
Amount obligated \$1,984,320

Bobcat Flat is a 303 acre, 1.6 mile long project. It is located on the north bank of the Tuolumne River 12 miles east of the City of Waterford between river miles 42.7 and 44.3. It is one of the few large floodplains remaining on the Tuolumne River. The project extends north from the river and across a broad floodplain. The river lies against the south cliff throughout the length of the project. This project essentially controls both banks of the river due to this arrangement. It has extensive wetlands with abandoned historic river channels and dredger ponds. See Attachment 7, County Map.

This project is partly a preservation project to protect its natural values from being degraded. Preservation of this property will prevent major loss of wildlife habitat. It provides an important opportunity for restoration to enhance fish and riparian wildlife values.

Bobcat Flat was at risk of being used for gravel mining that would create a deep pit surrounded by a levee. Existing rich habitat for wildlife and waterfowl would have been devastated. Mining would have narrowed the floodplain and removed natural coarse sediment otherwise useful for in-stream restoration. Floodplain restoration potential would have been nearly eliminated and the river channel permanently confined to a narrow defined channel without opportunity for meander.

Coarse sediment required for in-stream restoration work is plentiful.

Enhancement of the channel and riparian community will provide benefits to fish, mammals and birds. Spawning and rearing habitat for fall-run Chinook salmon and steelhead trout will be improved.

Physical modifications to the property will provide increased floodplain function.

Restoration:

Plant native woody riparian plantings as needed.
Extensive surface contouring to create structure.
Grading to lower some floodplain surfaces for improved floodplain function.
Filling undesirable fish stranding dredger ponds.
Remove and control non-native invasive species and habitat.
Monitoring.

Under this CALFED contract we are committed to deliver the Conceptual Restoration Plans as the next step following acquisition completion. We are in the process of finishing acquisition. We will finalize the conceptual plan very soon. See Attachment 8, Draft Conceptual Restoration Plan.

This CALFED project contract was finalized October 10, 2000. Since that time our efforts have been largely directed at acquisition. Efforts to that end have involved an extensive survey, and appraisal, level I contaminate survey, and County processes for lot line adjustments. About half the acreage was acquired earlier in 2001. The other half will be finalized by October of 2001 when Stanislaus County finalizes the lot line adjustment for the remaining two parcels.

Of the CALFED funds granted, approximately \$1,307,000.00 has been expended or committed to achieve the first goal of acquiring the project land.

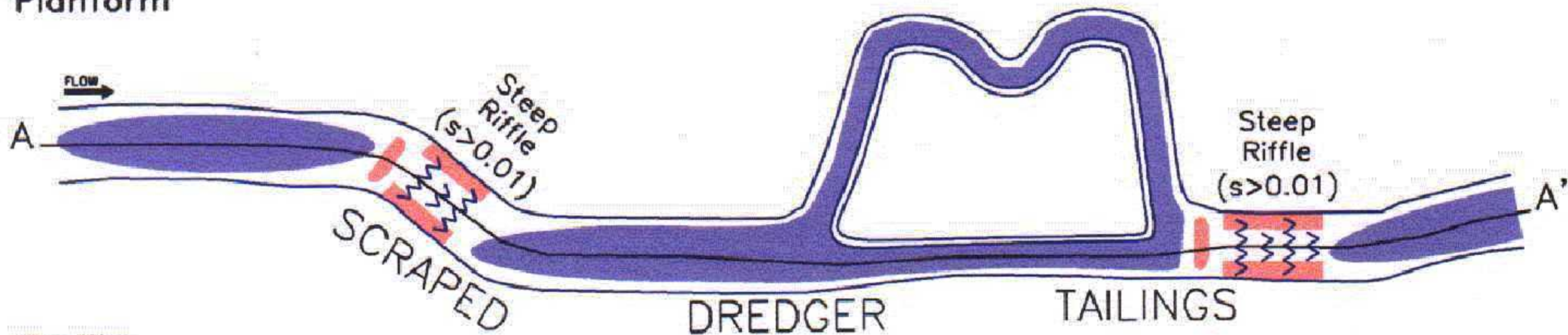
Data generated to date has been a baseline bird survey conducted in the spring of 2001 by PRBO. Monitoring was done at that time to capture nesting data.

The Tuolumne River Technical Advisory Committee has acquired funding through the California Department of Water Resources to do gravel augmentation at the downstream end of the Bobcat Flat Project. Friends of the Tuolumne are working with them to place onsite coarse sediment into a 1000 foot long channel reach to enhance spawning habitat. The project funding is currently in DWR contracting. Implementation is expected during the summer of 2003.

ATTACHMENTS

- 1 Figure 1 Dredge Mining Impacts on Channel
- 2 Figure 2 Strategy A: Large Gravel Introductions
- 3 Figure 3 Strategy B: Channel Reconstruction
- 4 Figure 4 Potential Improvements in Spawning Use
- 5 Table 1 Comparison of Spawning Riffle Areas
- 6 Aerial Photo--Proposed Dredger Reach Restoration
- 7 County Map
- 8 Draft Conceptual Restoration Plan
- 9 Monitoring Plans for Geomorphology and Fisheries
- 10 Highlights of Friends of the Tuolumne, Inc.
- 11 Board of Directors' Bio-sketches

Planform



Profile

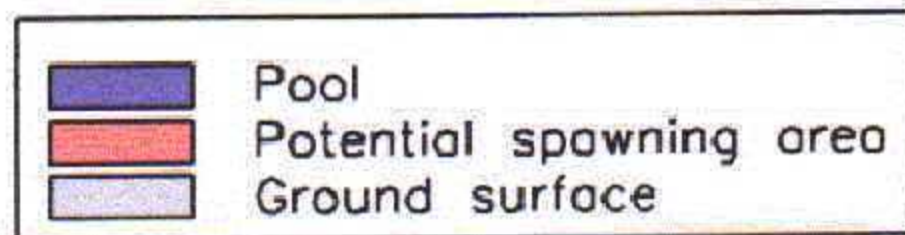
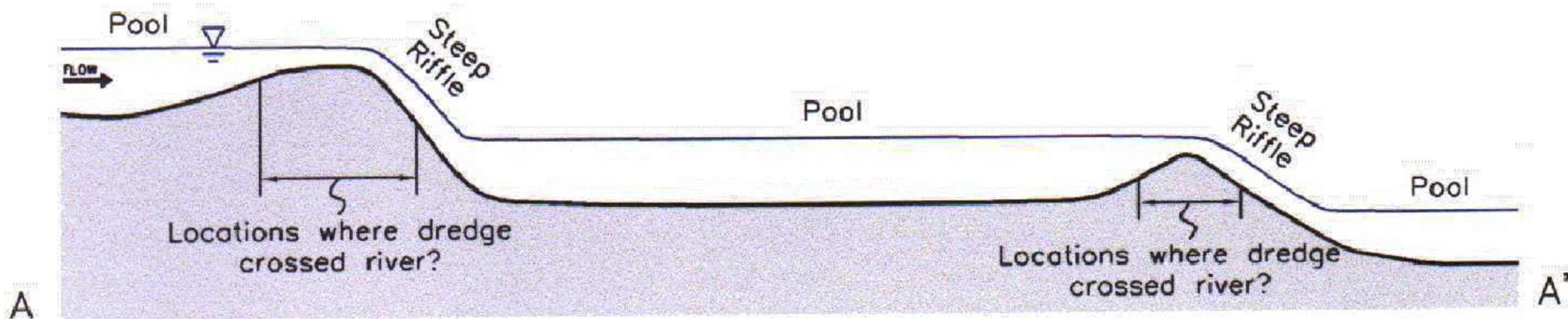
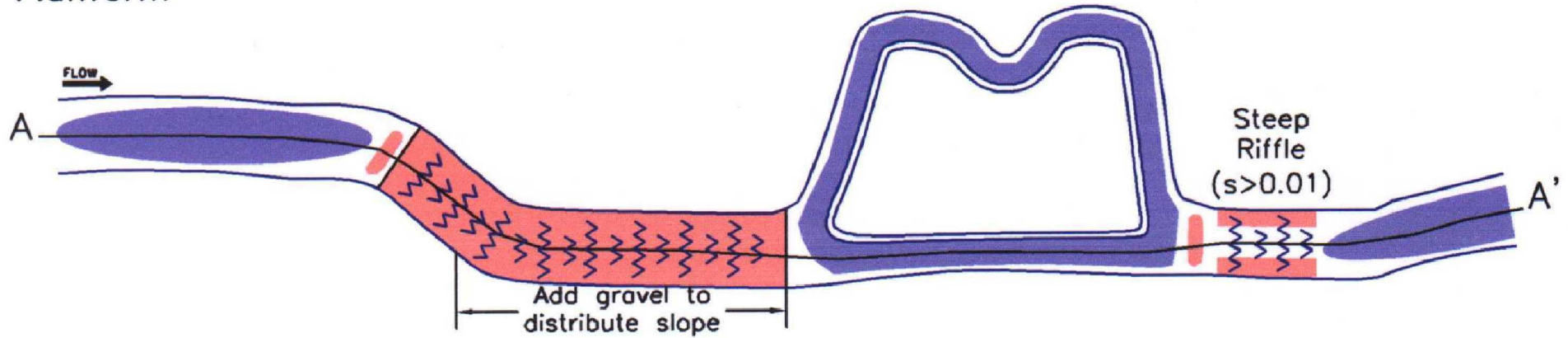


Figure 1. Post-dredge mining planform and longitudinal profile showing mining impacts on channel

Planform



Profile

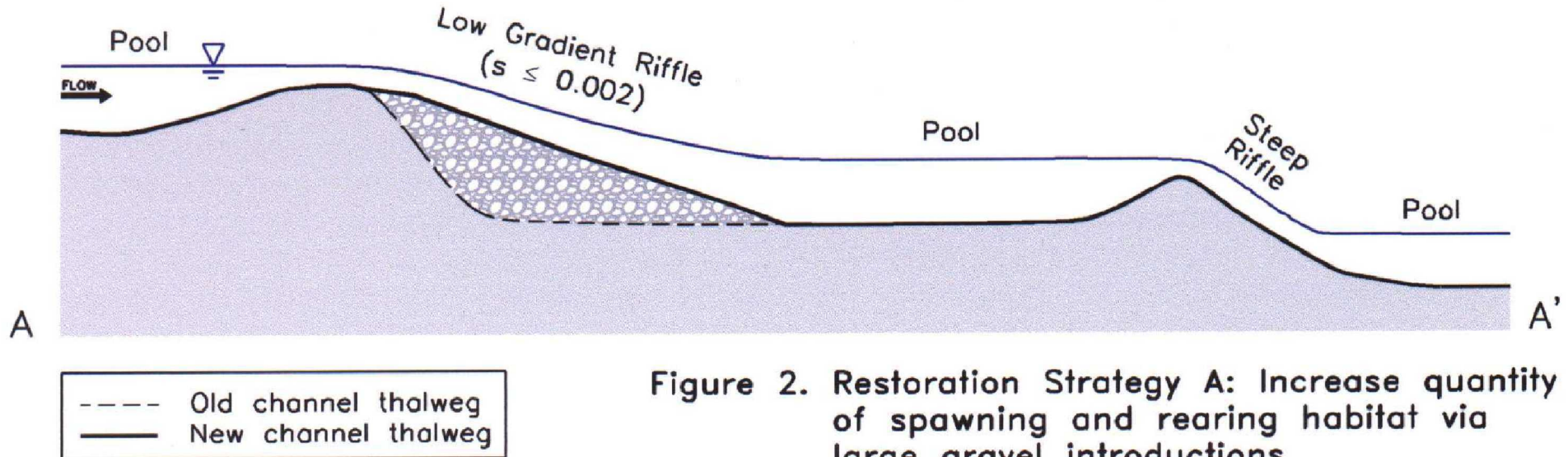
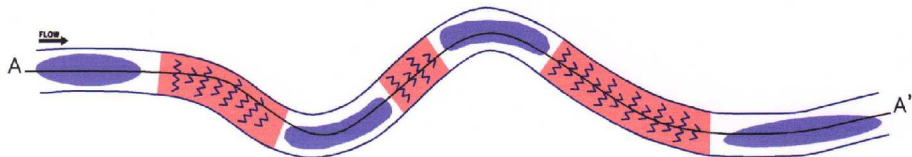
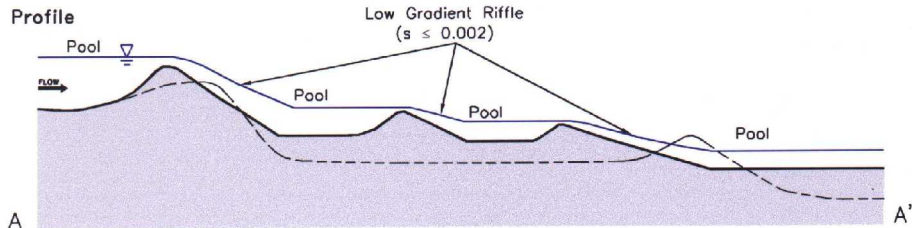


Figure 2. Restoration Strategy A: Increase quantity of spawning and rearing habitat via large gravel introductions

Planform

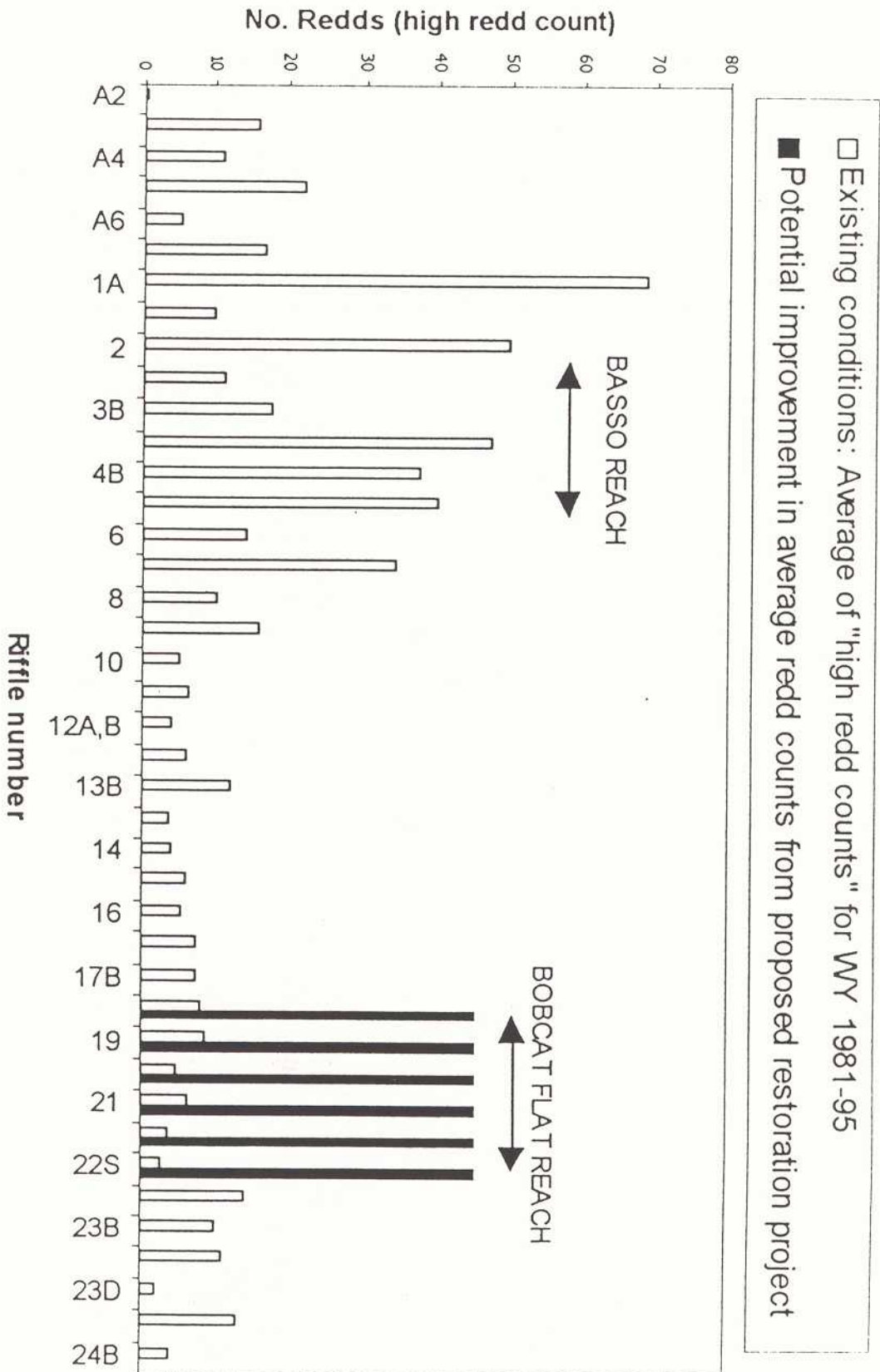


Profile



- Old channel thalweg
- New channel thalweg

Figure 3. Restoration Strategy B: Increase quantity of spawning and rearing habitat via channel reconstruction



Potential Improvements in spawning use

Attachment 4. Average number of high redd counts for the upstream portion of the gravel bedded reach, showing potential long-term improvements in spawning use in the Bobcat Flat reach as channel morphology and spawning habitat is improved.

Attachment 5.

<u>Reach</u>	<u>River mile</u>	<u>Riffle area (ft²)</u>	<u>Riffle area density (ft²/mi)</u>	<u>Average “high” redd counts (1981-1995)</u>
LaGrange Dam Reach	50.5 – 52.1 (1.6 miles)	68,000 ^a	42,400	875 ^b
Basso Spawning Reach	46.8 – 50.5 (3.7 miles)	767,000 ^a	207,000	5,600 ^b
Dredger Mining Reach	41.8 – 46.8 (5.0 miles)	326,000 ^a	65,000	3,000 ^b
Gravel Mining Reach	33.9 – 41.8 (7.9 miles)	699,000 ^a	89,000	2,800 ^b
In-channel Gravel Mining Reach	46.8 – 50.5 (7.9 miles)	821,000 ^a	104,000	900 ^b
Bobcat Flat Site	42.7 - 44.3 (1.6 miles)	56,000 ^a	35,000	160 ^b

^a Data summarized from EA Engineering, Science, and Technology (1992).

^b Based on CDFG annual redd counts from 1981-1995. “High” redd counts refer to the highest redd count for numerous redd surveys conducted during each year, and the value shown in the table above is the average of these “high” redd counts from 1981-1995.

Table 1. Comparison of spawning riffle areas between the Basso Spawning Reach (desirable) and Bobcat Flat (undesirable “lake-cascade” morphology within Dredger Tailing Reach).

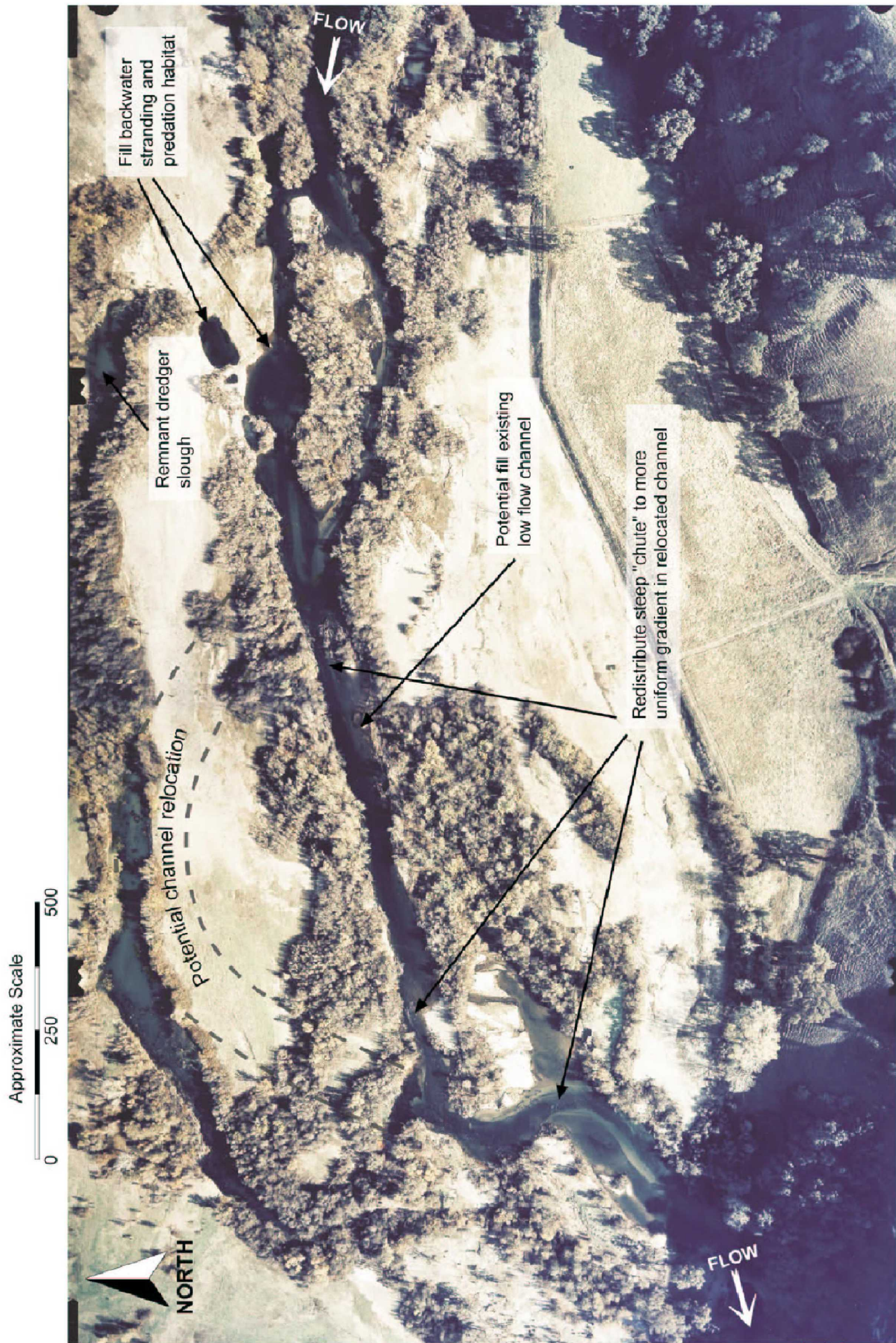


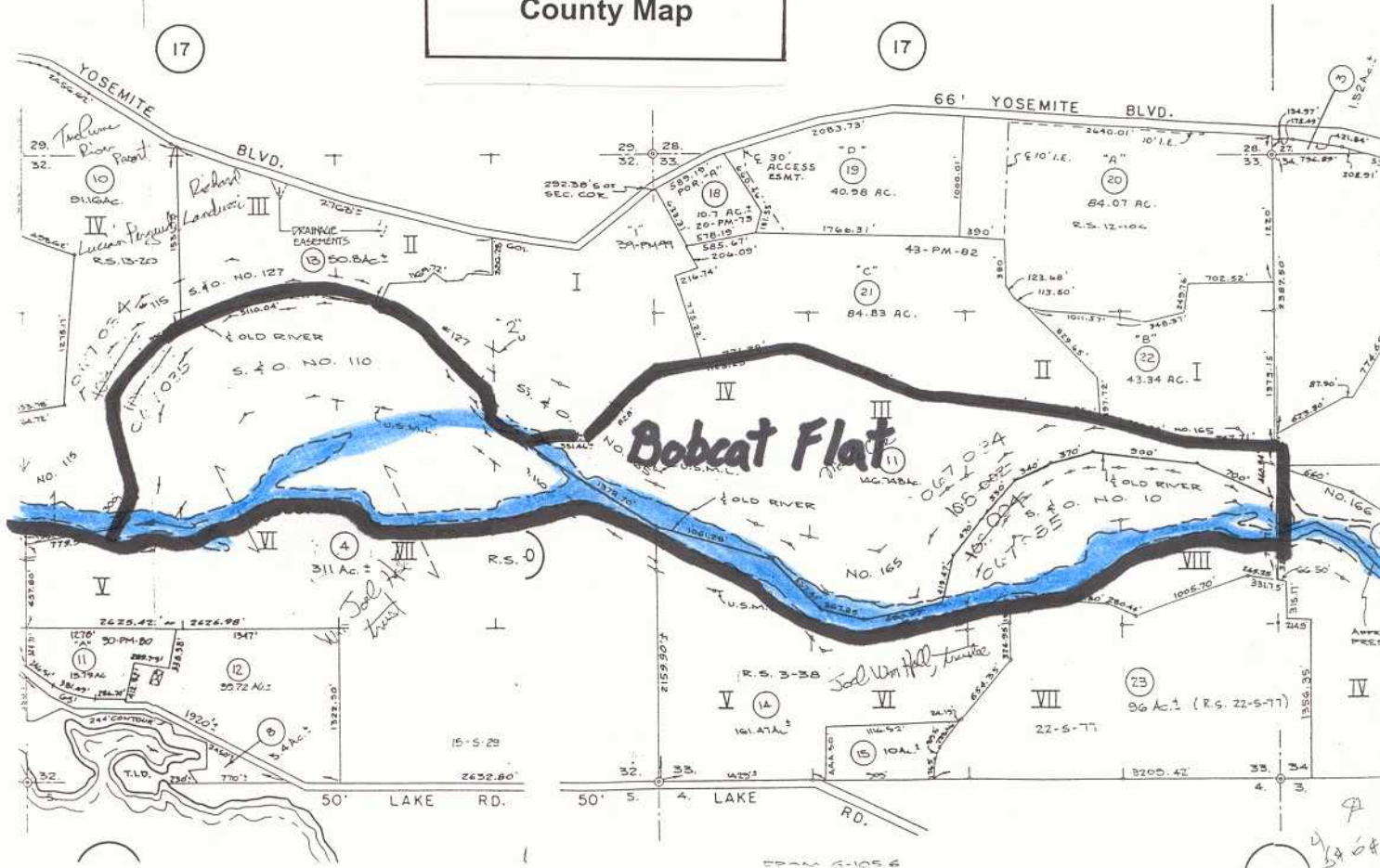
Figure 2. Proposed dredger reach restoration site from RM 44.2 to 44.7

R.13 E. M. D. B. & M.

Attachment 7

POR. T.3 S. R.13 E. M.

County Map



ATTACHMENT 9

MONITORING PLAN SUMMARY OF FISH SERIES RESOURCES AND GEOMORPHOLOGY FOR RIVER MILE 44 CHANNEL RESTORATION PROJECT, TUOLUMNE RIVER, CA.

Submitted to the Friends of the Tuolumne, Inc.

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I. GEOMORPHOLOGY

This RM 44 Channel Restoration Project (Project) will reconstruct natural channel morphology within this reach to repair the degradation caused by dredger gold mining, lack of sediment supply, and streamflow regulation. As mentioned above, one key experiment that will be tested by this project is to evaluate the response of two different methods of spawning habitat improvement: 1) channel relocation to distribute slope, as is proposed in this project, and 2) gravel augmentation to distribute slope, a downstream Bobcat Flat site (RM 43). The RM 43 project is funded by the Four Pumps Agreement Program (DWR) for the Tuolumne River Technical Advisory Committee; Friends of the Tuolumne will partner on the project. The channel design will provide an alternate bar morphology with low(er) gradient spawning riffles and deep pools. The channel design will size the bankfull channel to the post-New Don Pedro Dam high flow regime to allow fluvial processes of bed transport, scour and deposition to maintain channel characteristics. Project monitoring tasks will therefore target evaluating how the reconstructed channel responds to subsequent high flows, particularly focusing on longitudinal changes (riffle slopes) and hydraulic changes that influence spawning habitat and spawning use. Geomorphic monitoring will include:

1. Cross section surveys after threshold high flow event (>4,500 cfs) for planform adjustment and aggradation/degradation;
2. Thalweg profile surveys after threshold high flow event (>4,500 cfs) for aggradation/degradation, and longitudinal adjustment of slope;
3. Tracer rocks and scour core monitoring on cross sections for bed mobility thresholds;
4. Aerial photograph interpretation after large flood events;
5. Hydraulic measurements and modeling at spawning flows to evaluate changes in channel geometry and longitudinal profile

Cross sections and longitudinal profiles will also be used to evaluate significant changes in coarse sediment storage in the reach.

Task 1.1 Cross section surveys. Monumented cross sections will be installed during the design phase, and include rebar pins and coordinate control established by licensed GPS Survey. Following project implementation, cross sections will be resurveyed to establish as-built conditions. This will provide a basis against which to compare future surveys to evaluate planform and topographic response to streamflow. This task includes monitoring following two discrete bankfull events.

Task 1.2. Thalweg surveys. Similar to Task 1, the reconstructed channel is expected (and encouraged) to evolve in response to flows that exceed the design bankfull discharge ($>4,500$ cfs). In addition to planform and topographic responses (Task 1) this task will survey the longitudinal profile of the thalweg following high flow events. Thalweg survey will be done with a total station equipment to track planform location of the thalweg as well as elevation.

Task 1.3. Tracer rocks and scour cores. Surface particle mobility of the channel bed, and frequent scour of the bed and alternate bars is an important aspect of the channel design. As such, particle mobility and scour will be monitored by performing pebble counts to determine particle size distribution, then placing tracer rocks on cross sections representing the D_{84} , D_{50} , and D_{31} particle sizes. Scour cores will also be installed and monitored following at least two bankfull discharge events.

Task 1.4. Aerial photograph interpretation. The channel planform location can be monitored by examining aerial photographs taken before and after high flow events. This task will evaluate channel planform responses by digitizing low flow channel boundaries and measuring channel migration, sinuosity, channel geometry, etc.

Task 1.5. Hydraulic and geomorphic evaluation of channel evolution. The Project will import and place into the channel significant quantities of coarse sediment (gravel and cobble) that is intended to be fairly mobile at high flows. Due to channel conditions in reaches above the Project reach, bedload supply from upstream may not be adequate to maintain the reconstructed channel. Cross sections and longitudinal profiles will be used to evaluate changes in sediment storage resulting from sediment transport events, which may help estimate the “bedload supply replacement need” (*i.e.*, the volume of sediment required to maintain adequate storage in the restored reach for that reach of river). Additionally, hydraulic measurements (point velocities) and modeling in spawning areas will be compared with pre-construction conditions, and compared as high flow events begin to reshape the channel.

II. FISHERIES RESOURCES

The project area currently provides spawning substrate that is limited to steep riffle areas. In addition, an oxbow lake provides ideal backwater habitat for predatory fish juveniles (*e.g.*, largemouth and smallmouth bass, and the native Sacramento pikeminnow [formerly squawfish]). The primary fisheries objectives of the project are to (1) physically eliminate the backwater habitat for predatory fish species, (2) improve habitat conditions necessary for rearing and survival of juvenile chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*O. mykiss*), and (3) improve spawning habitat for chinook salmon and steelhead.

Biological monitoring for the proposed project includes a combination of direct observation of habitat utilization by juveniles and spawners, and physical habitat mapping to determine habitat availability and utilization under existing pre-project conditions and after project completion. In riverine systems, such as the lower Tuolumne River, aquatic and terrestrial insects typically

dominate the diet of juvenile salmonids. For this reason, evaluation of food resource availability for salmonids will require benthic and drift sampling of invertebrates in the river to determine changes in food supply that accompany the changes in channel bed characteristics before and after restoration. Existing monitoring protocols used in other Tuolumne River Gravel Mining Reach Channel Restoration Projects (McBain and Trush 1998) and prior invertebrate studies conducted on the Tuolumne River by Stillwater Science's staff will be adapted to the RM 44 Project site and will include:

- Comparison of habitat availability before and after restoration for various life history stages of steelhead, chinook salmon, and predator species.
- Invertebrate surveys to document changes in abundance and diversity of the invertebrate community.
- Evaluation of fish habitat utilization by snorkel surveys and redd counts.

Tasks associated with the fisheries monitoring include the following:

Task 2.1. Physical Habitat Mapping. Existing GIS habitat maps developed under the Tuolumne River Coarse Sediment Management Plan will be used to quantify existing habitat availability and changes in pre- and post-restoration physical habitat conditions. The habitat maps will provide a base layer for analysis of subsequent fish habitat utilization survey information and will be used to further delineate detailed habitat conditions (e.g., substrate, water depth, velocity, and temperature) and utilization of chinook salmon and steelhead trout. These criteria will be evaluated for steelhead, chinook salmon, and predator species and will generally rely on published literature but will include site-specific information whenever possible.

Task 2.2. Fish Habitat Utilization Surveys. In order to demonstrate that improved physical habitat created by channel and riffle reconstruction will lead to improved rearing conditions for Tuolumne River salmonids, surveys will be conducted to document: a) changes in physical habitat criteria (i.e. substrate, water depth, velocity); and b) changes in habitat utilization dominance from non-natives to salmonid species.

Both prior to and following construction, one springtime microhabitat survey per year will be conducted. Field crews will work systematically through the project reaches, using a simplified habitat classification system (Snider et. al. 1992) and predetermined habitat criteria for steelhead, chinook salmon, smallmouth bass, and largemouth bass juveniles. Fish-use sites located by direct observation will be added to the field maps as individual points, including depth, velocity, substrate and cover data. Data will be added to existing GIS maps of the project site to document areas of fish use in comparison to project features and pre-project conditions.

Task 2.3. Invertebrate Surveys. The restoration project is expected to improve channel conditions and processes (e.g., increase the amount of riffle habitat and increase bed mobility), leading to increased abundance and diversity of macro-invertebrates. More importantly, it is expected to lead to increased availability of macro-invertebrate taxa that serve as primary food sources for Tuolumne River salmonids. In order to demonstrate this, invertebrate surveys will be used to document changes in density within mapped riffle areas upstream, downstream and in the project reach before and after construction.

Drift samples will be collected in the existing pool at RM 44, during the spring prior to project construction. Drift nets will also be placed in the constructed riffle and pool habitat following implementation of the project, in order to quantify changes in invertebrate drift that is available to fish as a food source. The volume of water sampled using the drift nets will be calculated based

on the size of the net opening, the water velocity and/or tow distance through the water, and the sampling time. Drift sampling will occur over three one-hour periods near sunset using modifications to procedures outlined by Merritt et al. (1984), in the spring of each of two post-project years.

Benthic invertebrates will be sampled to provide an indication of shifts in the diversity of the invertebrate community, using standard indices. The existing pool habitat will be sampled prior to project construction using grab samples from the bottom of the pools, collected using gear appropriate to the depth and substrate. Samples will be taken along a transect or grid pattern throughout the pool, in order to collect a representative cross section of the invertebrate community.

Benthic invertebrates in riffles will be sampled using a 0.1 m² Hess sampler (Merritt et al. 1984) or Surber sampler across transects or on grids determined by water velocity or substrate quality. Sample sites will be selected across multiple riffles, using procedures detailed in the California Stream Bioassessment Procedure manual (CDFG 1999). Sampling will be repeated every spring, in each of the two post-project sampling years.

Samples will be processed in the laboratory by identification to the lowest practicable taxonomic level (*i.e.*, genus for most aquatic insect larvae and nymphs, family level or higher for other specimens), sorted by size (1 mm increments), and enumerated.

Task 2.4. Spawning Surveys. Measuring spawning utilization before and after channel reconstruction will be used to test the hypothesis that increased spawning habitat within this river reach will attract increased spawning, potentially reducing redd superimposition at the upstream spawning riffles. Spawning surveys (redd counts) will be conducted during the fall (for chinook salmon) and spring (for trout/steelhead) - following restoration (total of 3 years). One survey will be conducted at the end of the fall chinook salmon spawning period, and two surveys will be conducted during the spring trout spawning period. Existing redd count data will be compared to post-project use of spawning habitat.

Task 2.5. Study Plan and Project Monitoring Reports. This task includes: 1) preparation, revision and presentation of a study plan; 2) an initial report following conclusion of field data collection that will interpret the data and summarize the findings; and 3) a final project monitoring report.

III. BUDGET

Task 1 Geomorphology Monitoring	\$55,600
Task 2 Fisheries Monitoring	
2.1 Habitat Mapping	\$38,389
2.2 Habitat Utilization	\$49,622
2.3 Invertebrate Surveys	\$59,035
2.4 Spawner Surveys	\$48,549
2.5 Study Plans and Reports	<u>\$55,334</u>
Total	\$306,529

References

CDFG (California Department of Fish and Game). 1999. California Stream Bioassessment Procedure, Protocol Brief for Biological and Physical/Habitat Assessment in Wadeable Streams. May.

McBain and Trush. 1998. Tuolumne River Special Run Pools 9 & 10 and Gravel Mining Reach Restoration Projects – Draft Monitoring Plan. Prepared for Tuolumne River Technical Advisory Committee (Don Pedro Project, FERC License No. 2299).

Merritt, R. W., K. Cummins, and V.H. Resh. 1984. Collecting, sampling, and rearing methods for aquatic insects. Pages 11-26 in R.W. Merritt and K.W. Cummins, eds. An introduction to the aquatic insects of North America. Kendall/Hunt Publishing Co., Dubuque, Iowa.

Snider, W. M., D. B. Christophel, D. L. Jackson, and P. M. Bratovich. 1992. Habitat characterization of the lower American River. MOU between Beak Consultants and California Department of Fish and Game.

Attachment 10

Friends of the Tuolumne, Inc.
2412 Hilo Lane
Ceres, California 95307
(209) 537-7533
Brief Highlights of Friends of the Tuolumne, Inc.

2000 to present

Assist City of Waterford with several acquisition and restoration projects on river properties. Co-Project Manager for 9-acre riparian restoration.

2000 to present

Participate in the Tuolumne River Coalition. This process brings together various river interest groups including state, federal and local agencies and environmental groups. This process was successful in acquiring \$5 million for Tuolumne River uses. Other funding sources are being explored.

1999 to present

We are working with the Tuolumne River Regional Park Citizens' Advisory Committee. Our interest is in developing the park for walking, bicycle riding, and the enjoyment of the natural beauty of the river.

1998 to present

Sole sponsor of Bobcat Flat CALFED proposal for purchase and restoration of approximately 300 acres on the lower Tuolumne River. The \$2 million grant was approved and the purchase is nearly complete. Restoration plans are being developed.

1998

Published a pamphlet for free distribution to the public describing the plants and wildlife of the Tuolumne River corridor and how to use the resource in an environmentally friendly way.

1998

Filed complaint with City of Modesto concerning the Municipal Airport's illegal riparian vegetation management. A very satisfactory resolution was negotiated.

1997 to present

Co-sponsored with the East Stanislaus Resource Conservation District and wrote the successful \$732,000 CALFED grant proposal to purchase a conservation easement and restore 138 acres on the lower Tuolumne River. Total project cost was slightly over one million dollars. Purchase and restoration are complete. Long-term monitoring is in process to evaluate project performance for vegetation establishment, fisheries, and avian and mammal use. Dave Boucher, Friends of the Tuolumne President, is Project Manager.

1996 to 2000

Actively participated on the Tuolumne River hatchery development process.

1995 to present

Formed cooperative relationship with the East Stanislaus Resource Conservation District (ESRCD) to receive \$500,000 riparian fund arising from the Don Pedro Settlement Agreement to be used for riparian restoration. Two of the Friends of the Tuolumne Directors hold Associate Director positions with the ESRCD.

1995

Incorporated Friends of the Tuolumne as a non-profit 501(c)(3) land trust.

1995 to present

Members of the Tuolumne River Technical Advisory Committee that was an outgrowth of the Don Pedro Settlement Agreement. Implementation of the agreement and management of the resource are the primary focuses of this group. Members are signatories of the Settlement Agreement.

1994-95

Signatory to the New Don Pedro Dam FERC re-licensing process. Participated as one of thirteen parties negotiating the terms of the re-licensing. Water releases, ramping rates, channel restoration, riparian restoration, and fish studies are a few of the many topics of the settlement. Negotiated \$500,000 riparian fund settlement.

Attachment 11
Board of Directors' Bio-Sketches

FRIENDS OF THE TUOLUMNE, INC.
Board of Directors Brief Bio-sketches

David Boucher, President
Perfusionist
FERC Settlement Agreement negotiator
TRTAC representative, FOTT
Past President, Stanislaus Fly Fishermen
Treasurer, Stanislaus Fly Fishermen
Associate Director, East Stanislaus
Resource Conservation District
Gravel Restoration Project, Stanislaus
River, 1997 and 1998
Project Manager, Grayson River
Ranch CALFED project
Project Manager, Bobcat Flat

Bob Hackamack, Vice President
Engineer
FERC Settlement Agreement negotiator
Director, Tuolumne River Preservation
Trust
Past Chair, Tuolumne River Conference,
Sierra Club
Past Chapter Representative, Northern
California Regional Conservation
Committee, Sierra Club
Past President, Yokuts Group, Sierra Club

John Murphy, Director
Attorney
Gravel Restoration Project, Stanislaus
River, 1997 and 1998
CalTrout Governor
Conservation Chair, Stanislaus
Fly Fishermen
Director, Tuolumne River Preservation
Trust
Habitat Restoration Project, Tuolumne
River, 1989-1992

Allison Boucher, Treasurer
CPA
FERC Settlement Agreement negotiator
TRTAC representative, FOTT
Tuolumne River Regional Park Citizens'
Advisory Committee representative, FOTT
Past Chair, Yokuts Group, Sierra Club
Past Conservation Chair, Yokuts Group
Past Director, Ecology Action
Project Manager, Bobcat Flat
Project Mgr, Waterford Perc Ponds Paradise

Linda Larrick, Secretary
Farmer
FERC Settlement Agreement negotiator
Past Treasurer, Ecology Action
Tuolumne River Action Committee

Gordon Holingsworth, Director
Attorney
Past President, Stanislaus Fly Fishermen
Incorporator and initial Board member,
Children's Crises Center
Former member, DF&G San Joaquin River
System Committee
Former Director, Family Service Agency,
Modesto
Former member, Turlock Irrigation District
Citizens' Advisory Water Committee
Former Director, Modesto Police

Activities League

Sam Tyson, Director

Farmer

President, Ecology Action

President, Modesto Pease/Life Centr

Treasurer, Stanislaus Safe Energy

Committee

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