Tuolumne River Post Construction Habitat Evaluation

prepared by Boucher, Allison M

submitted to Ecosystem Restoration Program 2004 Monitoring and Evaluation

compiled 2004−11−19 00:37:18 PST

Project Information

This proposal is for the Ecosystem Restoration Program 2004 Monitoring and Evaluation solicitation as prepared by Boucher, Allison M.

November 18, 2004: Some checkboxes were not displaying correctly in the "printable" views and compilations. This problem has been resolved. Please check your proposals carefully and notify the help line if what you entered is not displayed correctly.

Proposal Title ***Tuolumne River Post Construction Habitat Evaluation***

Project Duration ***36 months***

Lead Organization Name ***Friends of the Tuolumne, Inc.***
Enter the name of the agency or institution to whom funds would be awarded.

Lead Organization Type ***non−profit organization***

Organization Contact

Please provide information for the primary person responsible for oversight of grant operation, management, and reporting requirements at the lead institution.

Social Title ***Ms.***
First Name ***Allison***
Last Name ***Boucher***
Street Address 7523 Meadow Avenue
City ***Stockton***
State Or Province ***CA***
ZIP Code Or Mailing Code ***95207***
Telephone ***(209) 477−9033*** *Include area code.*
E−Mail ***aboucher@netfeed.com***

Lead Investigator

Is the lead investigator the same as the main contact person?
Yes.
If not, provide the lead investigator's information below.

Social Title
First Name
Last Name
Institution
Institution Type
Street Address
City
State Or Province
ZIP Code Or Mailing Code
Telephone *Include area code.*

E−Mail

Provide information about additional investigators below.

Last Name	First Name	Organization
Hood	***Dennis***	***KDH Biological Environmental Services***
Demko	***Doug***	***S.P. Cramer and Associates, Inc.***
Hart	***Jeff***	***H.A.R.T. Restoration Team***
Hamilton	***Laurissa***	***Endangered Species Recovery Program***
Hammond	***Jeanne***	***PRBO***

Select one topic area that best applies to this proposal.
− at−risk species assessment
X river channel restoration
− estuary foodweb productivity
− ecosystem water and sediment quality
− environmental education
− environmental water management
− fish passage
− fish screens
− harvestable species assessment
− lowland floodplains and bypasses
− local watershed stewardship
− mine remediation
− hydrodynamics, sediment transport, and flow regimes
− non−native invasive species
− riparian habitat
− shallow water and marsh habitat
− upland habitatand wildlife friendly agriculture
− X2 relationships (freshwater − seawater interface)

Select a minimum of three keywords to describe the project.
− ***adaptive management***
− ***aquatic plants***
− ***benthic invertebrates***
X biological indicators
X birds
X neotropical migratory birds
− shorebirds
X upland birds
− wading birds
− waterfowl
− ***climate***
− climate change
− precipitation
− sea level rise
− snowmelt
− ***contaminants / toxicants / pollutants***
− contaminants and toxicity of unknown origin
− emerging contaminants
− mercury
− nutrients and oxygen depleting substances
− organic carbon and disinfection byproduct precursors
− persistent organic contaminants
− pesticides
− salinity
− sediment and turbidity
− selenium
− trace metals
− ***database management***
− ***economics***
− ***engineering***
− civil

− environmental
− hydraulic
− environmental education
− environmental impact analysis
− environmental laws and regulations
− environmental risk assessment
X fish biology
X bass and other centarchids
− delta smelt
− longfin smelt
− other species
X salmon and steelhead
X splittail
− striped bass
− sturgeon
− fish management and facilities
− hatcheries
− ladders and passage
− screens
− forestry
− genetics
− geochemistry
− geographic information systems (GIS)
− geology
− geomorphology
− groundwater
X habitat
− benthos
X channels and sloughs
− flooded islands
X floodplains and bypasses
− oceanic
− reservoirs
X riparian
X rivers and streams
X shallow water
− upland habitat
− vernal pools
− water column
X wetlands, freshwater
− wetlands, seasonal
− wetlands, tidal
− human health
− hydrodynamics
− hydrology
− insects
− invasive species / non−native species / exotic species
− land use management, planning, and zoning
− limnology
X mammals
− large
X small
− microbiology / bacteriology
− modeling
− conceptual
− quantitative
X monitoring
− natural resource management
X performance measures
− phytoplankton
X plants
− primary productivity
− reptiles
X restoration ecology
X riparian ecology

− ***sediment***
− ***soil science***
− ***statistics***
− ***subsidence***
− ***trophic dynamics and food webs***
− ***water operations***
− barriers
− diversions / pumps / intakes / exports
− gates
− levees
− reservoirs
− ***water quality management***
− ag runoff
− mine waste assessment and remediation
− remediation
− temperature
− urban runoff
− water quality assessment and monitoring
− ***water resource management***
− ***water supply***
− demand
− environmental water account
− water level
− water storage
− ***watershed management***
− ***weed science***
X wildlife
X ecology
− management
− wildlife−friendly agriculture
− ***zooplankton***

Does this project have multiple sites?
Yes.

If this project has only one site, provide geographic coordinates of the center point of the restoration action your project will monitor. Enter decimal degrees to the nearest 0.001 without directional characters (N, S, E, W).

Latitude: *example: 38.575; must be between 30 and 45*
Longitude: *example: −121.488; must be between −120 and −130*

Describe the project location using information such as water bodies, river miles, and road intersections.

The project has two sites, River Mile 43 and Grayson River Ranch. Both sites are located on the Lower Tuolumne River. RM 43 is located on the north bank at River Mile 43 approximately 20 miles east of the city of Modesto. Grayson River Ranch is located on the south river bank at River Mile 5 and is approximately 10 miles west of the city of Modesto. See the attached project location map.

13.2 Tuolumne River

Select all ecological management units containing a restoration site you will monitor, or another monitoring site included in your proposal.

ERP Regions, Ecological Management Zones ("Ecozones") and Ecological Management Units ("Ecounits")

Select each county containing a restoration site you will monitor or a monitoring site included in your proposal.
− Alameda County
− Amador County
− Butte County
− Calaveras County
− Contra Costa County
− Colusa County
− El Dorado County
− Fresno County
− Glenn County
− Madera County
− Marin County
− Mariposa County

− Merced County
− Napa County
− Nevada County
− Placer County
− Plumas County
− Sacramento County
− San Joaquin County
− Shasta County
− Solano County
X Stanislaus County
− Sonoma County
− Sutter County
− Tehama County
− Tuolumne County
− Yolo County
− Yuba County

Select each Indian reservation or rancheria containing or adjacent to a restoration site you will monitor or a monitoring site included in your proposal. Use the California tribal lands as a guide.

Amador County
− Buena Vista Rancheria
− Ione Band of Miwok
− Jackson Rancheria

Butte County
− Berry Creek Rancheria
− Chico Rancheria (Mechoopda)
− Enterprise Rancheria
− Mooretown Rancheria

Calaveras County
− California Valley Miwok Tribe (Sheep Ranch)

Colusa County
− Colusa Rancheria (Cachil Dehe Band of Wintun Indians)
− Cortina Rancheria

El Dorado County
− Shingle Springs Rancheria
− Washoe Tribe Reservations of California and Nevada

Fresno County
− Big Sandy Rancheria
− Cold Springs Rancheria
− Table Mountain Rancheria

Glenn County
− Grindstone Rancheria

Madera County
− North Fork Rancheria
− Picayune Rancheria (Chukchansi)

Placer County
− United Auburn Rancheria

Plumas County
− Greenville Rancheria

Shasta County
− Big Bend Rancheria (Pit River Tribe)
− Montgomery Creek Rancheria (Pit River Tribe)
− Pit River Tribe of California
− Redding Rancheria
− Roaring Creek Rancheria (Pit River Tribe)

Sonoma County
− Cloverdale Rancheria
− Dry Creek Rancheria
− Graton Rancheria
− Lytton Rancheria
− Stewarts Point Rancheria

Tehama County
− Paskenta Band of Nomelaki Indians

Tuolumne County
− Chicken Ranch Rancheria

− Tuolumne Rancheria
Yolo County
− Rumsey Rancheria

List each city (one per line) containing a restoration site you will monitor or a monitoring site included in your proposal.

None

11 Select all California Congressional districts which contain the applicant organization, a restoration site you will monitor, or another monitoring site included in your proposal.

14 Select all California Senate districts which contain the applicant organization, a restoration site you will monitor, or another monitoring site included in your proposal.

26 Select all California Assembly districts which contain the applicant organization, a restoration site you will monitor, or another monitoring site included in your proposal.

Is this proposal for next phase funding of an ongoing project funded by the CALFED ERP or the CVPIA?
Yes.

If it is, identify the ongoing project.

Project Title ***Bobcat Flat Acquisition and Restoration Project***
CALFED Contract Management Agency ***USFWS***
Amount Funded ***$1,984,320***
Date Awarded ***2000−01−01***
Lead Institution ***Friends of the Tuolumne, Inc.***
Project Number ***114200J100***

Have you received funding from CALFED for a project *not* listed above?
Yes.

If you have, list the project(s) below.

Project Title ***Grayson river Ranch Perpetual conservation Easement and Restoration***
CALFED Program ***Ecosystem Restoration***
CALFED Contract Management Agency ***USFWS***
Amount Funded ***$732,000***
Date Awarded ***1998−01−01***
Project Number ***11420−9−J041***

Project Title
CALFED Program
CALFED Contract Management Agency
Amount Funded
Date Awarded
Project Number

Project Title
CALFED Program
CALFED Contract Management Agency
Amount Funded
Date Awarded
Project Number

Project Title

CALFED Program

CALFED Contract Management Agency

Amount Funded

Date Awarded

Project Number

Have you ever submitted a similar proposal to any CALFED PSP?
No.

If you have, describe the submission below.

Project Title

CALFED Program

Date Of PSP

List people you feel are qualified to act as scientific reviewers for this proposal and are not associated with CALFED.

Full Name	Organization	Telephone	E−Mail	Expertise
				adaptive management
				adaptive management
				adaptive management
				adaptive management

Give additional comments, information, etc. here.

This proposal is for next phase funding for the completed Grayson river Ranch site as well as RM 43 at Bobcat Flat. Funds from the grants either have expired or will expire before planned monitoring activities could be completed.

Executive Summary

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Provide a summary of your project including the following:

- a brief description of your proposed project, including location
- objective
- the restoration action(s) it will monitor, and the approach to implement the proposal
- expected outcomes
- relationship to CBDA ERP or CVPIA goals

This information will be made public on our website shortly after the closing date of this PSP.

Executive Summary

This proposal is to monitor two separate restoration projects managed by Friends of the Tuolumne: BOBCAT FLAT RIVERMILE 43 AND GRAYSON RIVER RANCH.

We propose post construction monitoring of Bobcat Flat Rivermile 43, a CBDA and DWR/California Fish and Game funded instream and riparian restoration project on the Tuolumne River approximately 23 miles upstream of Modesto. Construction to be completed in 2005 includes removing aggregate from the floodplain thus lowering sections as much as four feet and placing the proper spawning gravel in the river channel to enhance salmonid habitat. Portions of the floodplain will be planted with native trees.

The objective of the project is to reestablish spawning and holding habitat for salmon and steelhead in an area that was severely damaged by the gold dredger. This is the first instream restoration on the Tuolumne River designed to enhance steelhead habitat. The riparian restoration objective is to lower the floodplain so that it will receive spring flood flows allowing some natural regeneration and to establish native plants. A high water scour channel will be built across the floodplain to enhance floodplain inundation.

We plan to monitor the instream habitat enhancements to evaluate the effectiveness of the designs which aim to provide not only increased salmon spawning but also spawning and holding habitat for steelhead/trout. The gravel is placed in riffles with deep holding water immediately below. The gravel is sized to attract both Chinook and trout spawning. Instream monitoring will complement other monitoring on the Tuolumne River, including monitoring at Bobcat Flat, by the Tuolumne River Technical Advisory Committee (TRTAC) and DFG such as juvenile fish seining, summer snorkeling, and fall run Chinook salmon redd surveys. We expect the outcome to be a stronger design “recipe” for riffle construction that will enhance both salmon and steelhead spawning.

Predator fish may be a limiting factor on the Tuolumne River. We propose to monitor the change in their use of the project site by analyzing where and when they are present and their feeding and spawning habits compared to pre−project status.

We plan to monitor the riparian restoration to determine if lowering the floodplain in this part of the river will encourage natural regeneration and provide for more successful planting.

Monitoring is designed to add to the base of knowledge for the TRTAC. We propose to use angling, cinema photography, GPS identification of specific sites, mapping, predator fish stomach contents analysis, and comparison with pre−project conditions. These tasks will help fill in the information gaps for adult steelhead/trout and predator fish in the spawning reach of the Tuolumne River.

The deliverables include detailed maps to demonstrate how the fish are using the new spawning and holding habitat, how the predator fish are responding to the new instream habitat, and reports describing the nature of the habitats and uses of the habitat compared to pre−project status. A report will evaluate the revegetation results and determine the effects of lowering the floodplain in this reach of the river.

This proposal also seeks funding to continue monitoring at GRAYSON RIVER RANCH RESTORATION at Rivermile 5 of the lower Tuolumne River. The objective at this site was to reestablish a riparian forest that was converted to agriculture many years ago and provide habitat for avian, terrestrial and aquatic species.

The restoration was physically completed in 2002. Active management ended in the fall of 2004. The CBDA contract has expired so we need additional funding to continue monitoring to evaluate biological responses to the restoration.

We propose to monitor the trend in abundance and diversity of avian species and mammals as indicators of restoration success, and to evaluate the plant palette mix of native trees and grass after the cessation of irrigation. Investigation into localized conditions that are predictive of planting success will be done in the development of a predictive site quality index. Natural regeneration of native plants will be investigated to determine if natural processes are contributing to the restoration. Restoration also created a new floodplain backwater. We will monitor to determine if salmon, steelhead, and splittail use

this habitat when water levels are appropriate.

Deliverables: Vegetation monitoring will produce GIS mapping of plant inventories, survival, natural regeneration, overlayed with a Site Quality Index accompanied by appropriate reports.

Wildlife components will provide data and reports to support biologic response to habitat improvements in terms of population trends and richness. Fishery study will generate data to document use of constructed floodplain backwaters by juvenal Chinook salmon, steelhead, and splittail. Reports will be generated and included in Tuolumne River reports for the Tuolumne River Technical Advisory Committee.

Bobcat Flat RM 43 and Grayson River Ranch both address several ERP and CVPIA goals – ERP Strategic Goal 1: At−Risk Species, “big R”. Goal 3: Harvestable Species. Goal 4: Riparian Habitats, and CVPIA Priority SJ3: Rearing and spawning habitat for Chinook salmon, steelhead, and splittail.

Environmental Compliance

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Successful applicants are responsible for complying with all applicable laws and regulations for their projects, including the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

Any necessary NEPA or CEQA documents for an approved project must tier from the CALFED Programmatic Record of Decision and CALFED Programmatic EIS/EIR to avoid or minimize the projects adverse environmental impacts. Applicants are encouraged to review the Programmatic EIS/EIR and incorporate the applicable mitigation strategies from Appendix A of the Programmatic Record of Decision in developing their projects and the NEPA/CEQA documents for their projects.

CEQA Compliance

Which type of CEQA documentation do you anticipate?
X none *Skip the remaining questions in this section.*
− negative declaration or mitigated negative declaration
− EIR
− categorical exemption *A categorical exemption may not be used for a project which may which may cause a substantial adverse change in the significance of a historical resource or result in damage to scenic resources within an officially designated state scenic highway.*

If you are using a categorical exemption, choose all of the applicable classes below.
− Class 1. Operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. The types of "existing facilities" itemized above are not intended to be all−inclusive of the types of projects which might fall within Class 1. The key consideration is whether the project involves negligible or no expansion of an existing use.
− Class 2. Replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced.
− Class 3. Construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure. The numbers of structures described in this section are the maximum allowable on any legal parcel, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.
− Class 4. Minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.
− Class 6. Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies. These may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded.
− Class 11. Construction, or placement of minor structures accessory to (appurtenant to) existing commercial, industrial, or institutional facilities, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

Identify the lead agency.

Please write out all words in the agency title other than United States (Use the abbreviation "US".) and California (Use the abbreviation "CA".).

Is the CEQA environmental impact assessment complete?

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

Document Name
State Clearinghouse Number

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

NEPA Compliance

Which type of NEPA documentation do you anticipate?
X none *Skip the remaining questions in this section.*
− environmental assessment/FONSI
− EIS
− categorical exclusion

Identify the lead agency or agencies.

Please write out all words in the agency title other than United States (Use the abbreviation "US".) and California (Use the abbreviation "CA".).

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

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

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

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

Local Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
Conditional Use Permit	−	−	
Variance	−	−	
Subdivision Map Act	−	−	
Grading Permit	−	−	
General Plan Amendment	−	−	
Specific Plan Approval	−	−	
Rezone	−	−	
Williamson Act Contract Cancellation	−	−	
Other	−	−	

State Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
Scientific Collecting Permit	***X***	−	
CESA Compliance: 2081	−	−	
CESA Complance: NCCP	−	−	
1602	−	−	
CWA 401 Certification	−	−	
Bay Conservation And Development Commission Permit	−	−	
Reclamation Board Approval	−	−	
Delta Protection Commission Notification	−	−	
State Lands Commission Lease Or Permit	−	−	
Action Specific Implementation Plan	−	−	
Other	−	−	

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

Other	–	–	

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

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

Land Use

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Does the project involve land acquisition, either in fee or through easements, to secure sites for monitoring?
X No. *Skip to the next set of questions.*
− Yes. *Answer the following questions.*

How many acres will be acquired by fee?

How many acres will be acquired by easement?

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

Is there an existing plan describing how the land and water will be managed?
− No.
− Yes. *Cite the title and author or describe briefly.*

Will the applicant require access across public or private property that the applicant does not own to accomplish the activities in the proposal?
− No. *Skip to the next set of questions.*
X Yes. *Answer the following question.*

Describe briefly the provisions made to secure this access.

Written permission has been acquired for access at Grayson River Ranch. Bobcat Flat RM 43 access routes are owned by Friends of the Tuolumne.

Do the actions in the proposal involve physical changes in the current land use?
X No. *Skip to the next set of questions.*
− Yes. *Answer the following questions.*

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

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

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

Is the land mapped as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance under the California Department of Conservation's Farmland Mapping and Monitoring Program?
X No. *Skip to the next set of questions.*
− Yes. *Answer the following questions.*

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

Is the land affected by the project currently in an agricultural preserve established under the Williamson Act?
X No. *Skip to the next set of questions.*
− Yes. *Answer the following question.*

Is the land affected by the project currently under a Williamson Act contract?
− No. *Skip to the next set of questions.*
− Yes. *Answer the following question.*

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

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

Conflict Of Interest

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Complete the following table in order to provide the full names and organizations of all individuals in the following categories.

- Applicant and investigators 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 fund.
- 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.

Parts of this table are generated from responses given in the project information form.

Role	Full Name	Institution
submittor	Boucher, Allison M	***Friends of the Tuolumne, Inc.***
contact/lead investigator	Boucher, Allison	Friends of the Tuolumne, Inc.
investigator	Hood, Dennis	KDH Biological Environmental Services
investigator	Demko, Doug	S.P. Cramer and Associates, Inc.
investigator	Hart, Jeff	H.A.R.T. Restoration Team
investigator	Hamilton, Laurissa	Endangered Species Recovery Program
investigator	Hammond, Jeanne	PRBO
subcontractor	***Walser, Steve***	***California Rivers Restoration Fund***

Tasks And Deliverables

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For each task in the project's scope of work, please list major deliverables and an estimate of the start and end time (in months from the date the project's contract is executed).

Task ID	Task Name	Start Month	End Month	Deliverables
1	Project Management	1	36	Semiannual and final reports. Periodic invoices. Project Oversight.
2	***O. mykiss habitat RM 43***	***1***	***36***	Detailed habitat map for each season, written and photographic description of nature of habitat; calculation of increase habitat (square yards)
3	***Predator fish habitat RM 43***	***1***	***36***	Detailed habitat map for each season, written and photographic description of nature of habitat; calculation of decreased habitat (square yards). Description of stomach contents.
4	***Vegetation Monitoring Bobcat Flat***	***1***	***36***	Written report detailing methods and results of planting, natural recruitment.
5	***Avian monitoring Grayson River Ranch***	***1***	***36***	Written report detailing methods and rsults of restoration re avian species. This written report is then compiled with the San Joaquin valley reports PRBO is generating for analysis region wide.
6	***Aquatic Monitoring Grayson River Ranch***	***1***	***36***	Written reorts analyzing the use of the backwater sloughs and the health of the aquatic species using the sloughs.
7	***Mammal Monitoring Grayson River Ranch***	***1***	***36***	Written report outlining objectives, methods, results. The information is useful for the general San Joaquin studies Endangerd Species Recovery Program and can help guide future restoration with small mammals in focus.
8	***Vegetation Monitoring Grayson River Ranch***	***1***	***36***	Written reports, GIS maps superimposed on airphotos, photo documentation, analyzing the success of the different plants and methods of planting.

Comments

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

Budget

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Provide a detailed budget showing how requested funds will be used to carry out the project's scope of work for each year of the project. Costs for each major task described in the "Approach and scope of work" section of your proposal must be presented. The first task in each year should be project management, including the specific costs associated with insuring accomplishment of a specific project, such as inspection of work in progress, validation of costs, report preparation, response to project specific questions and necessary costs directly associated with specific project oversight. Applicants should also include costs associated with managing project funds, including preparation of quarterly and final reports to the funding agency. Tasks for environmental compliance, monitoring, data handling, storage, and dissemination, and public outreach should also be included as appropriate for your project. In calculating indirect costs, assume funds will be awarded by State of California.

The sections in this budget form are derived from the tasks you have defined in the "Tasks and Deliverables" form.

Year 1 (Months 1 To 12)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	***12000***	***0***	***900***	***600***	***0***	***0***	***0***	***0***	$13,500	***0***	$13,500
2: O. mykiss habitat RM 43 (12 months)	***0***	***0***	***0***	***0***	***41000***	***0***	***0***	***0***	$41,000	***0***	$41,000
3: Predator fish habitat RM 43 (12 months)	***0***	***0***	***0***	***0***	***27250***	***0***	***0***	***0***	$27,250	***0***	$27,250
4: Vegetation Monitoring Bobcat Flat (12 months)	***1560***	***0***	***120***	***200***	***0***	***0***	***0***	***0***	$1,880	***0***	$1,880
5: Avian monitoring Grayson River Ranch (12 months)	***0***	***0***	***0***	***0***	***4000***	***0***	***0***	***0***	$4,000	***0***	$4,000
6: Aquatic Monitoring Grayson River Ranch (12 months)	***0***	***0***	***0***	***0***	***6000***	***0***	***0***	***0***	$6,000	***0***	$6,000
7: Mammal Monitoring Grayson River Ranch (12 months)	***0***	***0***	***0***	***0***	***6000***	***0***	***0***	***0***	$6,000	***0***	$6,000
8: Vegetation Monitoring Grayson River Ranch (12 months)	***0***	***0***	***0***	***0***	***21750***	***0***	***0***	***0***	$21,750	***0***	$21,750
Totals	**$13,560**	**$0**	**$1,020**	**$800**	**$106,000**	**$0**	**$0**	**$0**	**$121,380**	**$0**	**$121,380**

Year 2 (Months 13 To 24)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	***12000***	***0***	***900***	***600***	***0***	***0***	***0***	***0***	$13,500	***2000***	$15,500

2: O. mykiss habitat RM 43 (12 months)	*0*	*0*	*0*	*0*	*39250*	*0*	*0*	*0*	$39,250	*0*	$39,250
3: Predator fish habitat RM 43 (12 months)	*0*	*0*	*0*	*0*	*27500*	*0*	*0*	*0*	$27,500	*0*	$27,500
4: Vegetation Monitoring Bobcat Flat (12 months)	*920*	*0*	*60*	*100*	*0*	*0*	*0*	*0*	$1,080	*0*	$1,080
5: Avian monitoring Grayson River Ranch (12 months)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	$0	*0*	$0
6: Aquatic Monitoring Grayson River Ranch (12 months)	*0*	*0*	*0*	*0*	*6000*	*0*	*0*	*0*	$6,000	*0*	$6,000
7: Mammal Monitoring Grayson River Ranch (12 months)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	$0	*0*	$0
8: Vegetation Monitoring Grayson River Ranch (12 months)	*0*	*0*	*0*	*0*	*10000*	*0*	*0*	*0*	$10,000	*0*	$10,000
Totals	**$12,920**	**$0**	**$960**	**$700**	**$82,750**	**$0**	**$0**	**$0**	**$97,330**	**$2,000**	**$99,330**

Year 3 (Months 25 To 36)

Task	Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
1: project management (12 months)	*12000*	*0*	*900*	*600*	*0*	*0*	*0*	*0*	$13,500	*2000*	$15,500
2: O. mykiss habitat RM 43 (12 months)	*0*	*0*	*0*	*0*	*39250*	*0*	*0*	*0*	$39,250	*0*	$39,250
3: Predator fish habitat RM 43 (12 months)	*0*	*0*	*0*	*100*	*27500*	*0*	*0*	*0*	$27,600	*0*	$27,600
4: Vegetation Monitoring Bobcat Flat (12 months)	*920*	*0*	*60*	*0*	*0*	*0*	*0*	*0*	$980	*0*	$980
5: Avian monitoring Grayson River Ranch (12 months)	*0*	*0*	*0*	*0*	*5000*	*0*	*0*	*0*	$5,000	*0*	$5,000
6: Aquatic Monitoring Grayson River Ranch (12 months)	*0*	*0*	*0*	*0*	*6000*	*6000*	*0*	*0*	$12,000	*0*	$12,000
7: Mammal Monitoring Grayson River Ranch (12 months)	*0*	*0*	*0*	*0*	*6000*	*0*	*0*	*0*	$6,000	*0*	$6,000
8: Vegetation Monitoring Grayson River Ranch	*0*	*0*	*0*	*0*	*26750*	*0*	*0*	*0*	$26,750	*0*	$26,750

(12 months)											
Totals	**$12,920**	**$0**	**$960**	**$700**	**$110,500**	**$6,000**	**$0**	**$0**	**$131,080**	**$2,000**	**$133,080**

Project Totals

Labor	Benefits	Travel	Supplies And Expendables	Services And Consultants	Equipment	Lands And Rights Of Way	Other Direct Costs	Direct Total	Indirect Costs	Total
$39,400	**$0**	**$2,940**	**$2,200**	**$299,250**	**$6,000**	**$0**	**$0**	**$349,790**	**$4,000**	**$353,790**

Do you have cost share partners already identified?
Yes.

If yes, list partners and amount contributed by each:

California River Restoration Fund has offered to donate funds to cover the cost of office time required by CRRF staff estimated to have a value of $8,000. They have also offered to use their boats and equipment without charge.

Do you have potential cost share partners?
No.

If yes, list partners and amount contributed by each:

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

Budget Justification

This proposal is for the Ecosystem Restoration Program 2004 Monitoring and Evaluation solicitation as prepared by Boucher, Allison M.

November 18, 2004: Some checkboxes were not displaying correctly in the "printable" views and compilations. This problem has been resolved. Please check your proposals carefully and notify the help line if what you entered is not displayed correctly.

Labor

For each task in the scope of work, please provide the estimated hours or days and compensation rate proposed for each position for each year of the project.

Year 1: Monitoring field work and writing 39 hrs at $40/hour. Year 2: Monitoring field work and writing 23 hrs at $40/hour. Year 3: Monitoring field work and writing 23 hrs at $40/hour.

Benefits

Provide the overall benefit rate applicable to each category of employee proposed in the project (e.g., if you budget for three biologists, you only need to provide the benefit rate of a biologist once on the form).

None

Travel

Estimate costs for all travel for each task for each year of the project. Travel will only be reimbursed at rates approved by the State of California (with a hotlink to the travel reimbursement rules). Provide purpose all non−local travel. Estimate travel costs for each task for each year of the project. Travel will only be reimbursed at rates approved by the State of California, as provided in DPA Short−Term Travel Reimbursement for All Excluded and Represented Employees . Provide purpose for all non−local travel.

Estimate 2,600 miles for field work and project management in year 1. Estimate 2,500 miles for field work and project management in year 2. Estimate 2,500 miles for field work and project management in year 3.

Supplies And Expendables

List general categories of supplies, like office supplies or computer supplies, and the amount needed for each. Indicate the amounts proposed for each category of supplies for each task for each year of the project.

Year 1: Office supplies $600 and field monitoring supplies $200. Year 2: Office supplies $600 and field monitoring supplies $100. Year 3: Office supplies $600 and field monitoring supplies $100.

Services And Consultants

Identify the specific tasks for which these services would be used. This should include partners, other than the project applicant, in collaborative projects, whether or not the collaboration will be managed through a contractor−subcontractor relationship or through separate contracts between the funding agency and key project partners. Estimate amount of time required and compensation rate. Specify the services which these consultants, subcontractors, or partners will provide. These could include monitoring, laboratory analysis, or other services. List name(s) of partners or other consultants, if they have already been selected, their principal staff assigned to the project and the aspects of their work to be charged to the grant (e.g., salary, travel, supplies, etc.).

Year 1: O. mykiss − Dennis Hood 57 hrs at $70; local guide 47 days @ $750/day Year 1: Predator fish − Dennis Hood 29 hrs at $70; local guide 34 days at $750/day Year 1: Avian − 5 days field work plus office work $800/day plus supplies Year 1: Aquatic −5 or 6 days at $1000/day for field work, analysis, reporting Year 1: Mammal −2 biologists for 10 days at $600/day each Year 1: Vegetation at Grayson River Ranch − 45 technician field days at $280/day; 10 days field and writing for Hart @$95/hr Year 1: 2 aerial rectified photos at $1750 each including post processing

Year 2: O. mykiss – Dennis Hood 57 hrs at $70; local guide 47 days at $750/day Year 2: Predator fish – Dennis Hood 29 hrs at $70; local guide 34 days at $750/day Year 2: Avian – None Year 2: Mammals – None Year 2: Vegetation at Grayson River Ranch – 11 technician field days at $280/day; 74 hours at $95/hr for Hart field and writing

Year 3: O. mykiss – Dennis Hood 57 hrs at $70; local guide 47 days at $750/day Year 3: Predator fish – Dennis Hood 29 hrs at $70; local guide 34 days at $750/day Year 3: Avian – 5 days field work plus office work $800/day plus supplies Year 3: Aquatic – 5 or 6 days at $1000/day for field work, analysis, reporting Year 3: Mammals – 2 biologists for 10 days at $600/day ea Year 3: Vegetation – 40 technician field days at $280/day; 144 hours at $95/hr for Hard field work, analysis, and writing Year 3: Aerial photo rectified with post processing $1750

Equipment

Identify specific each item of equipment to be purchased and its cost. Equipment is defined as a piece of property costing $1,000 or more per unit with an expected use of three or more years.

None

Lands And Rights Of Way

List costs of any lands, easements, or rights of way needed for monitoring activities, explaining whether cost are based on completed appraisals of properties to be acquired or are estimates derived by other methods Explain how these costs were estimated (prior experience, recent sales, appraisal of parcels to be acquired, etc). State whether any appraisals used meet applicable state and federal standards, and include support or a rationale for this statement. Reasonable costs for appraisals, title reports, environmental site assessment, and other closing expenses may be included.

None

Other Direct Costs

Provide any other direct costs not already covered for each task for each year of the project.

None

Indirect Costs/Overhead

Overhead usually includes general office costs such as rent, phones, furniture, general office staff, etc., and is distributed by a predetermined "indirect rate" applied to other specific costs. This is usually an amount or pro rate share of existing salaries and benefits, rent, equipment, materials, and utilities attributable to a function or activity, but not necessarily generated by the function or activity. Where available, use indirect rates approved through state or federal budgetary procedures, such as Office of Management and Budget Circular A−87 (Cost Principles for State, Local, and Indian Tribal Governments) , Office of Management and Budget Circular A−21 (Cost Principles for Educational Institutions) or Office of Management and Budget Circular A−122 (Cost Principles for Non−Profit Organizations) . Explain what direct costs this rate is applied to when budgeting indirect costs (e.g., labor, benefits, etc.). Where an approved indirect rate is not available, explain what is encompassed in the budget for indirect costs. This could 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.

Year 1: Aerial photos with post processing Year 2: Aerial photos with post processing

Comments

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

Tuolumne River Post Construction Habitat Evaluation

A. Project Description

This proposal is to monitor two separate restoration projects managed by Friends of the Tuolumne: BOBCAT FLAT RIVERMILE 43 and GRAYSON RIVER RANCH.

BOBCAT FLAT RIVERMILE 43 (See Grayson River Ranch pages 10 – 18

STEELHEAD AND SALMON INSTREAM RESTORATION AND FLOODPLAIN RECLAMATION

The Friends of the Tuolumne received a CBDA grant and Don Pedro Dam FERC Settlement Funds from the City and County of San Francisco to purchase and restore 300 acres on the Tuolumne River approximately 23 miles upstream from Modesto. The property was purchased and the funded restoration construction will be completed in the summer of 2005. In 2002 Turlock Irrigation District on behalf of the Technical Advisory Committee was funded for Rivermile 43 gravel augmentation.

The construction will harvest aggregate from the floodplain, sort and clean the aggregate, and place it in the river for fishery habitat. The design for the instream placement of the gravel is unique to the Tuolumne River; it is the first project incorporating steelhead and trout spawning and holding water integrated into the design to provide both steelhead and salmon spawning habitat.

The riffle designs include contours with velocity above and below the shallow salmon riffles to provide a variety of habitats. The shallow riffle ledges will be bracketed with pocket water for steelhead spawning and holding areas. A deep transportation corridor will be included to provide protection for fish movement up and downstream. Streamside vegetation will be preserved for rearing and holding habitat. The patches of gravel will be placed to provide maximum steelhead and salmon spawning and holding habitat.

The harvesting of the aggregate will lower the floodplain by approximately four feet on about 9 acres. The reclamation design is intended to encourage natural regeneration of native trees and forbs. A high water scour channel across the same area will reduce the instream pressures during large flood events to better protect the constructed riffles from being washed out.

1. Problem, Goals, and Objectives: Steelhead and salmon spawning habitat in the Tuolumne River is insufficient. Although some good spawning habitat remains upstream at La Grange, very little remains in the dredger reach (Habitat Restoration Plan for the Lower Tuolumne River Corridor prepared for the

Tuolumne River Technical Advisory Committee, January 2001). This is the first instream design to implement steelhead, as well as salmon, spawning needs. Bobcat Flat is located within the reach of viable trout water. Bobcat Flat has the potential to significantly increase usable spawning habitat and increase the abundance of Chinook salmon spawning within its 1.6 miles of instream habitat (Habitat Restoration Plan for the Lower Tuolumne River Corridor).

Monitoring will provide guidance for future gravel augmentation projects on the Tuolumne and Merced Rivers in order to maximize both salmon and steelhead/trout spawning and holding habitat. The riffle designs are adapted from successful designs on the Stanislaus River that provide steelhead and salmon spawning on each riffle. The successful Stanislaus River gravel augmentation projects are used as a template. The monitoring of Bobcat Flat Rivermile 43 will help future Tuolumne River projects adapt for trout and salmon at the time of design.

Problem, Goals, and Objectives re predatory fish: The abundance of predatory fish in the Lower Tuolumne River may be a limiting factor for salmonid survival (FERC Settlement Agreement, Habitat Restoration Plan for the Lower Tuolumne River Corridor). Large backwater areas are ideal for predatory fish to hold and procreate. Bobcat Rivermile 43 has large numbers of bass, a known predator fish, and several areas documented as bass habitat.

Problem, Goals, and Objectives re vegetation: The dredger tailings were removed during the 1970's to build New Don Pedro Dam. The floodplain was left level, compacted, and covered with large aggregate. The new dam effectively limits spring flooding. Under these conditions natural regeneration of native trees and forbs has been minimal. The 9 acres in the funded restoration is covered with Star Thistle, an invasive weed.

The reclamation is designed to lower the floodplain allowing more frequent spring flooding in an effort to encourage natural regeneration of native trees and forbs. Because the floodplain will be lower to the water table, trees should be more successful in establishing a riparian forest. Once a riparian forest is established on this open and nearly barren land, the shade it provides will encourage native forbs. Planting of trees and forbs will test the hypotheses that (a) lowering the floodplain will encourage natural regeneration and (b) planted trees will be more easily established because the water table will be closer to the root zone. The construction also uses the aggregate for the instream riffle construction thus providing a double benefit.

2. Justification: Steelhead returning to spawn have few usable riffles. Gravel augmentation providing additional square yards for spawning can be designed to provide both salmon and steelhead spawning habitat, steelhead holding water, and transportation corridors for trout/steelhead.

Most areas actively used by steelhead/trout for spawning are on the downstream edge of the riffle and provide holding water that is at least four feet deep immediately downstream of the riffle. Although the recent gravel augmentation projects on the Tuolumne have been able to increase the square yards used by spawning salmon, they have not enhanced steelhead/trout habitat and may, in fact, have diminished useable trout habitat. The designs built at Bobcat Flat Rivermile 43 have incorporated steelhead/trout needs based on empirical observation upstream in the La Grange area on the Tuolumne River and on the Stanislaus River where adult steelhead/head trout have been recorded during spawning season. Building the Rivermile 43 instream restoration project is expected to provide additional useable square yards in the Tuolumne River for both steelhead/trout and salmon.

The Coarse Sediment Management Plan for the Lower Tuolumne River funded by the USFWS Anadromous Fish Restoration Program and administrated by Turlock Irrigation District includes mapping of general trout habitat and recommends monitoring of trout habitat both pre and post-project.

Steelhead/trout need spawning gravel of a smaller size than do Chinook salmon. Steelhead/trout also prefer riffles with higher velocity and/or surface turbulence providing cover. Steelhead/trout also need deeper holding water in the immediate vicinity of their spawning redds. All these attributes have been designed into Rivermile 43 construction.

Based on the monitoring results, the velocity, depth, gravel size, and length of riffles can be adjusted to improve future gravel projects on both the Tuolumne River and the Merced River. Velocity and linear length of the spawning riffles, depth and linear length of the holding water, and gravel size will be studied and compared to where and how the fish use the constructed project spawning riffles/pools. The exact design features can be fine tuned for the next instream restoration, particularly at Bobcat Flat since the next Bobcat Flat restoration is expected to be immediately adjacent to Rivermile 43.

Bobcat Flat has gravel available for instream restoration and will analyze the results of this project before implementing additional gravel infusion projects. We will also be certain that our results are fully shared with the Technical Advisory Committee as they begin implementation of the Coarse Sediment Plan for the Lower Tuolumne River gravel infusion projects. Steelhead/trout and salmon use patterns will be documented and analyzed in order to maximize available instream habitat for adult steelhead/trout, spawning salmon, and juvenile salmonid.

Justification re predatory fish: The construction of salmonid spawning, holding, and rearing habitat should reduce the available bass habitat. Post-construction monitoring will document any change in bass habitat and provide information for construction in areas that also have a predatory fish concern.

Bobcat Flat Rivermile 43 is an excellent choice of locations for this study because it is downstream toward the lower end of beneficial trout habitat and harbors large numbers of bass in the warmer backwaters.

The oversized cobble that will not be used to build the spawning riffles will be placed in some of the large, slow backwaters to reduce bass habitat as well as reduce the width of the stream and increase the velocity.

Justification re vegetation: Reestablishing a riparian forest in the dredger tailings section of the Lower Tuolumne River has been problematic due to the poor soil. By removing the large aggregate from the floodplain and using it for spawning riffle construction or other instream restoration, the soil will be improved enough to provide an adequate growing medium. The planting will leave some part of the 9 acres unplanted to test whether or not natural regeneration can occur with improved soil composition and a closer water table.

3. Previously Funded Monitoring: The report "Adult O. *mykiss* Habitat in the Lower Tuolumne River" was included in the Coarse Sediment Management Plan for the Lower Tuolumne River funded by USFWS Anadromous Fish Restoration Program and administrated by Turlock Irrigation District. The purpose for the report was to analyze successful steelhead/trout habitat on the Tuolumne River. Those elements have been designed into this construction project.

The Tuolumne River Technical Advisory Committee has prepared a three year monitoring proposal that will include seining for juvenile fish in the Lower Tuolumne River, including post-project Rivermile 43. The seining report will be incorporated into a comprehensive Bobcat Flat Rivermile 43 report.

California Department of Fish and Game has conducted salmon redd surveys for many years that include Rivermile 43. In addition, a pre-project salmon redd survey for Rivermile 43 is currently being implemented by McBain and Trush under funding by Department of Water Resources. DWR has funded $300,000 of the restoration for Rivermile 43 gravel augmentation including the pre-project redd survey and physical processes monitoring such as pebble counts, permeability, and facies mapping. The pre-project baseline monitoring reports will be included in a comprehensive analysis of the post-project results of restoration and reclamation at Rivermile 43.

Previously Funded Monitoring re predatory fish: Baseline predatory fish populations, their habitat use, feeding habits, and species will be completed before the instream construction begins. The baseline monitoring is funded by the original CBDA grant.

Previously Funded Monitoring re vegetation: Baseline vegetation monitoring has been completed with an inventory and photos (both aerial and landscape). The baseline vegetation monitoring has been funded by the original CBDA grant.

4. Approach as Scope of Work:

Adult Steelhead/trout: Trout habitat will be monitored using angling, cinema photography, and mapping GPS locations. Because other monitoring programs (McBain and Trush for the Technical Advisory Committee and Turlock Irrigation District) will monitor fish using seining and the physical processes such as pebble counts, permeability, and as built velocity, slope, etc., our program will focus on adult steelhead/trout. The construction at Rivermile 43 will be monitored by Dennis Hood with support from a local guide each year from January through June. The guide is capable of catching the elusive returning adult steelhead and native steelhead/trout. Previous angling efforts by other agencies have been unable to hook these large and difficult-to-catch fish. The guide was able to hook and land steelhead/trout weighing between 2 and 12 pounds for the California Department of Fish and Game DNA sampling in the Spring of 2004. Documentation of fish habitat usage will be mapped using GPS and cinema photography.

The deliverables will include a detailed map of the Rivermile 43 construction area for each of the three years, written and photo descriptions of the nature of habitat being used by steelhead/trout, and calculations of increased square yardage of use. Dennis Hood will prepare the reports and analysis comparing the results to the pre-project baseline monitoring and prior year monitoring results. We expect to be able to draw conclusions about the impact of the riffle designs on both Chinook salmon and steelhead/trout usage of Rivermile 43.

Because these riffles will be the first on the Tuolumne River designed to provide both Chinook salmon and steelhead spawning, holding, and rearing habitat, the analysis of how the post-project riffles are used will be valuable to the next designs prepared for both the Tuolumne and Merced Rivers. The hypothesis is that these riffle designs will increase use by both species for spawning, as well as provide holding water and a transportation corridor for trout movement up and downstream. We will also include in our reports the results of the juvenile seining at Rivermile 43 and evaluate how the post-construction affects rearing habitat usage.

Approach and Scope of Work re predator fish: Predator fish use of Rivermile 43 will be studied using angling, cinema photography, GPS location mapping, and stomach contents sampling. Currently predator fish use this part of the Tuolumne River for feeding and spawning. Our studies will compare the different species' use of the area each of the three years May through October and compare the approximate abundance and type and location of use to the pre-project monitoring report and to the prior years' reports. The goal is to establish the locations and water type used by predator fish and the impact salmonid restoration projects may have on predator fish.

Because other monitoring projects (McBain and Trush for the Technical Advisory Committee and Turlock Irrigation District) propose to study juvenile fish using seining and adult predator fish in other sections of the river using the same guide, our project will focus on adult predator fish specifically and in detail at Rivermile 43. Our results will be folded into McBain and Trush's reports to compile a river-wide report on adult predator fish.

Our monitoring results will be folded into a comprehensive report for Rivermile 43 detailing how predator fish use the habitat designed to enhance salmonids. Patches 4 and 5 of the gravel augmentation plan will use the oversize cobble to partially fill in backwater areas in an effort to reduce predator fish abundance as well as increase flow velocity. This angling and cinema photography will be intense so that an analysis can be prepared to recommend methods of reducing predator fish abundance throughout the entire 52 miles of the Lower Tuolumne River.

The deliverables will include a detailed map of the Rivermile 43 construction area for each of the three years, written and photo descriptions of the nature of habitat being used by predator fish, and calculations of decreased square yardage of use. Dennis Hood will prepare the reports and analysis comparing the results to the pre-project baseline monitoring and prior year monitoring results. We expect to draw conclusions about the impacts on predator fish abundance and habitat usage as affected by the gravel augmentation as designed and implemented.

The hypothesis is that these riffle designs will increase use by both salmon and steelhead/trout and reduce predator abundance by reducing predator spawning and feeding habitat. We will also include in our reports the results of the juvenile seining at Rivermile 43 and evaluate how the post-construction affects the abundance of juvenile predator fish.

Approach and Scope of Work re Vegetation: Monitoring the floodplain reclamation and revegetation will document how the vegetation was planted, what plant species survived, increased size, the methods of maintenance, and the degree and locations in which natural recruitment occurred. The physical characteristics of the post-construction floodplain will be described and photographed and compared to the pre-project floodplain.

Monitoring will be done during May of the first year post-construction and again in late summer or early fall in each of the three contract years.

Because we will be lowering the floodplain by approximately four feet, we need to document what effect this has on plant survivability and recruitment. The water table will be closer and we expect trees and plants to grow more easily. We will place water monitoring wells (tubes) during construction that will enable us to track the water table throughout the contract years. Readings will be taken

throughout the seasons to track how the water table is affected by flows and how it relates to plant survival.

The deliverables will include written and photographic descriptions of the re-vegetation results with conclusions regarding how the reclamation construction, planting methods, and maintenance methods affected success of which species, both planted and naturally occurring.

5. Feasibility: These monitoring tasks are feasible. The project construction is scheduled to be completed during the summer of 2005 so the post-project monitoring can begin January 2006 with the return of adult steelhead to the river. The contractor will have the necessary collection permits from CDFG and scientific research permits from NOAH. The steelhead/trout monitoring is seasonal and should begin in January in order to cover the full season from January through June.

As described above, we are using angling, photo cinema photography, and GPS mapping because we are focused on adult fish. Other monitoring programs on the Tuolumne River such as seining and snorkeling will and have covered juvenile and smaller fish during the summer months. Only angling has been able to study the elusive adult steelhead/trout and native trout. Most steelhead/trout monitoring is done during cold months when snorkeling is not suggested. Angling has been able to document the presence and location of steelhead/trout in the range up to 12 pounds.

The Tuolumne River Technical Advisory Committee is cooperating with us and we will be folding the results of their monitoring for juvenile fish and physical processes into our final report. We will share with them the results of our monitoring because we are the only study of adult steelhead/trout and we hope to draw conclusions about riffle design suitability. Our goal is to be able to guide future riffle designs to accommodate both Chinook salmon and steelhead/trout together and maximize the resources. The results will be useful for future riffle designs on both the Tuolumne and Merced Rivers. Bobcat Flat was purchased by Friends of the Tuolumne with the original CBDA grant. Therefore, no special permission is needed to perform the monitoring.

The vegetation monitoring needs no special permits. We plan to share our results with the Technical Advisory Committee, California Department of Fish and Game, and other groups managing restoration projects on the Tuolumne and Merced Rivers. Many of these projects face the same challenges of cobble rich but soil poor floodplains. Our experiment with lowering the floodplain by using the cobble for instream work in an effort to maximize the resource will gain some knowledge on the advantages/disadvantages of this strategy. Our monitoring reports will summarize our results for others managing projects in the region.

6. Expected Outcomes and Products: Steelhead

Our reports will detail the successful or unsuccessful aspects of the riffle designs with respect to how steelhead/trout use the restored habitat. We will fold into our report the information from the McBain and Trush salmon redd surveys and juvenile seining surveys so that we can analyze and make recommendations for the next instream gravel restoration projects on the Tuolumne and Merced Rivers. We expect the report to show that both species are using the restoration site in greater numbers than pre-project and that the heterogeneity provides excellent habitat for adult and juvenile Chinook salmon and steelhead/trout.

Expected Outcomes and Products: Predatory Fish

Our final report will analyze how the restoration has impacted predatory fish use of the area. Part of the design includes predator fish habitat reduction by filling large backwater areas where they spawn and feed and increasing flow velocity. The report will compare the predator fish use of the area and their diet to the results of the pre-project site. We will quantify the impact in an effort to measure the effectiveness of reducing predator fish so that the next restoration projects on the Tuolumne and Merced Rivers can adapt our results to their designs and use the opportunity to both enhance salmonid habitat as well as reduce predator impacts on salmonids.

Expected Outcomes and Products: Vegetation

Our report is expected to reach conclusions regarding the success of planting and the likelihood of natural regeneration on a lowered floodplain in the dredger reach. Each project to date on the Tuolumne River has improved and adapted from previous projects by all the project managers. This project will add to the knowledge base for restoration projects in cobble areas with little or no soil.

7. Data Handling, Storage, and Dissemination

Our reports and the results will be shared with the Technical Advisory Committee, local and county agencies restoring riparian habitat, California Fish and Game for their work on the Merced River, and any and all interested parties. We will provide tours and presentations to all interested groups and agencies. We work closely with many of the local and county agencies and will share with them all the knowledge learned in this monitoring program. We will continue our work to disseminate Tuolumne River knowledge as we work with cooperating groups.

8. Public Involvement and Outreach

As members of the Tuolumne River Technical Advisory Committee, Ceres River Bluff Regional Park floodplain restoration committee, regular participants in

discussions about the Tuolumne River Regional Park floodplain restoration, project managers of two CALFED projects, a member of the Tuolumne River Coalition (local watershed group with 12 agencies/non-profits), and active members in our community, we will give tours, assist in planning, offer our reports, and be available for questions on a regular basis. Our reports will be available for others' use.

9. Work Schedule

Each segment of our monitoring proposal can stand alone. Each segment of our monitoring is implemented annually for the three years of the contract. Steelhead/trout monitoring is January through June each year. Predator fish monitoring is May through October each year. The vegetation monitoring is May the first year and October of each year.

Although each segment can stand alone, together they provide a comprehensive study of an exciting new design theory for the Tuolumne River gravel augmentation program. Combined with the Technical Advisory Committee monitoring for juveniles, Chinook salmon redds, snorkeling, and general predatory fish in other projects, we will have a complete picture of the impact (success) of the different design features built into Bobcat Flat Rivermile 43 instream restoration and floodplain reclamation.

Small, S. , Nur, N, Black A., Geupel, G. and D. Humple. 2000. Riparian Bird Populations of the Sacramento River System: Results form the 1993 – 1999 Field Season. PRBO unpublished report to The Nature Conservancy and The US Fish and Wildlife Service.

B. Applicability to CALFED Bay-Delta Program ERP Goals, the ERP Draft Stage 1 Implementation Plan, and CVPIA Priorities

Bobcat Flat Rivermile 43

1. ERP and CVPIA Priorities: Our proposal seeks to address fall run Chinook salmon and steelhead habitat needs. Our construction project is instream and riparian rehabilitation in the salmonid spawning reach of the Lower Tuolumne River. The riffle designs are unique because they aim to provide spawning areas for both Chinook salmon and steelhead/trout in an area decimated by gold dredging 50 years ago.

Limited spawning is documented each year; the restoration aims to significantly increase the amount of usable riffle area and provide holding water and a transportation corridor for steelhead. Our proposal goal is to analyze the effectiveness of the riffle and gravel augmentation designs and the effectiveness of lowering the floodplain by utilizing the gravel for instream restoration. The

success of natural recruitment and plantings on the floodplain will be monitored. The proposal also addresses the expected impacts on predatory fish in the immediate vicinity of the rehabilitated instream habitat.

Bobcat Flat RM 43 addresses several ERP and CVPIA goals – ERP Strategic Goal 1: At-Risk Species, "big R". Goal 3: Harvestable Species. Goal 4: Riparian Habitat, and CVPIA Priority SJ3: Rearing and spawning habitat for Chinook salmon, steelhead, and splittail.

2. Relationship to Other Ecosystem Restoration Actions, Monitoring Programs, or System-wide Ecosystem Benefits: Our proposal builds on both past and future monitoring of the Lower Tuolumne River. Past snorkeling, seining, and redd surveys results will be compiled with our results to develop a comprehensive analysis of the Bobcat Flat Rivermile 43 rehabilitation. Proposed monitoring by the TRTAC will also be combined with our results to further the comprehensive analysis of the hypothesis that Chinook salmon and steelhead/trout spawning can be effectively designed together.

The results of our monitoring for the instream restoration will be available for future gravel augmentation projects under the Coarse Sediment Management Plan for the Lower Tuolumne River, at Bobcat Flat, and on the Merced River. We are eager to share the knowledge of this project and its monitoring program. We work closely with the TRTAC and California Fish and Game on the Tuolumne River. We expect the report to be a vital link in the association between Chinook spawning gravel projects and steelhead/trout habitat needs.

3. Land Acquisition: Not applicable.

A. PROJECT DESCRIPTION

Grayson River Ranch Perpetual Conservation Easement and Restoration
FLOODPLAIN RESTORATION TO RETURN CONVERTED RIPARIAN AREA TO FUNCTIONAL CONDITION FOR AVIAN, MAMMAL, AND FISH SPECIES.

Friends of the Tuolumne and the East Stanislaus Resource Conservation District partnered to apply for funding to undertake the 140 acre Grayson River Ranch Perpetual Conservation Easement and Restoration Project. It is located on the Lower Tuolumne River at Rivermile five.

It was funded through the 1998 CBDA ERP and by the U.S. Fish and Wildlife, Anadromous Fish Restoration Program (AFRP), and the U.S Department of Agriculture, Natural Resources Conservation Service (NRCS).

The perpetual conservation easement was finalized during the spring of 2000 with funds provided by the AFRP and NRCS. Construction of the site began in

August of 2000 when CBDA funds became available. The project was completed in October 2004. Long term monitoring of biologic response remains.

1. Problem Goals and Objectives:
The riparian forest of the eastern section was cleared and converted to agricultural use sometime prior to 1939. The western section was subsequently cleared and converted later. Aerial photographs taken in 1939 document a richly vegetated habitat on the western section and a completely converted eastern section. As intensive agriculture and modern technologies improved, the site was protected from river flood waters. As a consequence, the rich wildlife habitat of this site was lost and river flood functions were greatly diminished. Wildlife habitat value for all species was reduced to near zero. Agricultural use of the lower Tuolumne River has similarly converted the great majority of historic riparian land. Habitat necessary for both migratory and resident aquatic, avian, and terrestrial species is in short supply (Habitat Restoration Plan for the Lower Tuolumne River Corridor, prepared for the Tuolumne River Technical Advisory Committee).

Goal and Objectives
Create a healthy riparian forest where none existed that addresses the habitat needs of target species including resident and migratory avian, aquatic, and terrestrial species including "Big R" species identified in the Multi-Species Conservation Strategy (CBDA 2000): Central Valley steelhead ESU, Central Valley fall-/late-fall Chinook salmon SU, Valley Elderberry longhorn beetle .

Restoration actions
Two 2000 foot long backwaters were excavated to create off-channel fish habitat. 75,000 yards of material were moved to create backwater habitat that will fill from the downstream end and drain back out as river levels recede. These waterways are engineered to begin filling at approximately 4,300 CFS and fill the entire length with flows of 4,600 CFS. These are common high flows on the Tuolumne river that have occurred in approximately 50% of the years in recent history. Unfortunately, since completion of the construction, no such flows have occurred.

Riparian planting: The site has been devoid of riparian habitat for at least 30 and 65 years. It was replanted in 2001 and 2003 with a mix of approximately 7000 native riparian trees and grass. Some large areas on the site were left unplanted with the expectation that natural recruitment would vegetate those areas over time. Irrigation was reduced during 2004 and terminated in the fall of 2004. Establishment is well under way. The trees are beginning to establish very well and the native grass has taken hold in places and are beginning to spread. Wildlife use of the site is accelerating.

Physical restoration is 100% complete. Evaluation of wildlife biologic response to the improvements and continued monitoring of the vegetation will complete the project.

2. Justification

As outlined above, the site was bare cropland prior to restoration. It had almost no wildlife value due to its lack of habitat. Our conceptual model assumes that lack of wildlife use on this site was attributable to its impoverished habitat, and that creation of new habitat would produce a substantial increase. Proximity to the San Joaquin Wildlife Preserve and other heavily used local habitats indicates that good habitat is used when it exists. Grayson River Ranch contains good soils for vegetation growth. The soil types however have proven to be highly variable within localized project areas. This variability has apparently manifested itself in diverse vegetative viability and vigor (Hart Restoration, Inc).

3. Previously Funded Monitoring

Monitoring was funded as part of the original grant. The CBDA Cooperative Agreement expired October 2004. It is not possible to extend that contract to complete the planned long-term monitoring.

Monitoring of the site began with baseline monitoring prior to construction. Discrete components of the monitoring plan include actions to evaluate the biological response to restoration of the site. Funding to continue project evaluation has expired. Continued long term monitoring as originally envisioned will not be possible without additional funds.

Four key areas were selected from the ecosystem components because they represent the project performance across all possible components due to the inter-related processes of habitat creation and wildlife use. Project performance was related to wildlife population changes on the site for avian, mammals, and aquatic species relative to those of pre-construction. Vegetation monitoring evaluated early stage processes of survival and growth.

Performance measures for the project were evaluated by field monitoring by consultants from three of the four disciplines (Aquatic monitoring has not been possible due to inadequate river flow conditions to accommodate study requirements).

Vegetation is developing on the site with some regional areas showing substantial variability in growth and viability. More investigation is needed to determine the causes of these differences.

Wildlife population changes and use are important components of our conceptual model. It has been postulated that small mammals would show an earlier response to the habitat than larger ones due to their less mobile habits. In the mammal population, that appears to be true.

Avian populations responded immediately. Migratory songbirds and upland game birds have greatly expanded and increase each season as the project matures.

Scheduled monitoring activities to continue evaluation of biologic response will need to be postponed or cancelled if no additional funding is located. Preliminary data collected to date will provide limited value without continued monitoring as the project matures.

4. Approach and Scope of Work:

Avian

Recent studies have demonstrated that the presence of a suite of riparian bird species, and in particular, the successful breeding of these species, provides a good indicator of riparian health, and good gauge of restoration success (Griggs and Small, 2000). Natural process restoration and establishment of limited meander will create vegetation conditions (increased early successional habitat, vegetation structure and volume, patch diversity) that enhance and restore declining migratory bird species (Small et al 2000). Further information regarding the value of riparian habitat to birds and their roles as indicators of habitat health, is provided in the Riparian Habitat Joint Venture's Riparian Bird Conservation Plan (2000).

Overview and Objectives

The project will monitor trends in the avifauna and vegetation of the Grayson River Ranch site as a result of restoration activities. Data collected on the occurrence and abundance of bird species will be correlated with vegetation variables and compared to nearby control sites, which include undisturbed and other restored plots. These data will provide useful information to gauge the success of restoration at the site and help guide future restoration projects to better benefit birds. Collaborative data will be collected concurrently at nearby sites on the San Joaquin River. Data will be integrated with similar efforts on the San Joaquin National Wildlife Refuge. Furthermore, data from the site will be included in a statewide database that maps the current distribution of birds in California. For more information on this effort, please see the Riparian Bird Conservation Plan (Riparian Habitat Joint Venture 2000).

Objectives of this study are:

To assess bird species richness and diversity.
To determine abundance and distribution of select species.
To assess changes in the composition and structure of the plant community.
To use information to assess the constraints, and likelihood of recolonization of the restored riparian habitat.
To integrate data collected at this site with other projects to develop more complete models for riparian restoration along the San Joaquin River and its tributaries.

Hypotheses

Hypothesis 1: Species richness and diversity of native riparian-associated birds increases after riparian areas are restored.

Hypothesis 2: The occurrence and abundance of certain riparian-associated species is linked to particular vegetation variables, specifically related to the health of the native plant community.

Aquatic

Floodplain habitat provides valuable refugia to Chinook salmon and steelhead. Conditions in such habitats provide shelter from flood waters and improved feeding and rearing habitat for improved survival and growth. The floodplain backwater will be seine netted during appropriate flows to capture juvenile Chinook salmon and steelhead utilizing the backwater refugia. The nearby in-channel site will be seined as well. Data of captured fish will be compared to establish size differences between the two habitats. Such backwater locations also provide suitable habitat for splittail production. They will be sampled for splittail larvae.

Objective

Evaluate Grayson River Ranch restoration project to determine possible benefits to the Tuolumne River fishery. Determine fish species composition, density, and condition factor of salmonids in restored floodplain habitats compared to similar habitats in the main river channel. Sample for presence of splittail larvae. These objectives have been unfulfilled since the construction was completed because the required high river flows have not occurred. In recent years the required flows have occurred in about 50% of the years.

Hypotheses

1) Salmonids will use restored floodplain habitat during high river flows.

2) Salmonids utilizing restored floodplain habitat are more robust than those that use the adjacent in-channel habitat.

3)Splittail are present in the lower Tuolumne River during high flows and will use restored floodplain habitat.

Terrestrial

Overview

Monitoring efforts will be focused on two of three segments of the mammalian community – shrews and most rodents, which can be detected and enumerated by live trapping, and fossorial gophers and moles, which can be detected and their numbers indexed by counting the piles of castings on belt transects; on

medium and large sized species whose presence can be detected by the use of tracking stations, remote cameras, and direct observation. Medium and large mammal detection thresholds for determining population changes in such mobile populations is problematic. Because small mammals have lower vagility and often are more community-specific in their habitat requirements than medium and large-sized species, they are more likely to change in species composition and number with early successional changes in the plant community than are larger species. Thus, the small-mammal species will receive strongest emphasis in trend analysis monitoring.

Objectives:
Monitor selected mammalian species to document changes in the mammalian community throughout the project's establishment and maturation.

Hypothesis:
Changes in mammal species composition and number is related to successional changes in the plant community.

Vegetation:

Overview:
Vegetation monitoring typically involves three different phases. Phase I implementation monitoring documents the number and kinds of plants installed, their initial health, and planting location. Phase II maintenance and establishment monitoring occurs during the first several years. It documents plant health and growth during the first critical several years.

Phase I is complete. Phase II requires one more session to complete.
Hypothesis 1) Vegetative restoration will successfully establish.

Phase III monitoring remains in its entirety. It will document the transition of the plantings from individual plants to stands of vegetation that have habitat value.

There has been some debate regarding the relative merit of planting native riparian plant species vs. natural recruitment and colonization. Portions of the project were not planted with the expectation that natural regeneration would occur. Since approximately 1/3 of the property has been set aside as open (not planted) areas, the project area is ideally positioned to test the hypotheses:
2) Horticultural techniques of planting is (or is not) a more reliable approach than the results of allowing for natural recruitment to develop riparian habitat.
3) Growth rates of plants at this former agricultural site exceed growth rates of plants from nearby "natural sites".
4) Relative success of the different tree species is dependant upon environmental conditions at the site.

Monitoring of the riparian habitat will consist of the following research components:

1)Survival of woody plants/habitat development. : a) 100% inventory of all plants to determine percent survival compared to original plantings; b) GPS determinations of these trees by species; and, c) using geo-rectified air photos of the 133 acre restoration site, a GIS study will map and to analyze the areal extent of habitat conditions (i.e., actively restored habitat, natural recruitment, invasive plant communities).
2)Site Quality Index Evaluation. Growth and development of established habitat will be compared to natural plant growth in nearby natural "idealized" habitat areas. Within Grayson Ranch, site quality physical differences will be subsequently analyzed. As soil quality differences are likely related to soil profile and moisture differences, soil trenches will be dug to assess differences in soil quality and moisture availability.
3) Natural Recruitment/natural regeneration. We will design a sampling scheme to detect whether native plants are colonizing the site under the present conditions.
4) Native Grass Plantings. 15 acres of the site was planted with native grass seed. To determine the success of these plantings, plots will be located at random locations along transects within these areas. Measurements of density, percent cover and frequency will be made, comparing the planted grass species with other native and exotic species.

Feasibility

This restoration site is complete and biological responses are now developing. Project restoration began in 1999 and is now mature enough to offer meaningful observation and conduct research on developing processes. Data is now readily available and can be ascertained through continuation of monitoring activities previously described.

Fishery monitoring is one component of the proposal with a level of uncertainty because it relies upon appropriate river flow conditions. Scheduling those investigations will opportunistic.
There are no environmental compliance checklist items that are relevant during this phase of the project.

The project is located on an easement purchased in 1998 from Grayson River Ranch, LLC. The landowner of Grayson River Ranch has agreed to allow access through and across his property. Attachment___

Interested parties to this project include the property owner, The Tuolumne River Technical Advisory Committee, The East Stanislaus Resource Conservation District, Yokuts chapter of the Sierra Club, The Stanislaus County Audubon Society, and representatives of State and Federal agencies. All listed parties are highly supportive of these described efforts and there is no opposition. This phase of the project has no third party impacts since it is solely investigational.

Expected Outcomes and Products

Each of the four components of the monitoring program at Grayson River Ranch will prepare reports each season monitoring is conducted and a final compilation report with study conclusions the final year. All reports will be forwarded to our partners on the Tuolumne River, including the Tuolumne river Technical Advisory Committee and others actively working on the Tuolumne River. We will use the opportunity to share our information with the several groups we actively meet and work with. The project is generating good data. We will make presentations to various forums to share our findings. Articles will be prepared for agency publications and web-sites.

Avian- Reports will be compiled with the San Joaquin Valley reports PRBO is generating for analysis region wide. Reports generated will expose population and habitat use trends in response to maturing restored habitat. Populations and species diversity are expected to increase and nesting populations are anticipated as the project matures. Bird populations have already shown substantial increases and were the first to respond substantially to the restoration.

Aquatic- Reports generated will document use of the constructed floodplain backwater habitat. The fishery consultant performing the study also performs similar work for Turlock Irrigation District. This study will be included with District reports. It will produce quantitative and qualitative assessment of Juvenile Chinook salmon and steelhead trout using the habitat as compared to those that remain in the nearby river channel.

Terrestrial- Reports generated will be prepared to document population changes in mammal species. Increases are positive indicators that restoration goals are being achieved. It is expected that small mammal populations will lead the way as indicators for habitat recovery due to their more stationary life histories.

Vegetation- It is expected that phase II will document restored vegetation survival and establishment. It is also expected that the experimental species in the planting mix may begin to show stress during the summer of 2005 and begin to experience die off now that irrigation was been terminated in the fall of 2004. The site quality index evaluation being conducted is a pilot study for further investigation and refinement. GIS mapping will be produced indicating planting locations and survival with overlays of natural regeneration and the Site Quality Index. It will generate further investigation and improved understanding of plant response to environmental circumstances

Data Handling, Storage, and Dissemination

See section 7 in the Bobcat Flat RM 43 section

Public Involvement and Outreach

See section 8 in the Bobcat Flat RM 43 section.

Work Schedule

The monitoring plan for this project is comprised of four discrete components. Each one is free standing and independent of the others.

As previously discussed, aquatic monitoring scheduling needs to be opportunistic to take advantage of river flow conditions that inundate the floodplain back-water areas. Study will be conducted any season conditions are appropriate.

Avian - May through June in contract years 1 and 3.
Terrestrial – August through September in contract years 1 and 3.
Vegetation – April through October in contract years 1 and 3.
Aquatic – Opportunistic in any year December through May.
Public outreach will be continuous as we interact with our river partners and provide them with updates.

B. Applicability to CALFED Bay-Delta Program ERP Goals, the ERP Draft Stage 1 Implementation Plan, and the CVPIA Priorities

1. ERP and CVPIA Priorities

This project addresses multiple Bay-Delta ERP Goals and CVPIA Priorities listed below in the San Joaquin Region management Zone. The project design and monitoring plan addresses concerns of two “big R” species, (steelhead and splittail) as part of the monitoring plan. Additionally, Tuolumne River hosts a population of naturally spawning fall run Chinook salmon. This project is a previously CBDA funded riparian restoration to restore biotic function. It is the first on the river and the most mature.

ERP Draft Stage 1 Implementation Plan: goals **1**. At risk species **3**. Harvestable Species and **4**. Riparian Habitat.

Ecosystem Restoration Program Priorities for the San Joaquin Region.
SJ-3 Improve rearing and spawning Habitat … for Chinook salmon and steelhead trout and splittail

CVPIA Priorities for the San Joaquin Region 3. Improve rearing and spawning habitat particularly for Chinook salmon, steelhead trout and splittail.

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

There are several active restorations in progress over the length of the Tuolumne, Stanislaus and Merced Rivers. Restoration techniques, approaches, and observations have been widely shared. Grayson River Ranch is an early CBDA project on the Tuolumne River. It is four years ahead of the next comparable project on the river. It has lead the way and provided guidance and

instruction for implementation. The Endangered Species Recovery Program from California State, Stanislaus is one of our monitoring investigators. They will gain good information to add to their knowledge base and pass it on to other partners.

C. Qualifications

Allison Boucher, Co-project Manager
Occupation: Practicing CPA
Focused on habitat and issues and habitat of the Tuolumne since 1992. Has performed the roles of Co-Project Restoration Manager at Bobcat Flat (CBDA funded), Waterford Perc Ponds site, Grayson River Ranch (CBDA funded). Was 1995 FERC Settlement Agreement negotiator/signatory, member of the Tuolumne River Technical Advisory Committee, and the Tuolumne River Coalition, Treasurer, Friends of the Tuolumne, Inc.
Her financial skills will be useful during the project and her past experience in riparian and aquatic habitat make her well suited to surround herself with good people and guide the project through the process.

Dave Boucher, Co-project Manager
Occupation: Medical
Same as above except officer roles. Husband and wife team. President, Friends of the Tuolumne, Inc. Co-project Restoration Manager Stanislaus River gravel infusions 1997 and 1998. Past President and current Treasurer Stanislaus Fly Fishermen. Associate Director, East Stanislaus Resource Conservation District.

Dennis Hood, KDH Environmental Services
Fish and Wildlife Biologist
Mr. Hood has 16 years experience in his field in disciplines including fisheries and aquatic ecology, wildlife biology, and threatened and endangered species management. He has experience in fish and wildlife impact analysis and in developing, implementing, and monitoring of several fishery projects in the California central valley.

Doug Demko, PhD. S.P. Cramer and Associates, Inc.
Fish Biologist
Dr. Demko is has many years of experience on San Joaquin River Tributaries. He operates seining surveys on the Tuolumne River for the Dam operator and is responsible for data analysis, interpretation, and report preparation.

Dr. Jeff Hart, PhD., H.A.R.T. Restoration Team
Botanist and Plant Ecologist
Dr. Hart is well experienced the California Central Valley. He has performed restoration design work and performance monitoring on the Tuolumne River in the past for Friends of the Tuolumne at Grayson River Ranch and Bobcat Flat. He has also performed similar tasks for Turlock Irrigation District projects.

Laurissa Hamilton, Endangered Species Recovery Program
Wildlife Biologist
Ms. Hamilton is an experienced small mammal biologist with extensive experience monitoring small mammals on the San Joaquin River and its tributaries. She has led the mammal monitoring effort in the past at Grayson River Ranch.

Jeanne Hammond, PRBO
Avian Biologist
Ms Hammond is an experienced avian biologist with extensive experience monitoring bird populations of the California Central Valley. She devotes most of her investigations to local riparian habitats. She has led the avian monitoring in the past at Grayson River Ranch.

D. Cost sharing

Bobcat Flat Rivermile 43 Our proposal is linked with other monitoring by the Turlock Irrigation District and Tuolumne River Technical Advisory Committee. We will compile elements of their studies (salmon redds, juvenile seining, etc.) into a comprehensive report for Bobcat Flat Rivermile 43. We will share data from our studies with them for their reports. The California Rivers Restoration Fund (CRRF) is cost sharing on O. *mykiss* and predatory fish monitoring.

Grayson River Ranch Our monitoring is part of a comprehensive study of the San Joaquin River and its tributaries by both PRBO and the Endangered Species Recovery Program. Results from our studies is included in their comprehensive reports as well as distributed to groups and agencies working on the Tuolumne and Merced Rivers.

The fishery monitoring of the created floodplain backwaters will be included in the comprehensive reports by Cramer & Associates with their studies for the Turlock Irrigation District.

E. Compliance with Standard Terms and Conditions

We are willing and able to comply with the terms of standard ERP grant agreements.

G. Literature Cited

Habitat Restoration Plan for the Lower Tuolumne River Corridor prepared for The Tuolumne River Technical Advisory Committee, January 2001

Coarse Sediment Management Plan for the Lower Tuolumne River prepared the Tuolumne River Technical Advisory Committee, Turlock and Modesto

Irrigation Districts, USFWS Anadromous Fish Restoration Program, California Bay-Delta Authority, July 2004

Griggs, T. and Small, S. 2000. Riparian Vegetation White Paper for CALFED. Draft of 27 March 2000. 64 pages. Available from tgriggs@jps.net or small@prbo.org.

RHJV (Riparian Habitat Joint Venture). 2000. Version 1.0. The riparian bird conservation plan: a strategy for reversing the decline of riparian associated birds in California. California Partners in Flight. http://www.prbo.org/CPIF/Riparian/Riparian.html

Small, S. , Nur, N, Black A., Geupel, G. and D. Humple. 2000. Riparian Bird Populations of the Sacramento River System: Results form the 1993 – 1999 Field Season. PRBO unpublished report to The Nature Conservancy and the US Fish and Wildlife Service.

H. Nonprofit Verification

See attached scanned letter from IRS dated October 2000.

Tuolumne River Post Construction Habitat Evaluation

List of Attachments

Locator map

Bobcat Flat RM 43 restoration aerial planform

IRS 501(c)(3) status letter

Grayson River Ranch access permission

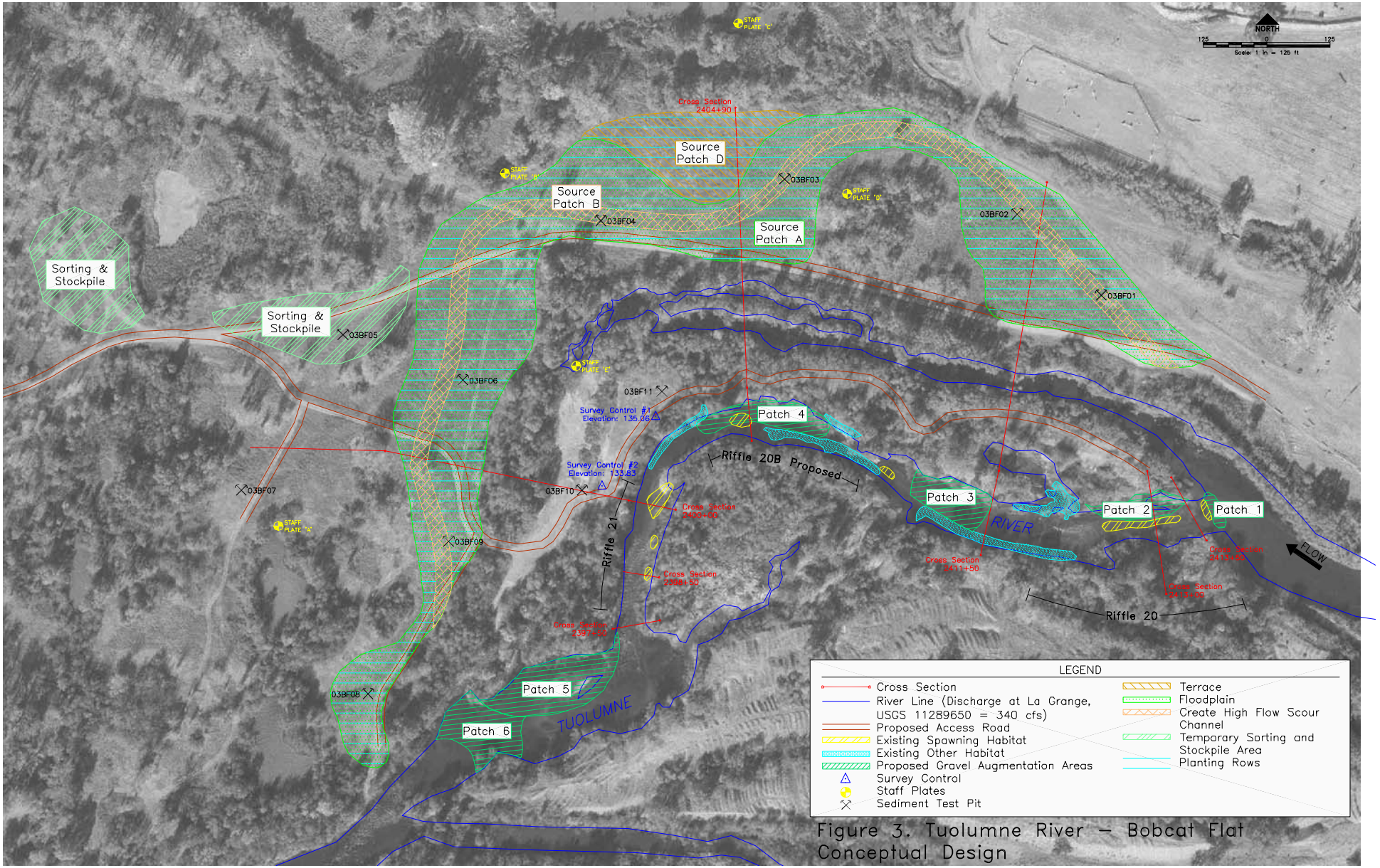
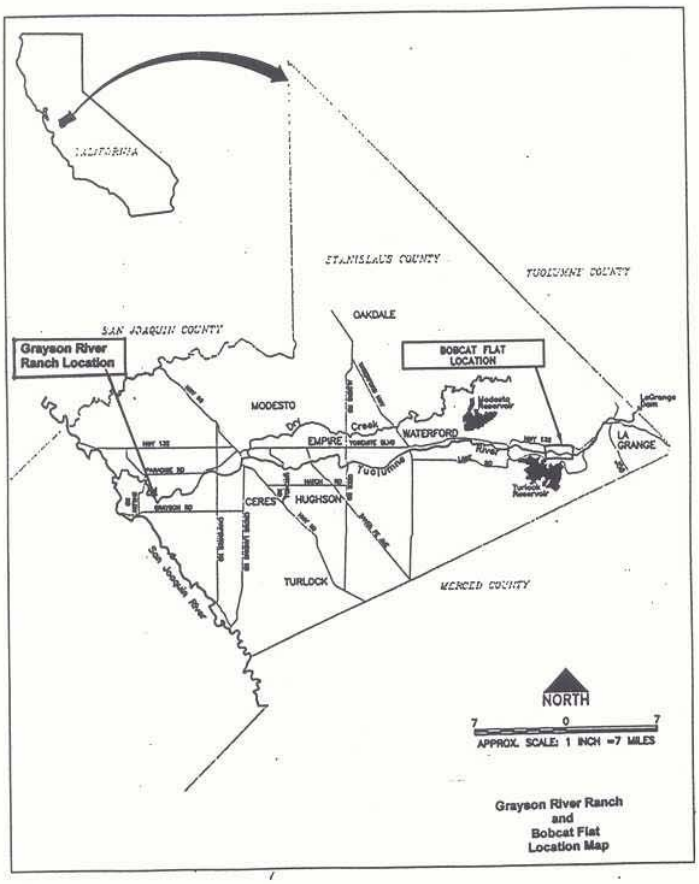


Figure 3. Tuolumne River – Bobcat Flat Conceptual Design



Grayson River Ranch
and
Bobcat Flat
Location Map

INTERNAL REVENUE SERVICE
P. O. BOX 2508
CINCINNATI, OH 45201

DEPARTMENT OF THE TREASURY

Date: OCT 05 2000

Employer Identification Number:
77-0404340
DLN:
17053267710010
Contact Person:
DAVID V SCIAN ID# 31369
Contact Telephone Number:
(877) 829-5500
Our Letter Dated:
October 1996
Addendum Applies:
No

FRIENDS OF THE TUOLUMNE
2412 HILO LANE
CERES, CA 95307

Dear Applicant:

This modifies our letter of the above date in which we stated that you would be treated as an organization that is not a private foundation until the expiration of your advance ruling period.

Your exempt status under section 501(a) of the Internal Revenue Code as an organization described in section 501(c)(3) is still in effect. Based on the information you submitted, we have determined that you are not a private foundation within the meaning of section 509(a) of the Code because you are an organization of the type described in section 509(a)(1) and 170(b)(1)(A)(vi).

Grantors and contributors may rely on this determination unless the Internal Revenue Service publishes notice to the contrary. However, if you lose your section 509(a)(1) status, a grantor or contributor may not rely on this determination if he or she was in part responsible for, or was aware of, the act or failure to act, or the substantial or material change on the part of the organization that resulted in your loss of such status, or if he or she acquired knowledge that the Internal Revenue Service had given notice that you would no longer be classified as a section 509(a)(1) organization.

You are required to make your annual information return, Form 990 or Form 990-EZ, available for public inspection for three years after the later of the due date of the return or the date the return is filed. You are also required to make available for public inspection your exemption application, any supporting documents, and your exemption letter. Copies of these documents are also required to be provided to any individual upon written or in person request without charge other than reasonable fees for copying and postage. You may fulfill this requirement by placing these documents on the Internet. Penalties may be imposed for failure to comply with these requirements. Additional information is available in Publication 557, Tax-Exempt Status for Your Organization, or you may call our toll free number shown above.

If we have indicated in the heading of this letter that an addendum applies, the addendum enclosed is an integral part of this letter.

Letter 1050 (DO/CG)

Because this letter could help resolve any questions about your private foundation status, please keep it in your permanent records.

If you have any questions, please contact the person whose name and telephone number are shown above.

Sincerely yours,

Steven T. Miller

Steven T. Miller
Director, Exempt Organizations

Grayson River Ranch, LLC

5518 Stoddard Road
Modesto, CA 95356-9001
209 545 9702

Grayson River Ranch Access Permission

November 16, 2004

CALFED Bay-Delta Authority
650 Capitol Mall, 5th Floor
Sacramento, CA 95814

Re: Access to Grayson River Ranch

Dear CALFED Bay-Delta Authority:

I have been advised by Dave Boucher of Friends of the Tuolumne that they will be responding to your current monitoring PSP. It is my understanding that for the purpose of conducting the proposed studies, they require my formal permission to travel on my property.

I authorize access to and across my property by them and their consultants for the purpose of monitoring site conditions.

Sincerely,

Paul Van Konynenburg
Managing Member
Grayson River Ranch, LLC

Tuolumne River Post Construction Habitat Evaluation: Signature

The applicant for this proposal must submit this form by printing it, signing below, and faxing it to +1 877-408-9310.

Failure to sign and submit this form will result in the application not being considered for funding.

The individual signing below declares that:

- all representations in this proposal are truthful;
- the individual signing the form is authorized to submit the application on behalf of the applicant (if applicant is an entity or organization);
- the applicant has read and understood the conflict of interest and confidentiality discussion under the Confidentiality and Conflict of Interest Section in the main body of the PSP and waives any and all rights to privacy and confidentiality1 of the proposal on behalf of the applicant, to the extent provided in this PSP; and
- the applicant has read and understood all attachments of this PSP.

Proposal Title: Tuolumne River Post Construction Habitat Evaluation
Proposal Number: 2004.02-0127
Submittor: Boucher, Allison M (aboucher@netfeed.com)

Allison M Boucher — 11/18/04

Applicant Signature **Date**

ALLISON M BOUCHER — FRIENDS OF THE TUOLUMNE, INC.

Printed Name Of Applicant **Applicant Organization**

A. PROJECT DESCRIPTION:

A.1. PROBLEM, GOALS, AND OBJECTIVES

1a. Problem Statement

The Tuolumne River, the largest of the three major tributaries to the San Joaquin River, drains a 1,960-square-mile watershed on the western slope of the Sierra Nevada Range (Figure 1). The lower Tuolumne River corridor, which extends 52.2 miles from La Grange Dam to the San Joaquin River, has been extensively altered by flow regulation and diversion, instream and floodplain gold dredging, instream and floodplain aggregate mining, and agricultural and urban development. These alterations have reduced habitat quantity and quality for native salmonids (Chinook salmon [*Oncorhynchus tschawytscha*] and rainbow trout/steelhead [*O. mykiss*]) and contributed to declines in their populations.

Since 1971, the Turlock and Modesto Irrigation Districts (the Districts), in cooperation with the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS), have conducted extensive studies of Chinook salmon population dynamics and habitat in the lower Tuolumne River. In 1995, through the FERC license amendment process for the Don Pedro Project, the Districts and the City and County of San Francisco (CCSF) entered into a FERC Settlement Agreement (FSA) with the USFWS, CDFG, and several environmental groups. The FSA revised minimum flow requirements for the Tuolumne River downstream of the Don Pedro Project and set forth a strategy for recovery of the lower Tuolumne River Chinook salmon population. Using adaptive management, the FSA goals are to: (1) increase the abundance of wild Chinook salmon in the Tuolumne River, (2) protect remaining genetic characteristics unique to the Tuolumne River Chinook salmon population, and (3) improve salmon habitat in the Tuolumne River.

While Chinook salmon have been the subject of many years of study in the Tuolumne River, rainbow trout/steelhead have received much less attention (though they have been recorded as incidental species in seining and snorkel surveys). With the 1998 listing of the Central Valley steelhead ESU as threatened under the federal Endangered Species Act, fisheries agencies have increased their focus on this species in the Tuolumne River. With input from the TRTAC Monitoring Subcommittee, the TRTAC recently expanded their monitoring of *O. mykiss* distribution in the river. The TRTAC also revised its Coarse Sediment Management Plan (McBain and Trush 2004) to more specifically address *O. mykiss* protection and habitat needs. (Because it is not possible to determine whether a juvenile of this species will mature into a resident rainbow trout or an anadromous steelhead, both life history strategies are collectively referred to as "*O. mykiss*" in this proposal.)

To achieve the FSA and broader restoration goals, the Tuolumne River Technical Advisory Committee (TRTAC) developed a comprehensive, process-based *Habitat Restoration Plan for the Lower Tuolumne River Corridor* (McBain and Trush 2000) that integrates fluvial geomorphic processes as a foundation for overall ecosystem recovery to support salmonid populations. Several high priority projects identified in the Restoration Plan are being implemented with funding from the California Bay-Delta Authority (CBDA), Anadromous Fish Restoration Program (AFRP), the CDWR Delta Fish Protection Agreement, and other sources. These projects span the 25 miles of gravel-bedded river, and are being constructed at a cost of tens of millions of dollars. With their sheer size and cost, these projects require thoughtful design, experimentation, and adaptive management to maximize their benefits both to the river and to restoration science.

The long-term biological research and monitoring data available for this river, combined with the geomorphic studies conducted for the Restoration Plan, provide a solid foundation for hypothesis development, adaptive management, and learning. Effective adaptive management, however, requires long-term monitoring designs that have the capacity to detect change and identify causal linkages in a highly variable environment. The Adaptive Management Forum, in their review of Tuolumne

River restoration projects, emphasized the need for long-term monitoring, as well as for integration of monitoring across spatial scales (i.e., from site-specific to river-wide) (AMF 2001). Tuolumne River project proponents have attempted to develop and implement comprehensive, hypothesis-driven monitoring plans for each restoration project, and initial monitoring has been conducted for several projects for which construction is complete. Short-duration funding cycles for the restoration grants, however, limit the duration of post-construction project monitoring to as little as one year. This short duration of monitoring is usually sufficient to document pre-project conditions and make some initial post-project evaluations. The need to have more experimental elements in the remaining designs will require longer term funding for monitoring to continue well after the projects are constructed. Moreover, interpretation of restoration effects across spatial scales requires monitoring across spatial scales. In the past, site-specific project monitoring has been included in restoration grants (usually funded by CBDA, AFRP, or the CDWR Delta Fish Protection Agreement), while river-wide monitoring was funded by Districts and CCSF (through the FSA) and CDFG. With the expiration of the FSA in 2005, these river-wide monitoring funds have been fully expended and are no longer available. Also, CDFG funding for surveys that they have traditionally conducted (carcass surveys, redd counts, and screw trap monitoring) apparently may not be available in 2005 or thereafter.

This proposal seeks to support adaptive management of the lower Tuolumne River Restoration Program and of these restoration projects by: (1) extending existing site-specific project monitoring for constructed projects and projects near construction; (2) augmenting existing monitoring to include additional metrics; and (3) continuing funding for long-term river-wide monitoring that previously was supported by other sources.

1b. Funded Restoration Projects Included in This Proposal

Projects for which monitoring is included in this proposal are: (1) Gravel Mining Reach Restoration (Phases I and II), (2) Special Run Pool 9 and 10 Restoration, (3) Fine Sediment Management, and (4) Coarse Sediment Management (Phases I through III) (including coarse sediment augmentation at the Friends of the Tuolumne [FOT] Bobcat Flat site). The locations of these projects are shown in Figure 2. Funding and implementation status for each project is provided in Tables 1 through 4. These projects are described in more detail below.

One additional proposal is being submitted to the CBDA ERP program (in this funding round) and another is being prepared for submittal to the CBDA Science Program in January 2005 that complements this proposal. Friends of the Tuolumne is submitting a separate proposal for post-project monitoring at the Bobcat Flat and Grayson River Ranch restoration sites. Monitoring proposed by FOT at these sites will supplement tasks presented in this proposal. FOT and TID will coordinate monitoring implementation and will share data to ensure that monitoring is efficient and that data gathered at all project sites are compatible. Stillwater Sciences and Turlock Irrigation District are preparing a separate proposal for submittal to the CBDA Science Program to study river-wide predator ecology related to the SRPs 9 and 10 projects and potential future channel reconstruction projects. Linkages to these separate proposals are identified in the following sections.

Gravel Mining Reach Restoration Project: The Gravel Mining Reach Restoration Project extends from RM 40.3 (near Roberts Ferry Bridge) to RM 34.4 (the Reed gravel operation) (Figure 2). Due to its length, the project is being implemented in four phases: the 7-11 Reach (RM 37.7 to 40.3), M.J. Ruddy Reach (RM 36.6 to 37.7), Warner-Deardorff Reach (RM 35.2 to 36.6), and Reed Reach (RM 34.3 to 35.2) (Figure 3). The project will reconstruct an appropriately scaled channel and floodplain through a reach that is currently heavily impacted by in-channel and floodplain aggregate mining. Project objectives are to:

- restore floodway width to convey floods of at least 15,000 cfs;
- improve salmonid spawning and rearing habitat by restoring an alternate bar (pool-riffle) morphology within a meandering channel;
- reduce salmon mortality and geomorphic impacts that occur when berms separating floodplain mining pits from the river breach;
- restore native riparian communities on appropriate geomorphic surfaces within the restored floodway; and
- decrease risk of flood damage to aggregate extraction operations, bridges, and other human structures.

Phase I, the 7/11 Reach, was completed in 2003. Phase II, the M.J. Ruddy Reach, will begin construction in 2005. The conceptual design for Phase I is shown in Figure 4. Pre- and post-construction aerial photographs of the 7/11 Reach are shown in Figure 5. Additional detail for the Gravel Mining Reach Project is provided in *Tuolumne River Floodway Restoration: Project Design Approach and Rationale* (McBain and Trush 2004).

Special Run Pools 9 and 10 Restoration Project: Special Run Pools (SRPs) 9 and10 extend from RM 25.9 to RM 25.0 (Figure 2). The SRP 9 and 10 pits, which were created by in-channel aggregate mining in the 1930s through the 1970s, are up to 400 feet wide and 36 feet deep,. Past studies of Chinook salmon population dynamics and outmigrant survival concluded that predation by non-native predatory bass species in these and other SRP reaches is a significant factor limiting Chinook salmon production in this river, particularly during drier years (TID/MID Engineering 1992). Project objectives are to:

- reduce/eliminate habitat favored by predatory bass species and replace it with riverine habitat suitable for Chinook salmon;
- construct a channel and floodplain that is scaled to contemporary and future sediment and flow regimes;
- restore sediment transport continuity through the reach; and
- revegetate reconstructed floodplains with native woody riparian species.

Conceptual designs for both phases are shown in Figure 6. The SRP 9 project was completed in 2002. Pre- and post-construction aerial photographs of the SRP 9 are shown in Figure 7. Immediately prior to construction, budget constraints required substantial modification of the project design. To reduce the volume of fill needed for construction, the elevation of the constructed floodplain at SRP 9 was lowered by 1 to 2 feet, resulting in a design bankfull channel capacity of 1,500 cfs (compared to the initial bankfull design capacity of 5,000 cfs). This modification is expected to increase benefits to juvenile Chinook salmon by increasing the duration of access to productive floodplain rearing areas from January through June from an average of 18 days/year for the 5,000 cfs floodplain to 59 days for the 1,500 cfs floodplain and may shift riparian vegetation species composition toward species that are more tolerant of prolonged inundation. Additional detail for the SRPs 9 and 10 projects, including modifications to the SRP 9 project design, are provided in *Tuolumne River Floodway Restoration: Project Design Approach and Rationale* (McBain and Trush 2004).

Coarse Sediment Augmentation Projects: The Tuolumne River Coarse Sediment Management Plan (CSMP) was completed in July 2004 (McBain and Trush 2004). The CSMP recommends adding more than 500,000 yd^3 of coarse sediment to the river at 29 locations extending from RM 51.5 (near La Grange) to the upstream end of the 7/11 Project (Roberts Ferry Bridge, RM 39.5). Several methods for placing coarse sediment in the river are included in the conceptual designs for augmentation projects,

and the CSMP outlines adaptive management experiments that in should be conducted to compare the costs, effects, and efficacy of each approach in meeting project objectives. Objectives are to:

- restore coarse sediment supply to the gravel-bedded reach downstream of La Grange Dam in a manner that protects existing habitat values for both salmon and *O. mykiss*;
- create immediately usable spawning habitat for both Chinook salmon and *O. mykiss* to supplement existing degraded habitat and/or create new habitat where none currently exists*; and*
- restore coarse sediment routing, reduce bed mobility thresholds, and initiate formation of active alluvial bars and riffles.

Coarse sediment augmentation projects are being implemented by CDFG (at several sites near La Grange), FOT (at Bobcat Flat [RM 43]), and TID (from La Grange Dam to Roberts Ferry Bridge). Augmentation locations are shown in Figure 2. From 1999 through 2003, CDFG added more than 20,000yd^3 of coarse sediment at several sites near La Grange. In 2005, FOT and TID will place up to 15,000 yd^3 of coarse sediment at the Bobcat Flat site (RM 43). In 2006, TID expects to begin implementing the Tuolumne River Sediment Transfusion Project (Phase III of the CSMP), which will add at least 140,000 yd^3 of coarse sediment to the river. The Tuolumne River Sediment Transfusion Project has been funded by the CBDA and is currently under amendment review for a change in scope regarding the source of aggregate for the project.

Fine Sediment Management: The Tuolumne River Fine Sediment Management Plan includes four major components: (1) identifying fine sediment sources to the Tuolumne River, (2) reducing sediment supply to the river from Gasburg Creek, (3) conducting field experiments to evaluate the relationship between Chinook salmon survival-to-emergence and substrate permeability, and (4) experimental riffle cleaning project (planned for summer 2005). Stillwater Sciences has completed the sediment source analysis (Stillwater Sciences 2004). Work on Gasburg Creek will include expansion of an existing wetland to function as an interim sedimentation basin and restoration of the creek channel and floodway where it currently flows through a recently abandoned sand mine. Work is expected to begin in 2005. Riffle cleaning is also expected to be implemented in 2005. Fine sediment management objectives are to:

- Reduce fine sediment and sand yield from Gasburg Creek to the mainstem Tuolumne River;
- Increase salmonid survival-to emergence in the mainstem river.
- Reduce the volume of sand currently stored in the Tuolumne River channel bed and thus increase salmonid survival-to emergence; and
- Quantify the relationship between substrate permeability and Chinook salmon survival-to-emergence.

1c. Goals and Objectives

The overarching goal of the TRTAC restoration program is to re-establish fluvial geomorphic functions, processes, and characteristics within contemporary flow and sediment conditions and, thus, promote the recovery and maintenance of a resilient, wild Chinook salmon population and native plant and animal communities. Because flow regulation will continue into the future, this goal targets a scaled-down version of the former river, but one in which dynamic fluvial processes (sediment transport and scour, floodplain inundation, channel migration) maintain the habitat characteristics favored by salmonids and other native fish and wildlife. Several projects identified in the restoration plan are in various stages of implementation. These projects and the objectives of each are described in Section 1b. Due to short funding cycles, monitoring funds for many of these projects extend only one to two years following construction, which is not adequate to assess project effectiveness. Moreover, river-wide monitoring,

which provides a longer-term and larger spatial context for interpreting site-specific monitoring results, is no longer funded. (In the past, this monitoring has been funded by the FSA and CDFG.)

The goal of this proposal is to ensure that adequate project-specific and river-wide monitoring is in place to: (1) assess the effectiveness of restoration projects that have been constructed or are near construction in the Tuolumne River across a range of spatial scales (from site-specific to river-wide); (2) evaluate ecosystem cumulative response to numerous restoration projects; and (3) provide monitoring data that is comparable to data from similar projects in other watersheds (such as the Merced River and Clear Creek). Proposal objectives are to:

- Extend existing post-project monitoring at constructed sites for three years;
- Augment monitoring for funded projects to collect additional baseline and post-project data needed to evaluate project effectiveness;
- Extend existing river-wide monitoring of Chinook salmon and *O. mykiss* populations.

A.2 JUSTIFICATION

2a. Conceptual Models

The Habitat Restoration Plan for the Lower Tuolumne River (McBain and Trush 2000) identifies 10 "Attributes of Alluvial River Integrity." The *Attributes* are: (1) spatially complex channel morphology; (2) variable yet predictable streamflow patterns; (3) frequently mobilized channel bed surface; (4) periodic channel scour and fill; (5) fine and course sediment supply in balance with long-term transport rates; (6) periodic channel migration and/or avulsion; (7) a functional floodplain; (8) infrequent channel resetting floods; (9) self-sustaining, diverse riparian corridor; and (10) naturally fluctuating groundwater table. Based on the *Attributes* and our current understanding of alluvial rivers, one can describe the linkages between **physical inputs** (e.g., sunlight, streamflow, sediment), **physical processes** (e.g., sediment transport, bank erosion, fine sediment deposition), **habitat structure** (e.g., shallow-gradient riffles, well-sorted and clean spawning gravels) and **biological responses** (e.g., healthy incubation, low density-dependent mortality) (Figure 8). These *Attributes* and the simple conceptual model shon in Figure 8 are the foundation of the conceptual models described below.

In June 2001, the UC Davis Center for the Environment and AFRP sponsored an Adaptive Management Forum to review the science behind the large-scale restoration projects on the Tuolumne River. The TRTAC Monitoring Subcommittee, with assistance and peer review by panel members from the Adaptive Management Forum, developed several interconnected conceptual models depicting our current understanding of (1) the effects of flow regulation and mining on geomorphic processes, habitat structure, and salmonid abundance in the river, (2) the river's Chinook salmon population dynamics, and (3) effects individual restoration actions on geomorphic processes, habitat structure, and salmonid abundance These conceptual models are presented in the report *AFRP / CALFED Adaptive Management Forum: Tuolumne River Restoration Summary Report* (Stillwater Sciences 2001). Models relevant to this proposal are described below.

Model G-1. Effects of dams and mining on geomorphic inputs and processes, habitat structure, and population response (Figure 9). This model illustrates linkages between physical inputs, geomorphic processes, habitat structure, and salmonid abundance and the effects of dams and mining on these linkages. In this model, dams alter seasonal flow patterns in the lower river, reduce peak flow magnitude, reduce fine sediment supply, and eliminate coarse sediment supply. Aggregate mining and gold dredging further reduce coarse sediment supply to the river by removing stored sediment from the channel and floodplain and by trapping coarse sediment that is in transport. These reductions in flow and sediment supply reduce sediment transport, channel migration and avulsion, recruitment of large wood, and floodplain inundation and result in channel incision, bed armoring, channel narrowing

(through riparian vegetation encroachment), and abandonment of pre-dam floodplains. In-channel mining also creates large, lake-like pits in the river channel. These alterations reduce habitat quality for salmonid spawning, incubation, rearing, and outmigration. In addition, reductions in flow magnitude and alteration of seasonal flow patterns potentially affect salmonid run timing and emigration timing, as well as incubation, rearing, and outmigrant survival.

Model G-2. Fine sediment supply and storage in the Tuolumne River and effects in Chinook salmon survival (Figure 10). This model illustrates sources and storage of fine sediment in the Tuolumne River and the effects of fine sediment on Chinook salmon survival. In this model, fine sediment is supplied to the spawning reach primarily by Gasburg Creek and erosion from the New Don Pedro Dam spillway that occurred during the 1997 flood. Average annual yield of fine sediment (< 2mm) from Gasburg Creek to the river is estimated to be 1,440 t/yr (Stillwater Sciences 2004). Gasburg Creek is the first significant tributary to the mainstem Tuolumne River below La Grange Dam, but several smaller tributaries also contribute fine sediment to the river. Based on reconnaissance-level field surveys, Stillwater Sciences (2004) concluded that Mill Gulch, Indian Hill Gulch, Gauging Station Gulch, and Morgan Gulch, combined with failure and erosion of canal embankments, contribute about the same amount of fine sediment to the Tuolumne River as Gasburg Creek. More study of these basins is required to compare their absolute or relative fine sediment yield to the river. Fine sediment yield from Lower Dominici Creek, which in the past was considered to be a potentially significant source of fine sediment to the river, appears to be minor (McBain and Trush 2004). Combined with reduced sediment transport capacity caused by flow regulation, this increase in fine sediment supply has resulted in increased storage of fine sediment in riffles and possibly in pools. The sand stored in pools can be mobilized during high flows, thus increasing supply. The increase in the volume of sand stored in riffles results in reduced permeability in spawning substrates and a concomitant reduction in salmon survival-to-emergence.

Model S-1. Factors affecting Chinook salmon population abundance in the Tuolumne River (Figure 11). This conceptual model depicts the factors affecting each Chinook salmon life history stage, within and outside of the Tuolumne River basin. Within the basin, research and monitoring have identified three primary factors that limit Chinook salmon population abundance: (1) redd superimposition; (2) low survival-to-emergence resulting from low substrate permeability; and (3) low outmigrant survival resulting from spring flow conditions, predation by largemouth bass, and water temperature. Other factors could also affect Chinook salmon population abundance, but these are not considered to be limiting. Of the limiting factors identified, redd superimposition is the only density-dependent mortality factor. The superimposition model developed by Stillwater Sciences from field studies on the Tuolumne River supports the hypothesis that superimposition and delayed fry emergence is a key factor driving the stock-recruitment curves developed from empirical observations in the Tuolumne River (TID/MID 1997, Report 96-6). Numerous factors outside the Tuolumne River watershed also affect the numbers of Chinook salmon returning to the Tuolumne to spawn. Such factors include (but are not limited to) Delta exports, ocean harvest, ocean conditions, and predation and water quality in the Delta.

Model P-1. Effects of the Special Run-Pools (SRPs) 9 and 10 Projects on geomorphic process, riparian vegetation, and Chinook salmon survival (Figure 12). Past studies of Tuolumne River Chinook salmon population dynamics identified predation by largemouth bass as a major factor limiting outmigrant survival (and thus recruitment) in the Tuolumne River, particularly during drier years (TID/MID 1992). Largemouth bass prefer deep, low velocity, warm-water habitats with abundant cover. In this model, replacing the large, deep SRP pit with a shallower, narrower channel reduces habitat suitability for adult largemouth bass and, thus, reduces adult bass carrying capacity (and adult bass abundance) and predation pressure on outmigrating salmon at the site. During high flows (>1,400 cfs), reconstructed

floodplains provide rearing areas and outmigration routes that are reduce juvenile salmon interactions with adult largemouth bass. The reconstructed floodplain also provides a surface for colonization by riparian vegetation. (Note that the project also includes initial planting and maintenance of riparian vegetation.)

Model P-2. Effects of the Gravel Mining Reach Project on geomorphic processes, riparian vegetation, and Chinook salmon survival (Figure 13). In this model, reconstructing a channel and floodplain that are scaled to contemporary flow conditions, combined with planting native riparian vegetation on the reconstructed floodplain and maintaining coarse sediment supply, improves in-channel and floodplain geomorphic and riparian processes and improves Chinook salmon spawning and rearing habitat. Constructing an appropriately scaled channel and maintaining coarse sediment supply balances sediment transport capacity with sediment supply, thus providing a channel and floodplain that functions under contemporary, regulated flow conditions. By providing conditions that allow the channel to construct bars and riffles, the project improves salmon spawning, incubation, and rearing habitats. In addition, by reducing floodplain elevation, increasing floodplain width, and creating high flow channels on the floodplain, the project reduces flow velocities during floods and provides refugia for rearing salmon.

Model P-3. Effects of flow and coarse sediment management on aquatic and riparian habitat (Figure 14). This model depicts the anticipated effects of flow management and gravel augmentation on in-channel, floodplain, and riparian habitats and on Chinook salmon survival. In this model, increased spring high flows recharge shallow groundwater tables, deposit sand and fine sediment on floodplains, and scour and deposit coarse sediment in the channel. At the same time, adding gravel to the spawning reach increases coarse sediment supply. The combined effects of increased flow and increased sediment supply include prevention of riparian vegetation encroachment into the active channel, reconnection of floodplains to the channel, reinitiation of riparian vegetation recruitment and successional processes, and creation of active alluvial bars and riffles. In addition, increased spring flows reduce water temperature and, under some conditions, could increase salmon outmigrant survival. Increased spawning habitat area reduces redd superimposition, and reduced storage of sand and fine sediment in the channel bed improves incubation conditions. Both of these factors increase salmon survival-to-emergence.

Model P-4. Effects of fine sediment management on substrate conditions and Chinook salmon survival (Figure 15). This model depicts the anticipated effects of the fine sediment management project on spawning substrate conditions and salmon survival-to-emergence. The Gasburg Creek restoration project reduces fine sediment supply to the Tuolumne River by: (1) enlarging an existing wetland to function as an interim sedimentation basin to capture sediment delivered from the upper Gasburg Creek watershed, and (2) implementing watershed management actions to reduce fine sediment supply. Downstream of the At the same time, riffle cleaning reduces sand and fine sediment storage in riffles. Potential methods of riffle cleaning were evaluated from existing data and literature and are reported in McBain and Trush (2004). By reducing sand and fine sediment storage in riffles, riffle cleaning increases spawning substrate permeability, thus increasing salmon survival-to-emergence. Increased permeability is maintained by reducing sand supply to the spawning reach from Gasburg Creek and other tributary sources.

A.3 PREVIOUSLY FUNDED MONITORING

The Habitat Restoration Plan for the Tuolumne River Corridor (McBain and Trush 2000) recommends a two-tiered monitoring strategy for the river: (1) project-specific monitoring to assess the effectiveness of individual restoration projects in meeting specific objectives, and (2) river-wide monitoring that addresses overall goals of the Restoration Plan, as well as the cumulative effects of the individual restoration projects.

Project-specific Monitoring

Project-specific monitoring has been developed and partially implemented for the Gravel Mining Reach, SRPs 9 and 10, Coarse Sediment Augmentation (including augmentation at Bobcat Flat and CDFG projects at La Grange), and Fine Sediment Management. Monitoring hypotheses, metrics, and methods are described in Table 5. Monitoring funding and implementation status for each project is shown in Tables 1 through 4.

River-wide Monitoring

In the past, long-term river-wide monitoring of Chinook salmon population trends in the Tuolumne River was funded by the FSA and CDFG. The FSA allocated and expended $1,335,000 for salmonid monitoring in the Tuolumne River. The FSA program included trend monitoring of adult Chinook salmon escapement, distribution, and timing; spawning and incubation habitat quality (with regard to substrate composition); fry and juvenile abundance, distribution, and stranding; outmigrant survival, abundance, and timing, and water temperature and quality. The FSA will expire in 2005, and its funds are now fully expended. No additional monitoring funds are available through this program.

Funds for these river-wide monitoring programs are no longer available through the FSA. Over the past several years (or decades in some cases), CDFG has conducted Chinook salmon escapement surveys and redd counts and has operated rotary screw traps deployed at the mouth of the river. CDFG funding to continue these efforts in 2005 and beyond is not secure, and CDFG cannot commit to continuation of these monitoring efforts. With the potential loss of CDFG funds and the expiration of the FSA, no funds have been identified to continue this river-wide trend monitoring. Streamflow is monitored at La Grange and Modesto by the U.S. Geological Survey.

A.4 APPROACH AND SCOPE OF WORK

Tasks included in the Scope of Work are listed below and are described in more detail in Table 5. The majority of the monitoring included in this proposal has been implemented by the TRTAC, their consultants, and CDFG over the past several years. In these cases, this proposal would simply extend the duration of ongoing monitoring. This proposal includes continuing existing, long-term river-wide trend monitoring that previously was funded by CBDA or AFRP. No new trend monitoring is proposed. Tasks not included in previous CBDA- or AFRP-funded monitoring are indicated by an asterisk (*). Contractors or agencies expected to conduct each task are indicated in [brackets] following each task description.

Task 1. Project Management

TID, with support from their contractors, will provide all technical and administrative services associated with performing and completing the work for this project and will provide quarterly progress reports, invoices, and scheduled deliverables as indicated.

Task Deliverables: Quarterly progress reports, invoices, and subcontract documentation.

Task 2. Public Participation

2A. Coordinate with TRTAC, TRTAC Monitoring Subcommitee, and Lower Tuolumne River Coalition:

Public outreach and involvement for the Tuolumne River monitoring will occur through three venues: (1) coordination and updates through existing forums, (2) development and distribution of user-friendly, graphically rich “brochures”, and (3) presentation of findings at least one CBDA Science Conference. TID and their consultants will continue to participate in the TRTAC, the TRTAC Monitoring Subcommittee, and the Tuolumne River Coalition. TID currently participates in and coordinates activities of TRTAC, which has overseen monitoring design and implementation in the lower Tuolumne River for nearly ten years and provides a forum for input from agencies

(NOAA, CDFG, USFWS), environmental groups (California Rivers Restoration Fund, Friends of the Tuolumne, Tuolumne River Preservation Trust), and the Districts (CCSF, TID, and MID). TID will continue to collaborate with TRTAC and TRTAC Monitoring Subcommittee on all project-specific and river-wide monitoring included in this proposal. TID also participates in the Tuolumne River Coalition (www.tuolumnerivercoalition.org), which brings together 25 agencies and organizations to integrate existing plans, increase public awareness, and obtain financial support for projects that benefit the Tuolumne River. The Coalition includes city and county agencies, water districts, local non–governmental organizations, as well as state and federal agencies. TID is a member of the Coalition and will use Coalition meetings and publications as opportunities to provide updates on Tuolumne River monitoring. [TID, McBain and Trush, Stillwater Sciences]

2B. Produce and Distribute Interpretive Brochures for the Restoration Projects and Monitoring: To provide user-friendly information about the restoration projects, ongoing monitoring, and adaptive management on the Tuolumne River, TID or their consultant will develop an 11"x17" 4-page brochure for each restoration project that explains the project, project monitoring activities, and the river-wide context for each project and summarizes monitoring results. The brochures will be concise, easily reproducible, graphically rich, and directed to a general public audience. Brochures will be provided to CALFED (hard copies and web-ready electronic versions) and distributed through existing forums. Electronic versions will be posted on the TID website and will be made available for posting on other stakeholder websites. [McBain and Trush]

2C. Present findings at CALFED Science Conference and Prepare Manuscript(s) for Publication: TID and the investigators included in the proposed monitoring will make at least one presentation at at least one CBDA Science Conference. In addition to methods and findings, the presentation(s) will include lessons learned and recommendations for future similar restoration projects and monitoring programs. To support broad dissemination of scientific information and collaboration among restoration scientists, TID and their consultants will also endeavor to publish monitoring results for each restoration project listed in Section 1b of this proposal in an appropriate peer-reviewed journal. Tentative publication topics include: efficacy of constructing "scaled down" rivers as restoration, effects of channel reconstruction on predator populations and Chinook salmon predation mortality, and effects of coarse sediment augmentation of geomorphic processes, channel form, and salmonid habitat. [McBain and Trush, Stillwater Sciences]

Task Deliverables: Quarterly progress reports, meeting summaries and minutes of the TRTAC, TRTAC Monitoring Subcommittee, and Tuolumne River Coalition meetings; one hard copy and one electronic copy of an interpretive brochure for each restoration project and related monitoring; presentation(s) at least one CBDA Science Conference; up to three manuscripts submitted to peer-reviewed journals.

Task 3 . 7/11, M.J. Ruddy, and SRP 9 Project Monitoring

Monitoring would include the following tasks:

3A. Resurvey cross sections and a longitudinal profiles: Resurvey 7 to 9 cross sections and a longitudinal profile through each project site after each of two high flow events exceeding 4,500 cfs. [McBain and Trush]

3B. Deploy and maintain tracer rocks: Deploy and maintain tracer rocks on approximately six cross sections at each of the 7/11 and M.J. Ruddy sites. (No tracer rocks would be deployed at SRP 9 because the channel slope at that site is too low to support coarse sediment transport.) Rocks would be checked and replaced after each flow exceeding 4,500 cfs. Budget allows at least three tracer rock deployments at each site. [McBain and Trush]

3C. *Map channel migration and other planform changes: Obtain and orthorectify aerial photographs after one flow exceeding 9,000 cfs or if noticeable changes in channel location occur. Aerial photographs will be true color, stereo pairs, and at suitable resolution for printing and interpretation at a scale of 1:6,000 or larger. [McBain and Trush]

3D. *Monitor peak flow water surface elevations (crest gauges): Establish and maintain crest gauges at a subset of channel cross sections to monitor peak flow water surface elevation. Maintain each gauge after each flow exceeding 4,500 cfs. These data will be used to test actual channel capacity relative to design capacity and calibrate the hydraulic model developed for the project. [McBain and Trush]

3E. *Continuous water surface elevation recording gauge: Establish and maintain one continuously recording stage gauge at one cross section within the each project site. [McBain and Trush]

3F. Monitor survival, percent cover, and growth of planted riparian vegetation: Continue monitoring survival, percent cover, and growth of planted riparian vegetation through post-project year 5 (i.e., 2008). [McBain and Trush]

3G. *Monitor natural riparian vegetation recruitment and establishment on reconstructed floodplain surfaces*:* Conduct annual plot-based monitoring of natural riparian vegetation recruitment and establishment on the reconstructed floodplains for three years. [McBain and Trush]

3H. *Map Chinook salmon spawning location and habitat characteristics at spawning sites: Conduct biweekly surveys to document Chinook salmon spawning and habitat characteristics of spawning sites in the reconstructed reach from approximately November 1 through December 31 each year. Redds would be mapped onto orthorectified aerial photographs and given unique identifying codes. At each redd, habitat characteristics, including flow depth and velocity, would be recorded at the head of each redd. [Stillwater Sciences]

3I. *Conduct seine surveys to assess juvenile distribution, abundance, and size: Add one location within the each reconstructed site in conjunction with the river-wide seining surveys (budget for this task is included in Task 6). [Stillwater Sciences]

3J. * Monitor groundwater wells on reconstructed floodplains: Install and monitor five groundwater wells on reconstructed floodplains within each site. [McBain and Trush]

3K. *Monitor riparian nesting species composition, abundance of selected species, and associations with vegetation structure: Conduct repeat point count bird surveys and associated riparian vegetation relevée surveys during the breeding season (May and June) on at least one restored floodplain location at each project site and at least two control sites (i.e., one "natural" riparian forest and one unrestored site) for three years. Methods will be consistent with similar monitoring being conducted by Pt. Reyes Bird Observatory Conservation Science on several Central Valley rivers and streams, including the San Joaquin River, Tuolumne River (Grayson River Ranch), Sacramento River, and Clear Creek. [McBain and Trush]

3L. Report Preparation and distribution: At the end of the funded monitoring period, prepare and distribute a draft and final report presenting monitoring methods and results for each site, including synthesis of previous project monitoring methods and results (if available), as well as past and on-going reach-scale and river-wide monitoring results. [McBain and Trush]

Task Deliverables: Quarterly progress reports, orthorectified aerial photographs, one draft and one final monitoring report that describes each project, monitoring methods, and monitoring results; synthesizes data from previous monitoring (if applicable); synthesizes results across spatial scales (i.e., project site to river-wide); updates conceptual models based on monitoring results, and provides recommendations for adaptive management of these projects and design and monitoring of future similar projects. Technical data collected as part of the monitoring (e.g., cross section surveys, flow stage) will be included in appendices to the monitoring report.

Task 4. Fine Sediment Management Monitoring

4A. Quantify annual sediment accumulation in the interim sedimentation basin: Extend interim sedimentation basin monitoring to include two additional total station surveys of sediment accumulation. [McBain and Trush]

4B. Monitor channel stability and riparian vegetation establishment in the Gasburg Creek restoration site: Extend monitoring of the reconstructed Gasburg Creek channel (repeat cross section and profile surveys) and planted riparian vegetation (survival and percent cover by species) for three years. One year of this survey is funded under the existing Fine Sediment Management Plan, and this task will extend surveys to 2007 and 2008. [McBain and Trush]

4C. *Quantify fine sediment contribution to the river from tributaries and prioritize future fine sediment management actions: Measure suspended sediment transport rates during consistent storm event (synoptic) in tributaries identified through field surveys (McBain and Trush 2004) as the largest potential contributors of fine sediment to the river. Based on fine sediment loading, identify and prioritize future fine sediment management needs and locations. [McBain and Trush]

4D. *Monitor benthic macroinvertebrate composition, abundance, biomass and diversity in the gravel-bedded reach: Monitor benthic macroinvertebrate composition, abundance, biomass and diversity indices using the California Stream Bioassessment Procedure (CDFG 1999) at five sites (three Hess samples each) in the gravel-bedded reach. Sample locations will be selected from cleaned riffles and untreated sites using staircase design (Walter et al. 1998). [Stillwater Sciences]

4E. Quantify Chinook salmon spawning habitat selection and redd superimposition. Conduct biweekly, detailed Chinook salmon redd mapping at riffle treatment sites (riffle cleaning sites and augmentation sites including CDFG sites, Bobcat Flat RM 43, and Phase III Sediment Transfusion sites) and control sites throughout the spawning reach to compare spawner utilization of treatment sites to similar "natural" riffles, utilization of different cleaning and augmentation methods/ designs, and redd superimposition rates between riffles and years (i.e., within increasing numbers of augmentation projects constructed). Mark each redd and measure mound length, mound width, pit depth, pit length, pit depth and length of tail spill using previously established methods (TID/ MID 1992), and measure flow depth and velocity at a subset of redds during each survey. This task uses a staircase design (Walters et al. 1988) modification to the "before-after-control-impact" (BACI) approach (Stewart-Oaten et al. 1986) at six riffle habitat sites in the lower Tuolumne River. [Stillwater Sciences]

4F. Report Preparation and distribution: At the end of the funded monitoring period, prepare and distribute the following draft and final reports: (1) Gasburg Creek Monitoring Report (Tasks 4A and 4B), (2) Tributary Suspended Sediment Monitoring and Management Recommendations (Task 4C), and (3) Riffle Cleaning Report (Tasks 4D, 4E, 5E, 6D, and 6E). All reports will include synthesis of previous project monitoring methods and results (if available), as well as past and on-going reach-scale and river-wide monitoring results. [McBain and Trush, Stillwater Sciences]

Task Deliverables: Quarterly progress reports; one draft and one final report describing the Gasburg Creek project, monitoring methods, conclusions, and recommendations for future actions in the Gasburg Creek watershed (if needed); one draft and one final report describing locations, methods, and results of suspended sediment monitoring and providing recommendations for locations, methods, and priority of future tributary fine sediment reduction actions; one draft and one final report describing locations, methods, and results of benthic macroinvertebrate monitoring, comparing the results of this monitoring with previous macroinvertebrate monitoring on the Tuolumne River, and providing recommendations for future riffle cleaning and coarse sediment augmentation implementation.

Task 5. Coarse Sediment Augmentation Project Monitoring: Tuolumne River Sediment Transfusion Project, CDFG Sediment Augmentation Projects at La Grange, and Bobcat Flat (RM 43) Sediment Transfusion Project

[NOTE: The Tuolumne River Sediment Transfusion Project (ERP-02-P29) was submitted to CBDA for a Level III Amendment on November 8, 2004 to address a change in sediment source for the project. The revised project, if approved, would fund Task 5. Task 5 is included in this proposal as a contingency in the event that the amendment is not approved.]

5A. Document channel bed texture and monitor bed mobility thresholds: Map channelbed sediment facies at sediment transfusion sites, collect pebble counts and bulk samples to document surface and subsurface sediment composition, install and monitor tracer rocks to document surface particle mobility thresholds, install scour cores to document depth of scour during flood events. Recover tracer rocks and scour cores after flows exceeding 4,500 cfs. A total of three redeployments is budgeted over a three-year period. [McBain and Trush]

5B. Survey reach-scale channel cross sections and profile and quantify net sediment removal from augmentation sites: After flow exceeding 4,500 cfs, resurvey 20 cross sections to document changes in sediment storage and channel geometry, resurvey longitudinal profile in 3 mile reach from La Grange Bridge to Basso Bridge, and survey topography at 2 transfusion sites to document change in sediment storage volume. [McBain and Trush]

5C. Develop and test a predictive sediment transport model: Measure suspended sediment and bedload transport rates using a 6-inch Helley-Smith sampler deployed from a cataraft at Riffle 4B (repeating sediment transport measurements conducted in 2000) at flows ranging from 5,500 cfs to 10,000 cfs. Budget allows for sampling three discrete flow events over a three-year period. The Sediment Transfusion Project includes funds to develop HEC-RAS and sediment transport models for the reach from La Grange Dam to Roberts Ferry Bridge (i.e., the upstream end of the Gravel Mining Reach). The sediment transport model will be similar to those developed for the Sandy River and Merced River (Stillwater Sciences 2000, 2004) and will be a powerful tool for predicting the effects of coarse sediment augmentation on transport rates and channel morphology, as well as predicting the volume of sediment needed for long-term supply maintenance. [McBain and Trush, Stillwater Sciences]

5D. Map planform geomorphic and habitat features: Using laminated aerial photographs as base maps, map and quantify geomorphic features (bed and banks, alternate bars, active floodplains, sediment deposits) for pre- and post-augmentation in the augmentation reach. Map and quantify mesohabitat features (pool, riffle, run) and salmonid spawning habitat. Mapping will be conducted for one pre- and post-augmentation year and will build on data collected by the Districts in 1988 and data collected under the Coarse Sediment Management Plan (McBain and Trush 2004). [McBain and Trush]

5E. Monitor spawning substrate permeability: Measure permeability, intra-gravel dissolved oxygen and temperature, and collect and analyze bulk samples at 14 riffle sites in the primary spawning reach (between La Grange Dam and Basso Bridge). Methods will be consistent with prior permeability monitoring and will include riffle treatment sites cleaned of fine sediment under the Fine Sediment Management Plan. Gravel quality analyses will be conduced in 2006 and in 2008. [Stillwater Sciences]

5F. Report preparation and distribution. Write and distribute a summary report for each monitoring year, presenting all data collected and analyzed, including interpretations of data for each project and within a broader river-wide context. [McBain and Trush, Stillwater Sciences]

Task Deliverables: Annual Monitoring Report containing all field data and analyses in raw and/or summary format, graphics presenting data results, and written descriptions and interpretations of monitoring results.

Task 6. Monitoring of Cumulative Effects on Target Populations [Chinook salmon and *O. mykiss*]
This task would extend river-wide trend monitoring that, in the past, was funded by the FSA and CDFG. FSA funds are fully expended, and no additional funds are available. CDFG funds are not certain. Without additional, secure funding, these long-term monitoring efforts may be halted. Methods and reporting for all Chinook salmon, *O. mykiss*, and macroinvertebrate monitoring under Task 6 be consistent with the protocols and participants employed in 2004 monitoring activities.

6A. Juvenile Chinook salmon production and outmigration timing: Install and monitor two rotary screw traps near RM 5.5 from approximately January 1 through June 15 for three years. The trap would generally be operated 7 days/week and will be checked at least daily. Conduct up to six trap efficiency test releases each year. Test releases will use captured, wild juvenile salmon when available. When sufficient numbers of wild juvenile salmon are not available, hatchery-reared juvenile salmon will be used for the tests. [CDFG, S.P. Cramer]

6B. Juvenile Chinook salmon and *O. mykiss* distribution, abundance, and size (winter and spring): Conduct biweekly seining surveys from January through May at up to 18 locations from approximately RM 51.5 (near La Grange) through RM 0 (including two sites in the San Joaquin River) for three years. Sample locations would include approximately ten sites used during prior years, as well as additional sites within the Gravel Mining Reach, SRPs 9 and 10, Bobcat Flat, and coarse sediment augmentation projects. Data for Bobcat Flat will be extracted and provided to FOT. [Stillwater Sciences, S.P. Cramer]

6C. Juvenile Chinook salmon and *O. mykiss* distribution (summer): Conduct two snorkel surveys during June through September at up to 16 locations from RM 51.5 (La Grange Bridge) through RM 31.5 (near Hickman Bridge), including restoration project sites, to document summer distribution of juvenile Chinook salmon and *O. mykiss*. Data for Bobcat Flat will be extracted and provided to FOT. [Stillwater Sciences, S.P. Cramer]

6D. Chinook salmon adult escapement: Conduct weekly Chinook salmon carcass surveys and redd counts from upstream of La Grange (RM 51.6) to Geer Road (RM 26) from approximately October 15 through January 15 for three years to quantify adult escapement and document spawning distribution. [CDFG, S.P. Cramer]

6E. *O. mykiss* adult distribution: Conduct hook-and-line surveys from approximately RM 52 through RM 36.5 (within the M.J. Ruddy Reach) for three years to document distribution of adult *O. mykiss*. Surveys would be conducted approximately biweekly from November 1 through December 31 and weekly from January through June. [Stillwater Sciences, S.P. Cramer with local guide subcontractor (California Rivers Restoration Fund)]

6F. Benthic macroinvertebrate composition, abundance, and diversity indices: Conduct annual summer benthic macroinvertebrate monitoring (composition, abundance, and diversity indices) using the California Stream Bioassessment Procedure (CDFG 1999) over a three-year period. Three separate kicknet samples will be taken at six sites in the gravel-bedded reach; three Hess samples will also be collected at two of those sites. [Stillwater Sciences]

Task Deliverables: Quarterly progress reports; one draft and one final report for each task describing monitoring methods, results, and conclusions. Reports will be in a format consistent with reports included in the Districts 2003 FERC report (TID 2004).

Task 7. Aerial Photography and Bathymetry

Aerial photography, topography, and bathymetry available for channel design and monitoring have been collected in a piecemeal fashion for specific reaches of the Tuolumne River. However, low altitude orthorectified photographs with channel and floodplain topography are extremely useful tools for preparing conceptual designs, documenting pre-construction conditions, and documenting future conditions as the channel evolves, and for developing hydraulic and sediment transport models. This task will provide a high-quality, river-wide aerial photograph set for the lower Tuolumne River from La Grange Dam to the San Joaquin River, with complete topography and bathymetry developed for the upper 18 miles below La Grange Dam:

7A. Aerial photo flight: Take low altitude color aerial photographs from La Grange Dam (RM 53) to the San Joaquin River (RM 0). [McBain and Trush]

7B. Ground control: Install surveyed ground control points. [McBain and Trush]

7C. Orthorectification: Orthorectify aerial photographs based on ground control points from La Grange Dam (RM 52) to RM 25. Orthorectification could be extended downstream to include the entire river at a later date, if needed and as funding permits. [McBain and Trush]

7D. Develop topography : Using standard photogrammetric analyses, generate topographic data and maps from La Grange Dam to RM 34.2 at a 2 ft contour interval accuracy. Photogrammetry could be completed for the entire river at a later date, if needed and as funding allows. [McBain and Trush]

7E. Channel bathymetry: Use boat-mounted bathymetric surveys or other appropriate technology (such as water penetrating LIDAR) to generate channel bathymetry data and maps from La Grange Dam to at least the downstream end of the Gravel Mining Reach Project (RM 34.2) and extending further downstream if funding permits. [McBain and Trush]

Task Deliverables: The photogrammetry and bathymetry topographic data will be integrated to produce a single digital terrain model for the upper 18 miles below La Grange Dam. This topography will provide baseline channel and floodplain conditions for evaluating the topographic evolution of the channel in the Sediment Transfusion reaches and in the Gravel Mining reaches. The digital terrain model will also provide the topographic data needed to construct a HEC-RAS model and a sediment routing modeling that is proposed under the revised Sediment Transfusion Project.

5. FEASIBILITY

The proposed monitoring is feasible within the project timeline and with available staff and contractor resources, permits required for the proposed monitoring are either in-hand or in process, and access to private property has been arranged. The greatest uncertainty that could affect the proposed monitoring is the occurrence of flows large enough to do geomorphic work. Many of the geomorphic monitoring events are triggered by flows exceeding 5,000 cfs. If flows sufficient to trigger monitoring do not occur during the funding period, funds for uncompleted tasks would be remain with CBDA because CBDA only reimburses contractors for actual expenditures. At the close of the contract any unexpended funds revert to CBDA for reallocation to other projects.

All proposed monitoring is for projects that are implemented or that are scheduled for implementation by 2006. The 7/11 and SRP 9 projects are constructed. Construction for the M.J. Ruddy and Gasburg Creek projects is expected to begin in 2005. Riffle cleaning is also expected to begin in 2005. The Tuolumne River Sediment Transfusion Project is expected to begin in 2006. Implementation of this project will likely require two construction seasons. These implementation schedules allow for continuation of ongoing post-construction monitoring (7/11, SRP 9, M.J. Ruddy, Gasburg Creek, Bobcat Flat, CDFG sediment augmentation, and riffle cleaning) or collection of baseline data with limited (1-2 years) post-project monitoring (Tuolumne River Sediment Transfusion).

Monitoring would be implemented by contractors to TID and CDFG, with input from the TRTAC and TRTAC Monitoring Subcommittee. These parties have worked together for many years on these projects. Most of the monitoring included in this proposal has been implemented by the TRTAC, their consultants, and CDFG over the past several years. In these cases, this proposal would simply extend the duration of ongoing monitoring. New monitoring tasks would use standard methods applied by the investigators on the Tuolumne, Merced, and other river. Invertebrate analysis and sediment transport modeling will use methods developed by Stillwater Sciences and applied on the Merced River and other rivers.

Depending on the task, contractors and staff participating in monitoring may be required to have collection permits from CDFG and scientific research permits from NOAA (pursuant to Section 10 of the Endangered Species Act). All investigators participating in collection and sampling of Chinook salmon and *O. mykiss* (S.P. Cramer and Stillwater Sciences) have current CDFG collection permits. Permit numbers are provided in Attachment A. TID applied to NOAA for a scientific research permit for their staff and contractors on October 9, 2000. NOAA is currently processing this permit application. Since submitting the application, TID and their contractors have worked with NOAA staff to obtain short-term authorizations consistent with the pending application. TID will continue to work with CDFG and NOAA to ensure that all collection permits are obtained and kept current.

Access to the majority of the Tuolumne River and Gasburg Creek monitoring sites is through public properties (owned by Stanislaus County, Modesto ID, TID, and CDFG). Access through private property would be required at the 7/11 and Bobcat Flat project sites. A letter from Friends of the Tuolumne (who owns the Bobcat Flat site) authorizing access for monitoring purposes is provided in Attachment B. TID owns an easement on the 7/11 site that allows access for monitoring and maintenance. Several seining survey locations for river-wide monitoring (Task 6) require access through private lands. Landowners have provided access to TID to conduct these surveys since 1986. If funding is approved, TID obtain letters providing permission to access these properties from the landowners. If permission is withheld, the affected seine location could be shifted to a similar site nearby.

6. EXPECTED OUTCOMES AND PRODUCTS

The CBDA and AFRP have invested nearly $30 million in restoration projects on the Tuolumne River, managed by TID and implemented by the TRTAC and its consultants. An additional $4.4 million is being considered by the CDBA Amendment Committee. The CBDA and AFRP have acknowledged that more research needs to be done to better understand how to do large-scale river habitat restoration. But if these river restoration projects are to effectively generate knowledge that is transferable to future projects, investigations of process need to be instituted, and investment in monitoring is essential. The proposed monitoring will provide monitoring funding during a critical period of restoration program implementation, and will provide data and reports needed to support adaptive management at project design, reach-wide, and river-wide scales. Data and reports to be delivered are described in Section A.4 and the Task and Deliverables form.

The Adaptive Management Forum panel stated that “The implementation of an ecosystem-based adaptive management approach to these projects will have to be implemented gradually. However, the monitoring of long-term project effectiveness and the implementation of comparative studies needs to be given a higher status, adequately supported, and made more effective. The Panel recommends that this issue be addressed directly and urgently because it will affect the degree to which investments already made in projects sponsored by AFRP and CBDA can be leveraged into useful knowledge for future projects.”

The Tuolumne River is a focal point for implementation of the CBDA and AFRP program goals, testing a fundamental hypotheses of scaled-down river channel reconstruction, river-wide restoration, and ecosystem management under regulated flow and sediment conditions. Investment in continued monitoring of these projects is essential to:

- sustain salmonid populations and other ecosystem components on the Tuolumne River through improved restoration project design and implementation;
- provide information that will improve our understanding of the performance of projects recently implemented or scheduled to be implemented in the next several years;
- yield knowledge and information applicable to other systems or restoration programs, generated through passive and active adaptive management experiments;

7. DATA HANDLING, STORAGE, AND DISSEMINATION

TID will function as contract manager for this project, similar to other Tuolumne River projects funded by CBDA. TID typically develops service contracts with consultants to conduct monitoring. If specific monitoring tasks are to be performed by agencies, such as CDFG, then the TID anticipates entering into agreements for that work. Reports and analysis prepared by the contractor are submitted to the TRTAC for review. These monitoring reports are also included with the annual Status Report submitted to FERC along with the associated river-wide monitoring conducted by the Districts and TRTAC. All reports, maps, GIS data, draft and final project design documents, regulatory compliance documents, bid specification packages, and monitoring data are compiled by TID as project records. Information is generally stored in MS Excel and Word, AutoCAD, and ArcInfo. All final reports prepared as task deliverables during this project will be provided to CBDA and AFRP, and additional reports and data will be made available to CBDA/AFRP upon request.

Contractors will be responsible for quality assurance/quality control of their data collection and data entry. All data recorded in field books will be photocopied upon returning from the field and archived. Originals or copies of all other field data (such as maps, photographs, etc.) will be maintained by the Contractor and archived pending completion of the project. Electronic data files will be made available to CBDA upon request.

8. PUBLIC INVOLVEMENT AND OUTREACH

Public involvement and outreach is described in Task 2. In addition to outreach described in Task 2, several opportunities for public involvement were provided during the design and environmental review phases of the SRPs 9 and 10 and Gravel Mining Reach projects. TID (the state lead agency) and the U.S. Fish and Wildlife Service (the federal lead agency, completed and circulated an Environmental Assessment/Initial Study (EA/IS) for these restoration projects. The EA/IS comment period included a public hearing held in June 1998. The EA/IS outlines mitigation and monitoring for these restoration projects.

With the completion of the Habitat Restoration Plan for the Lower Tuolumne River Corridor (McBain and Trush 2000), the TRTAC hosted an additional public workshop in June 1999 to present the plan and provide an opportunity to address the public's questions about future restoration. This workshop included presentations by TRTAC member groups and agencies, and TRTAC participants and their consultants were available at topic-specific information stations to discuss the projects and answer questions. To make the Restoration Plan more available to the public and other interested parties, the TRTAC (with funding from AFRP) developed a 16-page summary. Since 1999, more than 5,000 copies of this brochure have been distributed. The brochure is also available at the TID web page at www.tid.org.

9. WORK SCHEDULE

See Table 6 for the work schedule.

B. APPLICABILITY TO PROGRAM GOALS

1. ERP AND CVPIA PRIORITIES

ERP Priorities: Components of the ERP Vision for the Tuolumne River Ecological Management Unit addressed by the proposed monitoring include: spatially complex channel morphology, frequently mobilized channel bed surface, periodic channel bed scour and fill, balanced coarse and fine sediment budgets, periodic channel migration or avulsion, functional floodplain, self-sustaining riparian plant communities, naturally-fluctuating groundwater table (ERP Plan vol. II, pp. 387-388). Measures to achieve this vision are addressed in more detail in the ERP Stage 1 Implementation Plan (CBDA 2001). Proposed monitoring would specifically address the following Implementation Plan priorities and specific action and information needs (pp. 69-74):

- SJ-1: Continue habitat restoration actions including channel-floodplain reconstruction projects and habitat restoration studies in collaboration with local groups (specific actions/information: channel-floodplain reconstruction projects, gravel augmentation projects);
- SJ-2. Restore geomorphic processes in stream and riparian corridors (specific actions/information: hydrologic, hydraulic, and sediment transport models);
- SJ-3. Improve rearing and spawning habitat and downstream fish passage on tributary streams and the mainstem San Joaquin River, particularly for Chinook salmon, steelhead trout and splittail (specific actions/information: studies that (1) build knowledge on status and needs of steelhead in the San Joaquin River tributaries, and (2) assess life history and habitat associations in relation to existing and restored habitats); and
- SJ-6. Conduct adaptive management experiments in regard to natural and modified flow regimes to promote ecosystem functions or otherwise support restoration actions (specific actions/information: mechanistic models as restoration tools).

Conservation Species: Proposed monitoring would gather and synthesize data relevant to the following "Big R" species identified in the Multi-Species Conservation Strategy (CBDA 2000): Central Valley steelhead ESU, Central Valley fall-/late-fall Chinook salmon SU, Valley Elderberry longhorn beetle (as related to riparian vegetation recruitment).

CVPIA/AFRP Priorities: The AFRP has made a large investment in Tuolumne River restoration. The proposed monitoring addresses the following restoration actions identified in the Final Restoration Plan for the AFRP (AFRP 2001):

- Improve watershed management and restore and protect instream and riparian habitat, including consideration of restoring and replenishing spawning gravel and performing an integrated evaluation of biological and geomorphic processes (priority: high); and
- Evaluate and implement actions to reduce predation on juvenile Chinook salmon, including actions to isolate ponded sections of the river (priority: medium).

2. RELATIONSHIP TO OTHER ECOSYSTEM RESTORATION ACTIONS, MONITORING PROGRAMS, OR SYSTEM-WIDE ECOSYSTEM BENEFITS

This proposal extends, augments, and integrates monitoring of channel reconstruction, coarse sediment augmentation, and fine sediment management projects funded by ERP and AFRP and also is linked to

restoration projects funded by the CDWR Four Pumps Mitigation Fund. Proposed monitoring would assess geomorphic processes at the site-specific and reach-scales and would assess Chinook salmon and to some extent *O. mykiss* response to restoration at the site-specific, reach, and river-wide scales. Information gathered through this monitoring would inform design and implementation of future restoration projects, including SRP 10, future Gravel Mining Reach phases, and future coarse sediment augmentation.

3. ADDITIONAL INFORMATION FOR PROPOSALS CONTAINING LAND ACQUISITION

No land acquisition is included in this proposal.

C. QUALIFICATIONS

The project team described below has been conducting monitoring on the Tuolumne River for over 15 years, and is uniquely qualified to implement this project. In addition to TID and the consultants listed below, the California Department of Fish and Game will also be participating in the monitoring efforts.

Turlock Irrigation District (TID) is the grant applicant and would manage the project. TID has decades of experience in overseeing monitoring programs conducted through contractors and partner agencies. Beginning in 1971, TID and its partners managed a comprehensive research program that ultimately resulted in the flow schedule and restoration measures included in the FSA. TID and its partners also managed more than $1.3 million in FSA monitoring funds, which will culminate in a report to FERC in 2005 that provides monitoring conclusions and recommendations for future river management. TID has received and managed several CBDA and AFRP grants for restoration projects on the Tuolumne River, totaling nearly $30 million (see Tables 1 through 4). *Primary Technical Staff for the Project:* Wilton Fryer, P.E., has been program manager for the Turlock and Modesto Irrigation District Restoration Program since 1997. Mr. Fryer graduated from the University of California at Davis with a BS in Soil & Water Science, an MS in Irrigation Science, and an ME in Civil Engineering with an emphasis in water resources. He is currently registered as both a Civil Engineer and an Agricultural Engineer. Tim Ford has been the staff aquatic biologist for TID and MID since 1981. Mr. Ford graduated from the University of California at Davis with a BS in Wildlife and Fisheries Biology in 1977. He worked as a Biological Technician for the Modoc, Tahoe, and Stanislaus National Forests prior to working for the Districts. Mr. Ford oversees the aquatic resources program for the Districts.
McBain and Trush, Inc. is a professional consulting firm applying fluvial geomorphic and ecological research to river preservation, management, and restoration. McBain and Trush authored Habitat Restoration Plan for the Tuolumne River and the Tuolumne River Coarse Sediment Management Plan. For this project, McBain and Trush would develop and implement geomorphic, hydraulic, hydrologic and riparian vegetation monitoring; manage the subcontract for riparian bird surveys; coordinate and oversee aerial photography; and prepare public outreach brochures. *Technical Staff for the Project:* Dr. William Trush (PhD, Forestry) was a principal scientist in developing the Habitat Restoration Plan for the Tuolumne River, and has been designing restoration projects and conducting monitoring on the Tuolumne River since 1989. Scott McBain (MS. Civil Engineering) was also a principal scientist in developing the Restoration Plan and created the conceptual designs for the Gravel Mining Reach, SRPs 9 and 10, Gasburg Creek, Bobcat Flat, and Tuolumne River Sediment Transfusion Projects. Mr. McBain has also been a lead scientist for restoration planning and investigations on Clear Creek and the Trinity River. Darren Mierau (MA, aquatic biologist) has been involved with the Tuolumne River restoration program since 1997, assisted in completion of the Restoration Plan, developed and implemented

monitoring plans in the Gravel Mining Reach and SRP projects, was project manager and co-author of the Tuolumne River Coarse Sediment Management Plan. Jennifer Vick (MLA, Environmental Planning/ Landscape Architecture) has been involved with restoration planning, implementation, and monitoring on the Tuolumne and Merced Rivers since 1997. She was lead author on the Merced River Corridor Restoration Plan and has designed, managed, and implemented baseline evaluations and restoration project monitoring on the Tuolumne River since 1998. She also co-authored of the Tuolumne River Coarse Sediment Management Plan. John Bair (MA, riparian botanist) has developed riparian and wetland restoration designs in Clear Creek and the Tuolumne River.

Stillwater Sciences is a firm of biological and geological scientists that specializes in developing new scientific approaches and technologies for environmental problem solving in aquatic and terrestrial systems. Its founding members are experienced in freshwater ecology, fisheries and wildlife biology, riparian and wetland ecology, entomology, botany, and hillslope and fluvial geomorphology and have led ecological studies on the Tuolumne River since 1987. Stillwater Sciences is currently developing restoration designs and has conducted detailed hydraulic and sediment transport modeling for the Merced River Dredger Tailings Reach and will provide important connectivity between similar restoration and monitoring projects be implemented the Merced and Tuolumne rivers. For this project, Stillwater will oversee fisheries and ecological monitoring, including *O. mykiss* surveys, macro-invertebrate studies, redd superimposition studies, and riffle cleaning analyses. Stillwater, with S.P. Cramer and Associates, will also conduct seine and snorkel surveys. *Primary Technical Staff for the Project:* Frank Ligon is an aquatic ecologist and geomorphologist specializing in investigations of the role of fluvial processes in the ecology of stream fish, invertebrates, and plant communities. On the Tuolumne River, Mr. Ligon managed fisheries studies for the Districts from 1987 to 1996. Anthony Keith is an ecologist specializing in stream ecology and geomorphology, aquatic and terrestrial entomology, and watershed management. On the Tuolumne River, Mr. Keith has participated in assessments of fish and invertebrate populations, spawning gravel quality, and juvenile Chinook salmon outmigration. Noah Hume (Ph.D., P.E.) will provide technical oversight of all monitoring tasks contracted to Stillwater. Dr. Hume has over 15 years experience on a wide variety of interdisciplinary projects, as well as engineering design. Dr. Hume has been involved in projects relating to egg survival to emergence, spawning gravel cleaning, smolt survival studies, and fish population composition and distribution.

S.P. Cramer & Associates, Inc. (SPC) was established in 1987 to provide innovative solutions for issues relating to salmon and trout on the Pacific Coast. Previous and ongoing fisheries research includes, annual juvenile salmonid outmigration monitoring, adult migrant trapping, radio-tracking, and electrofishing studies. SPC has conducted seine surveys, snorkel surveys, and rotary screw trap deployment and operation on the Tuolumne River since 1998. SPC will participate in seine and snorkel surveys with Stillwater Sciences and will provide field, data management, and analysis and report writing support for carcass surveys, rotary screw trap monitoring, and Chinook salmon redd mapping. *Primary Technical Staff for the Project:* Doug Demko (Senior Consultant) manages and coordinates project activities within SPC and between cooperating agencies and supervises data analyses, interpretation, and report preparation activities. Mr. Demko received a BS in Biology in 1992, and a Juris Doctor degree in 2002. Andrea Fuller (Fish Biologist) joined SPC as a fisheries technician in 1995. Ms. Fuller coordinates field personnel and data collection activities and assists in data analyses and report preparation. Michele Simpson (Fish Biologist) joined SPC in 2002 after working as a fisheries biologist for the U.S. Bureau of Reclamation and NOAA Fisheries. She received her MS in Biology in 1997 and specializes in Endangered Species Act issues regarding salmonid populations.

D. COST

1. BUDGET

Costs for major tasks are provided in the website budget form. Table 7 provides a comprehensive budget summary with more detailed cost information for tasks and subtasks.

2. COST SHARING

TID and MID provide two full-time positions to support the Tuolumne River Restoration Program- a project manager (Wilton Fryer) and an aquatic ecologist (Tim Ford). Other specific cost-sharing has not yet been identified, but will factor into long-term river-wide monitoring as described in the following section.

3. LONG-TERM FUNDING STRATEGY

The Districts have funded over $1.3 million for a 10-year river-wide monitoring program that ends in 2004. Additional funding of monitoring, such as redd counts and carcass surveys, was provided by CDFG. The basis of several monitoring tasks in this PSP was derived from that prior work. Funding for future river-wide monitoring by the Districts and CDFG have not been identified, but the Districts anticipate that portions of the current river-wide monitoring will continue through 2016 using FERC Settlement Agreement funds. Specific levels of monitoring and associated funding levels for the 2005-2016 period have not yet been identified.

E. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

TID has reviewed and understands the standard terms and conditions for ERP grant agreements. TID will comply with these standard terms and conditions.

F. LITERATURE CITED

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H. NON-PROFIT VERIFICATION

N/A

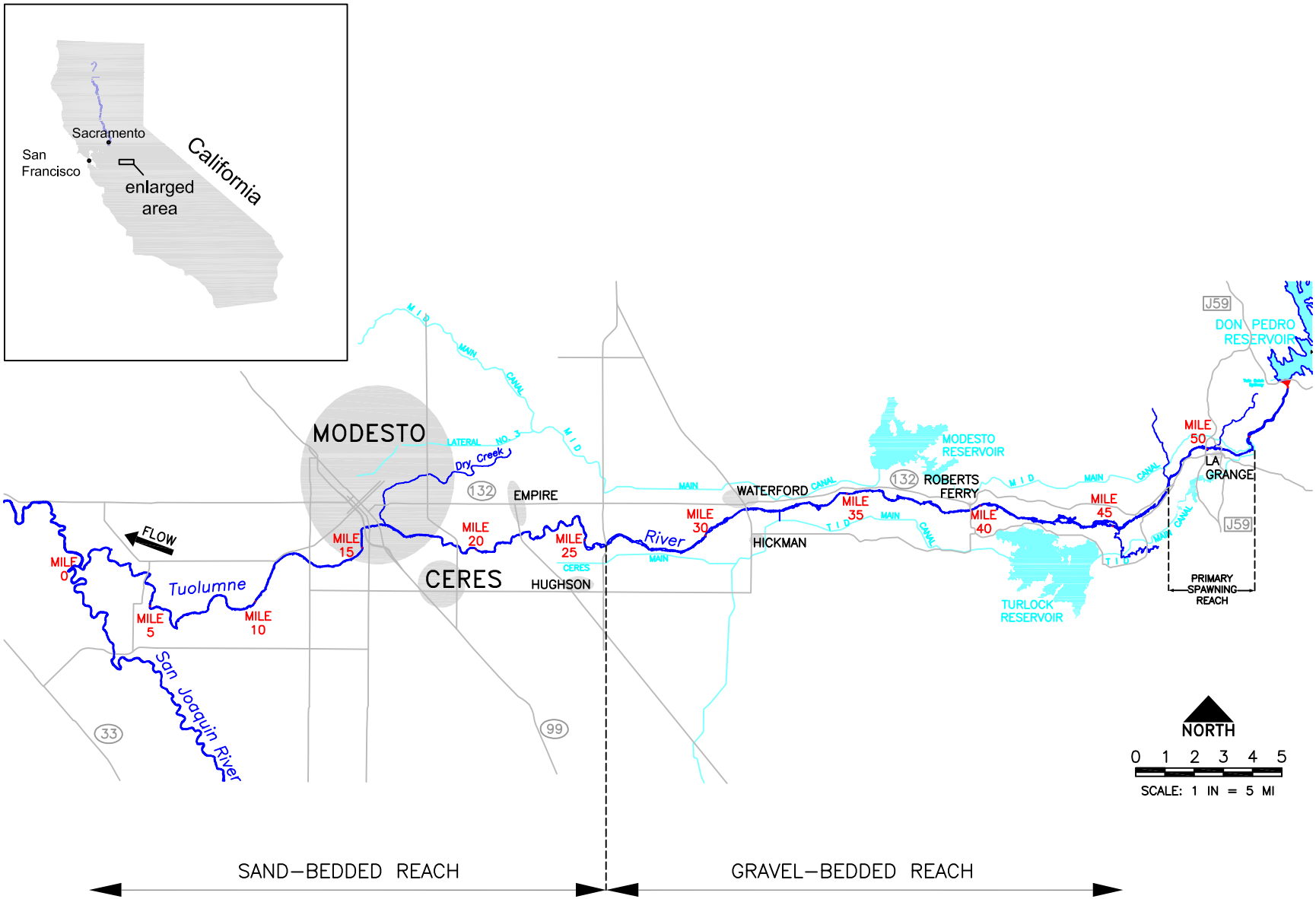


Figure 1. Tuolumne River location map.

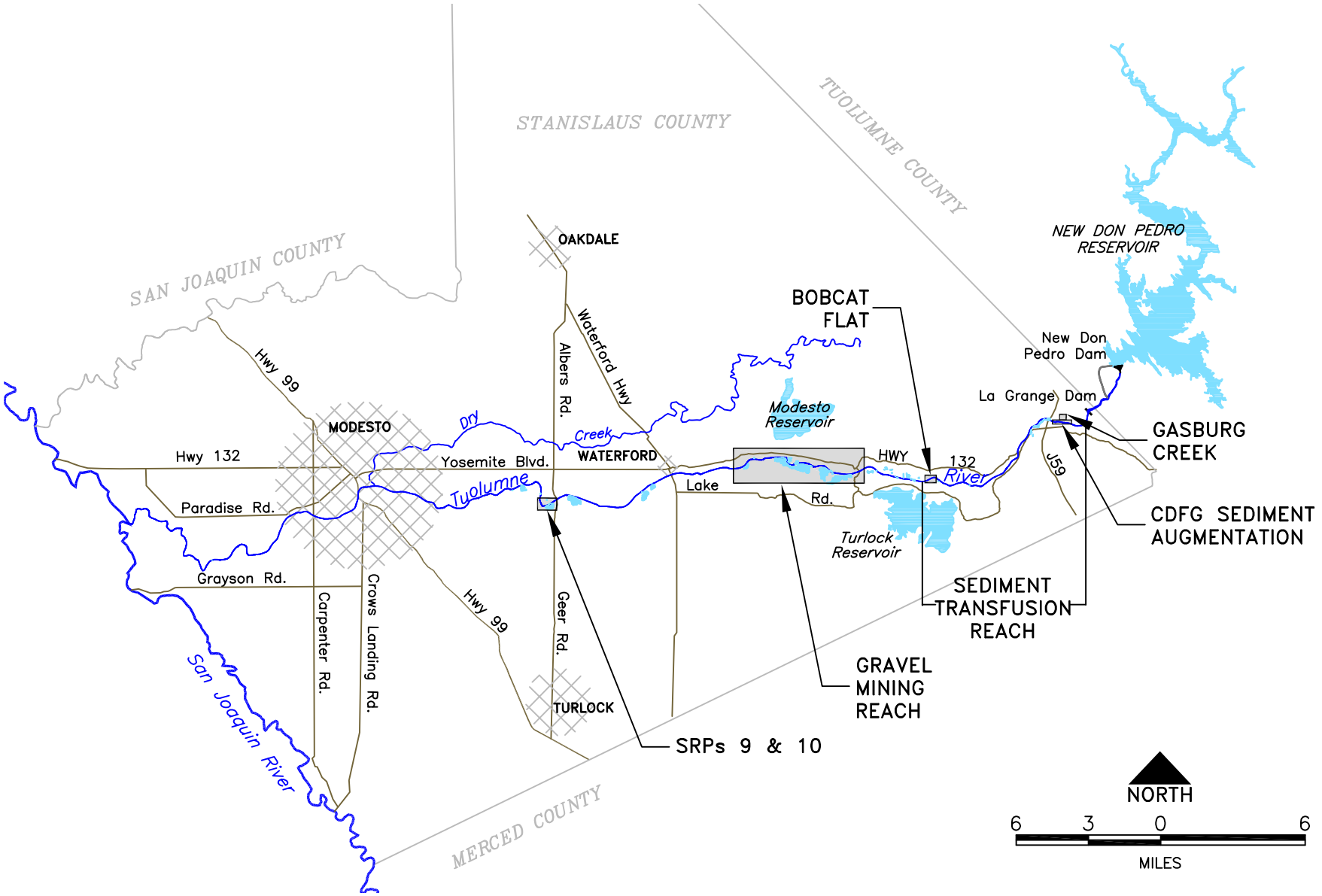


Figure 2. Tuolumne River restoration projects location map.

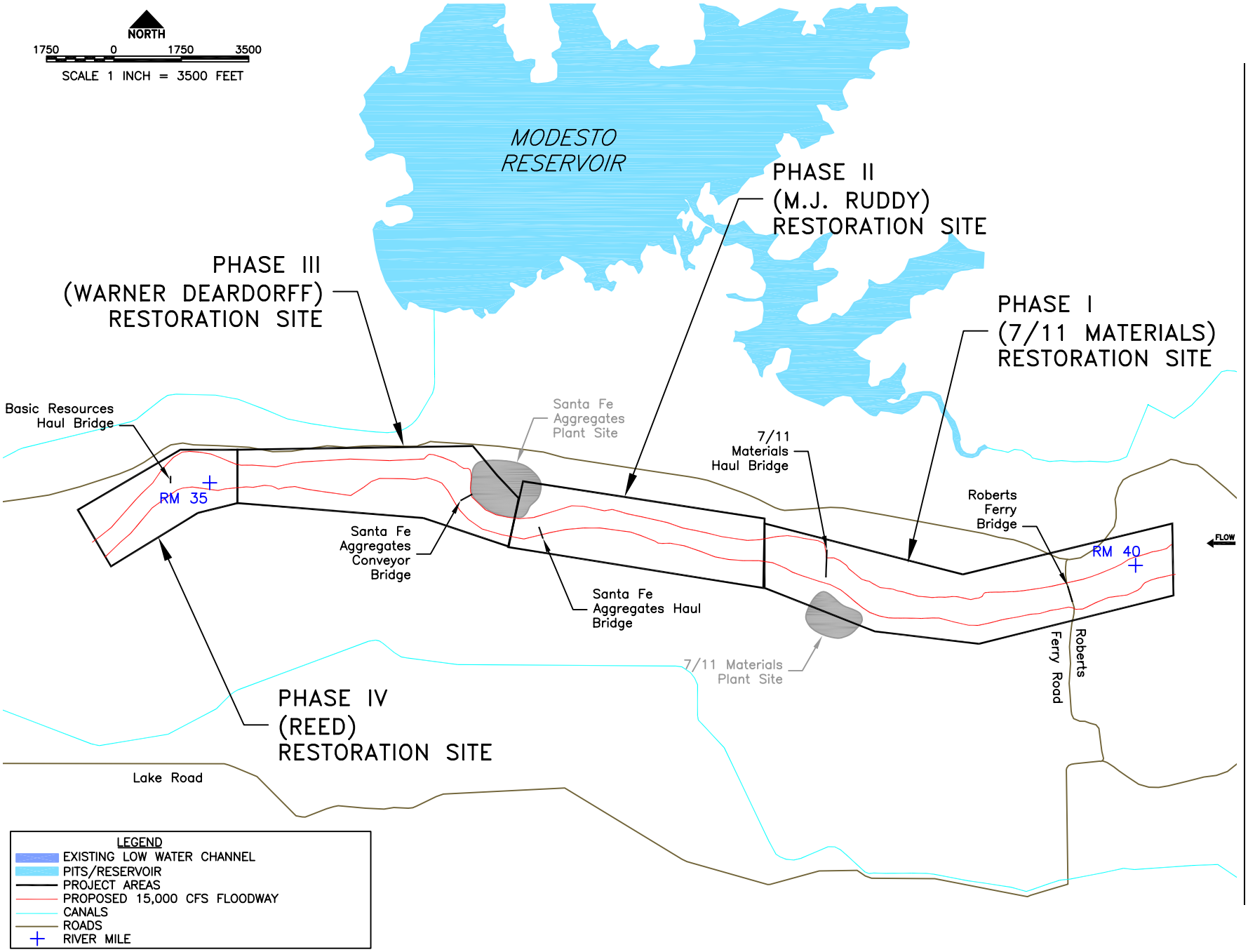


Figure 3. Gravel Mining Reach Project: boundaries of the 7/11, M.J. Ruddy, Warner/Deardorff, and Reed reaches.

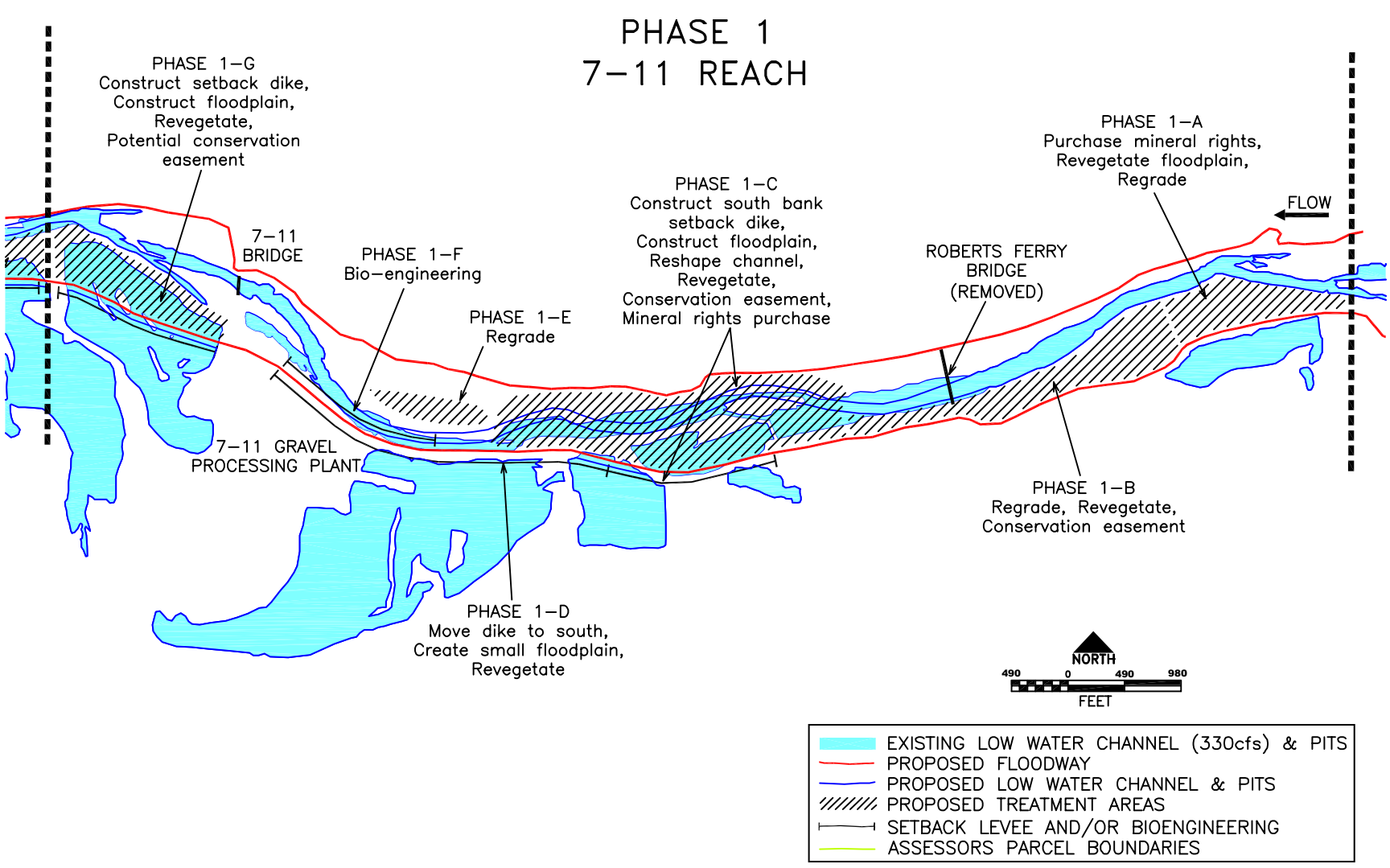


Figure 4. Conceptual design for the 7/11 phase of the Gravel Mining Reach Project, as submitted to CALFED in 1997.

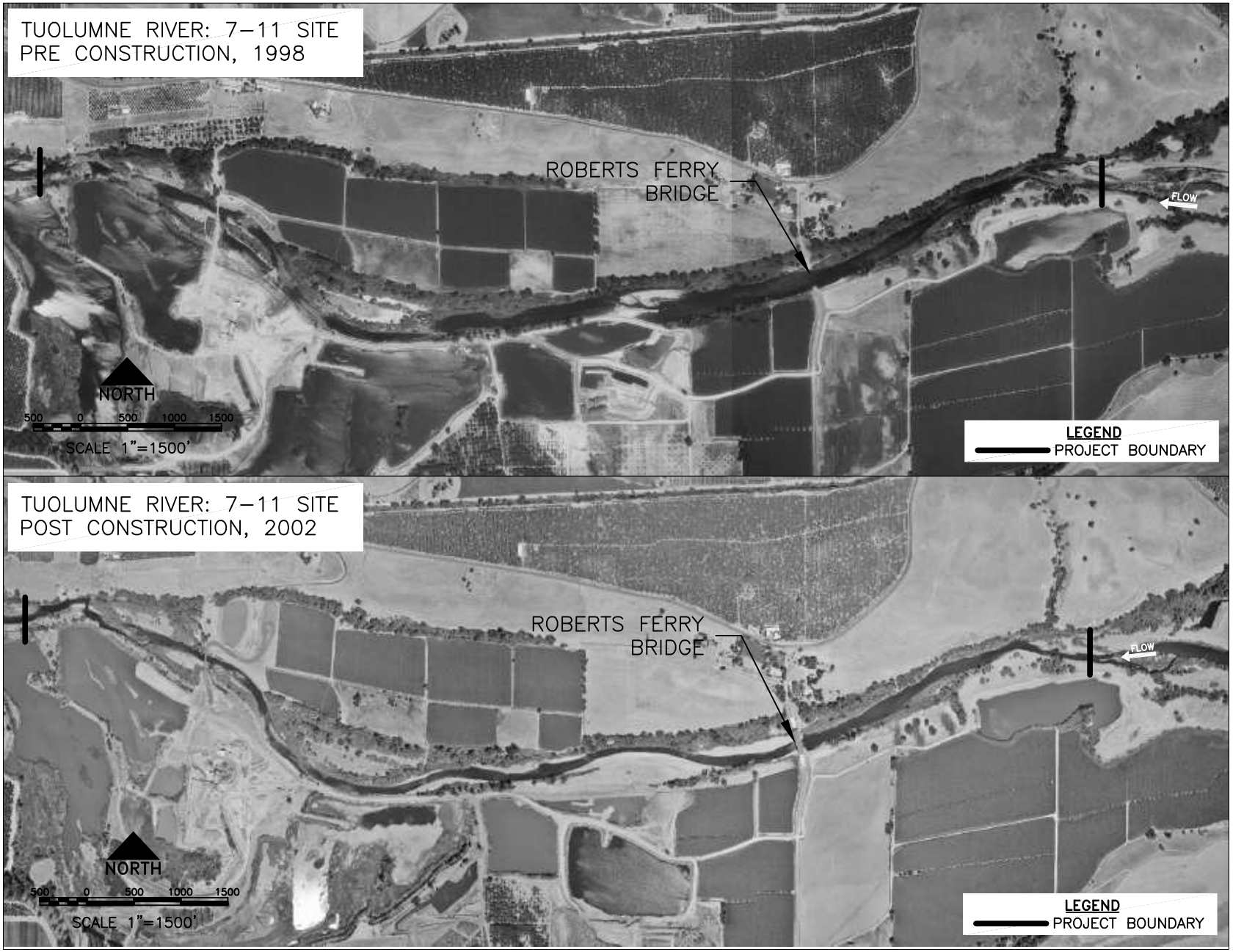


Figure 5. Aerial photographs of the 7/11 phase of the Gravel Mining Reach Project, pre- and post-construction.

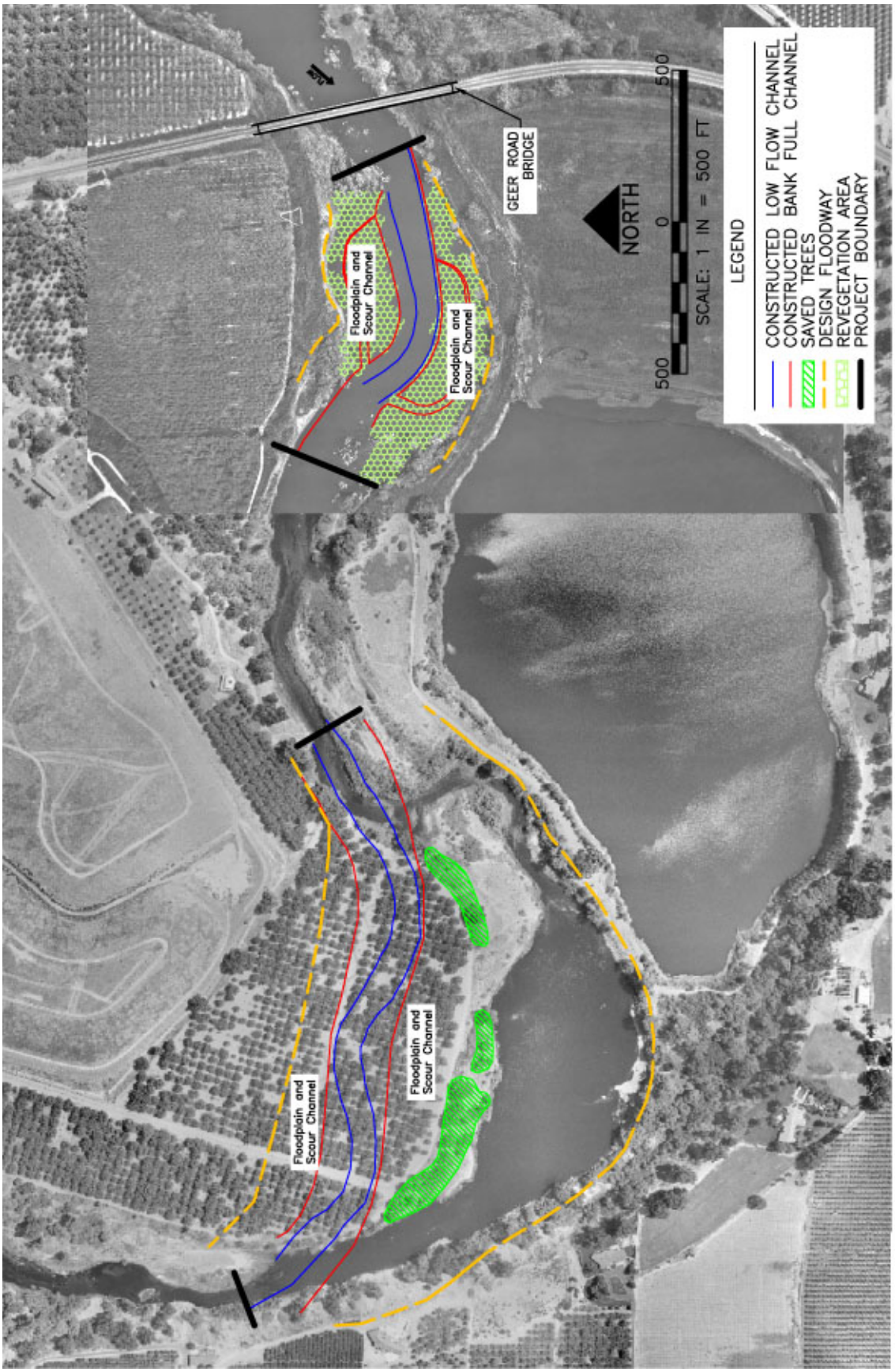


Figure 6. Conceptual designs for the SRPs 9 and 10 Projects.

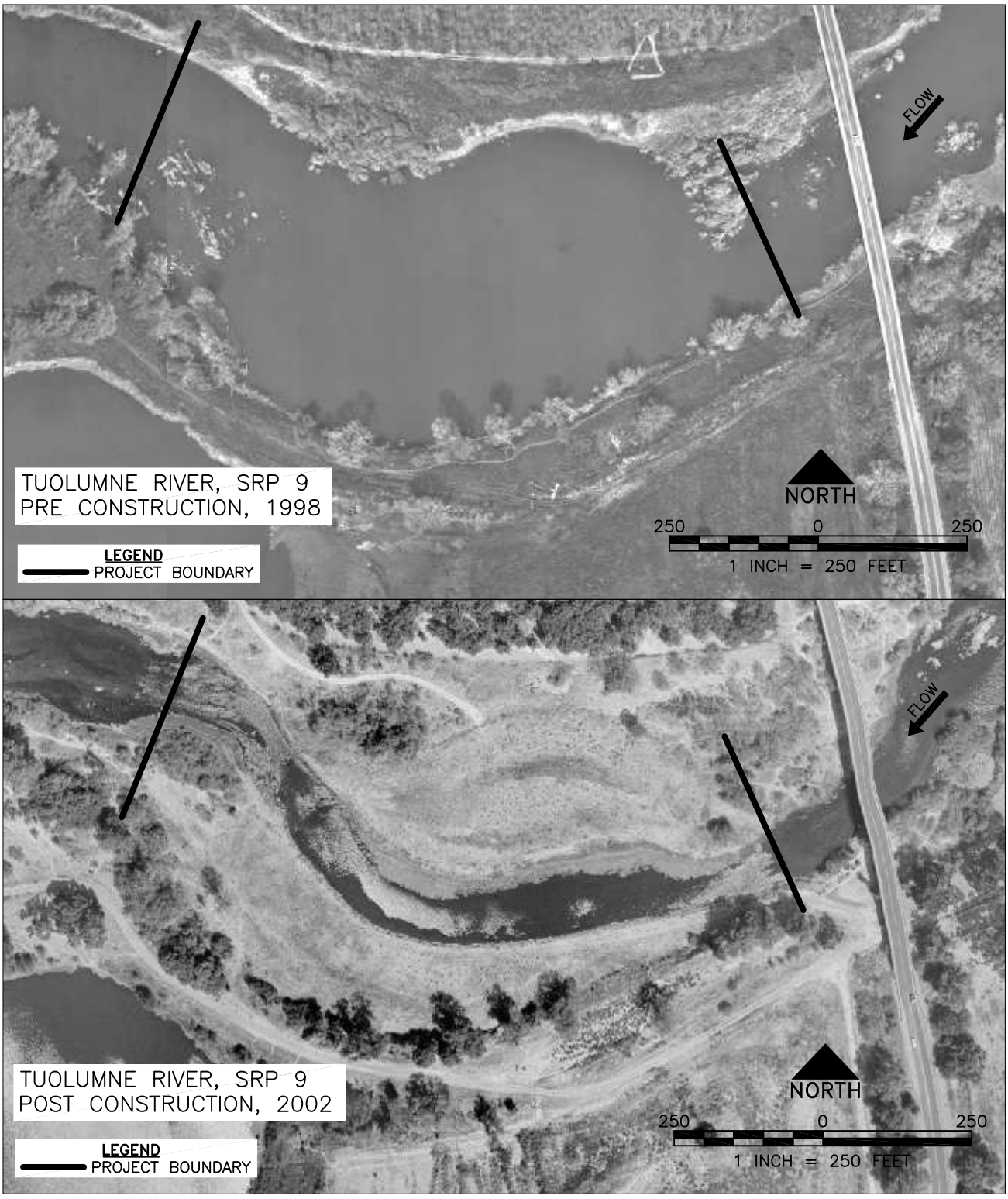


Figure 7. Aerial photographs of the SRP 9 Project, re- and post-construction.

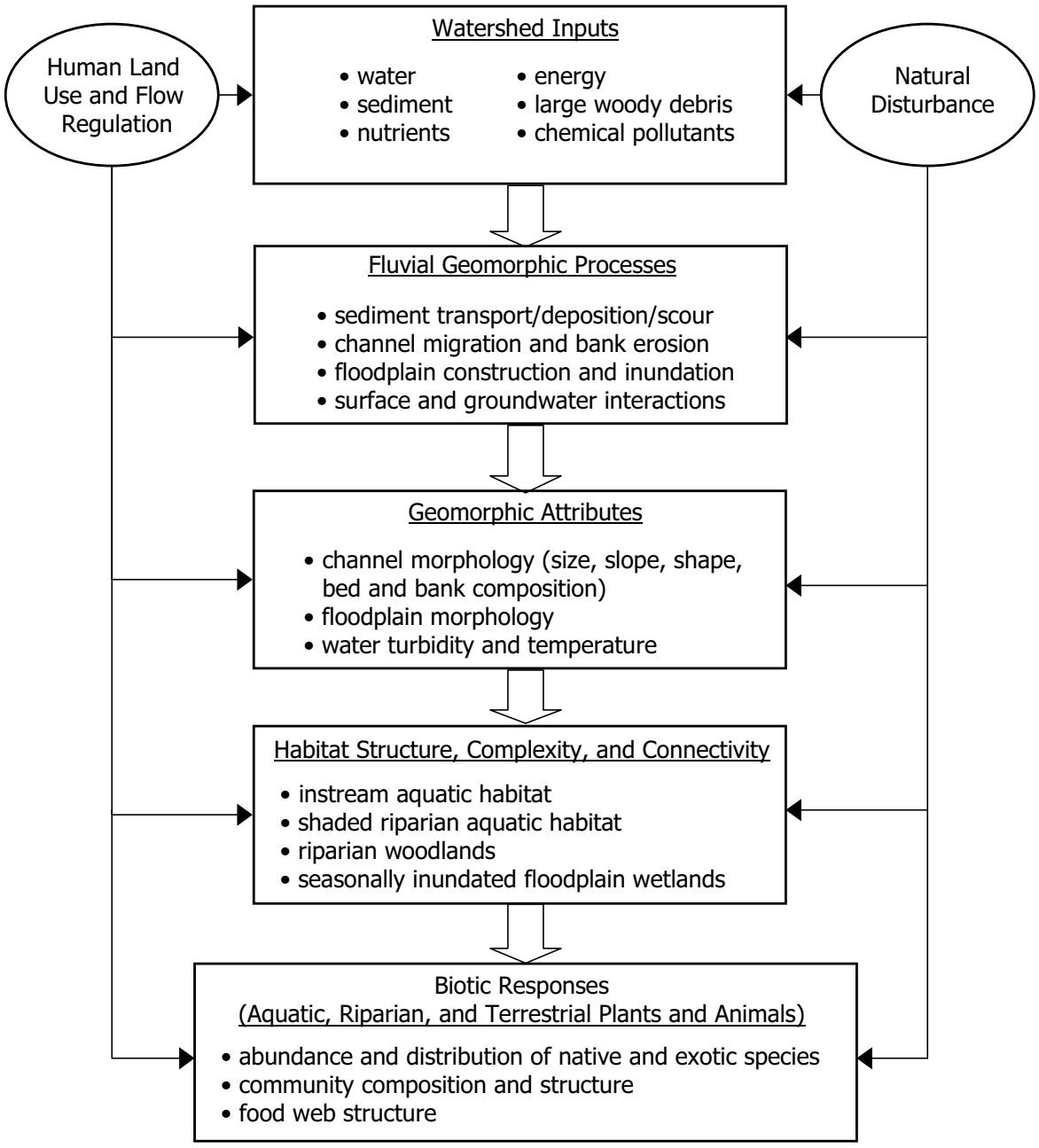


Figure 8. Simplified conceptual model of physical and ecological linkages in alluvial river-floodplain systems (source: Stillwater Sciences 2001).

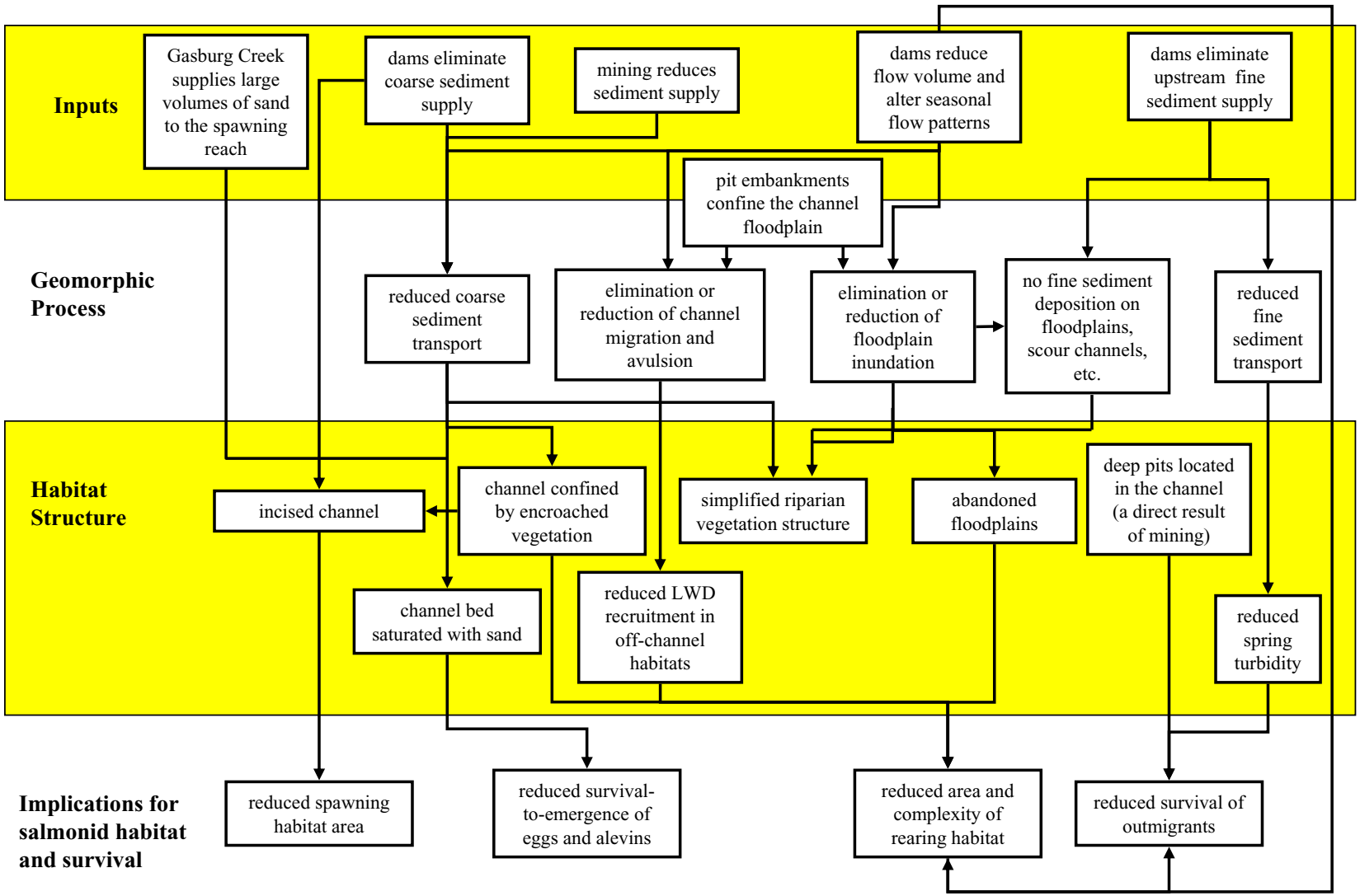


Figure 9. Conceptual model of the effects of dams and mining on geomorphic inputs and processes, habitat structure, and population response

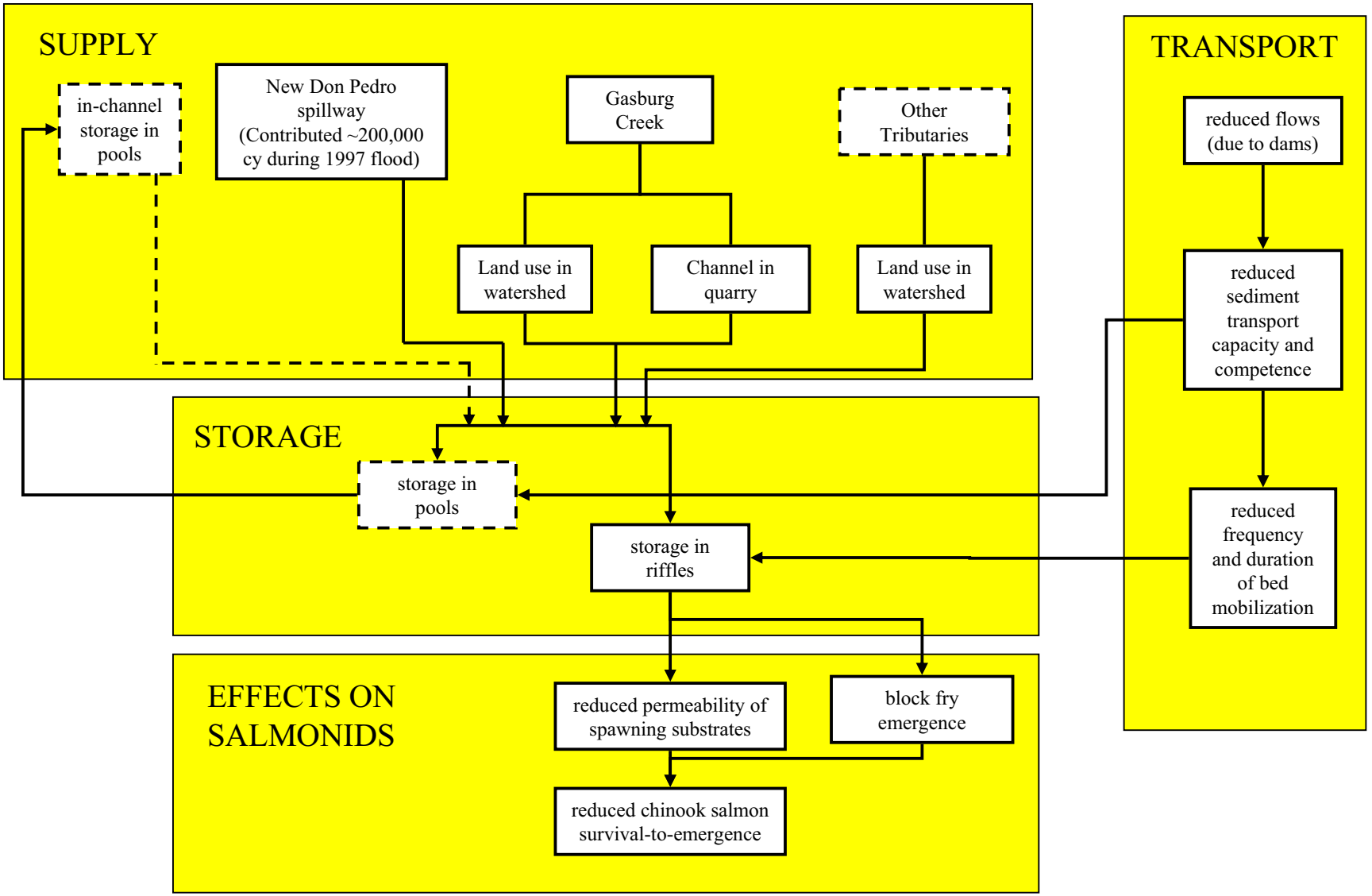
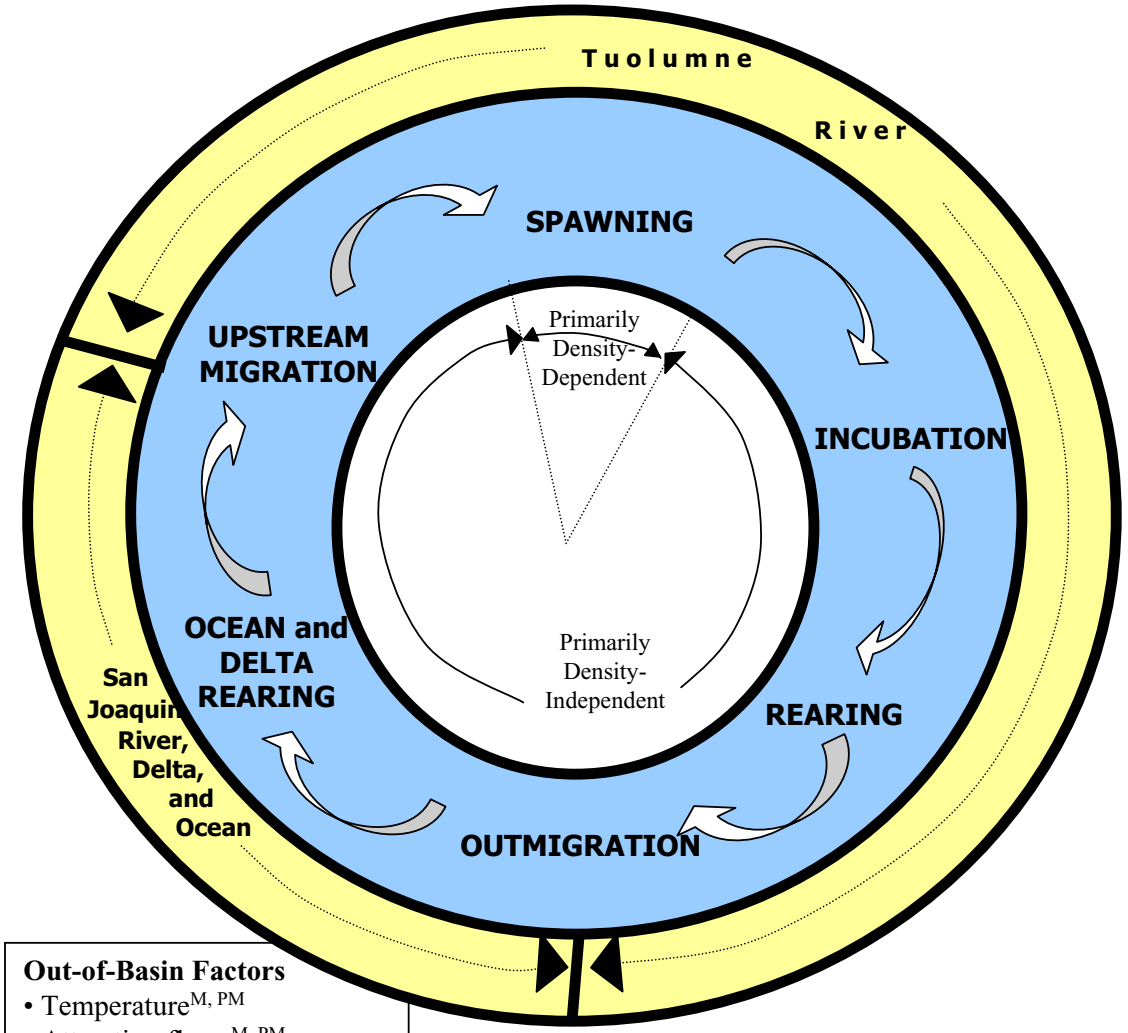


Figure 10. Conceptual model of fine sediment supply and storage in the Tuolumne River and effects in Chinook salmon survival



Key In-Basin Factors

Affecting Adult Migration
- Flow
- Temperature
- Dissolved oxygen

submodel

Affecting Spawning and Incubation Survival
- Redd superimposition*, PM [S-2]
- Habitat area M, PM [S-2, S-3]
- Substrate permeability *, PM [S-3]
- Water temperature M, PM [S-3]

Affecting In-river Rearing Survival
- Water temperature M, PM
- Stranding M, PM
- Food supply PM
- Flow variability M, PM
- Habitat [G-1]

Affecting Outmigration Survival
- Spring flow *, M, PM [S-4]
- Temperature*, M, PM [S-4]
- Predation *, M, PM [S-4]

* Indicates factors that are considered to be limiting.
M Indicates factors that are currently being monitored.
PM Indicates factors for which past monitoring data are available.

Out-of-Basin Factors
- Temperature M, PM
- Attraction flows M, PM
- Water quality M, PM
- Dissolved oxygen M, PM
- Harvest *, M, PM
- Ocean conditions M, PM
- Delta export mortality *, M, PM

Figure 11. Conceptual model of the factors affecting Chinook salmon population abundance in the Tuolumne River

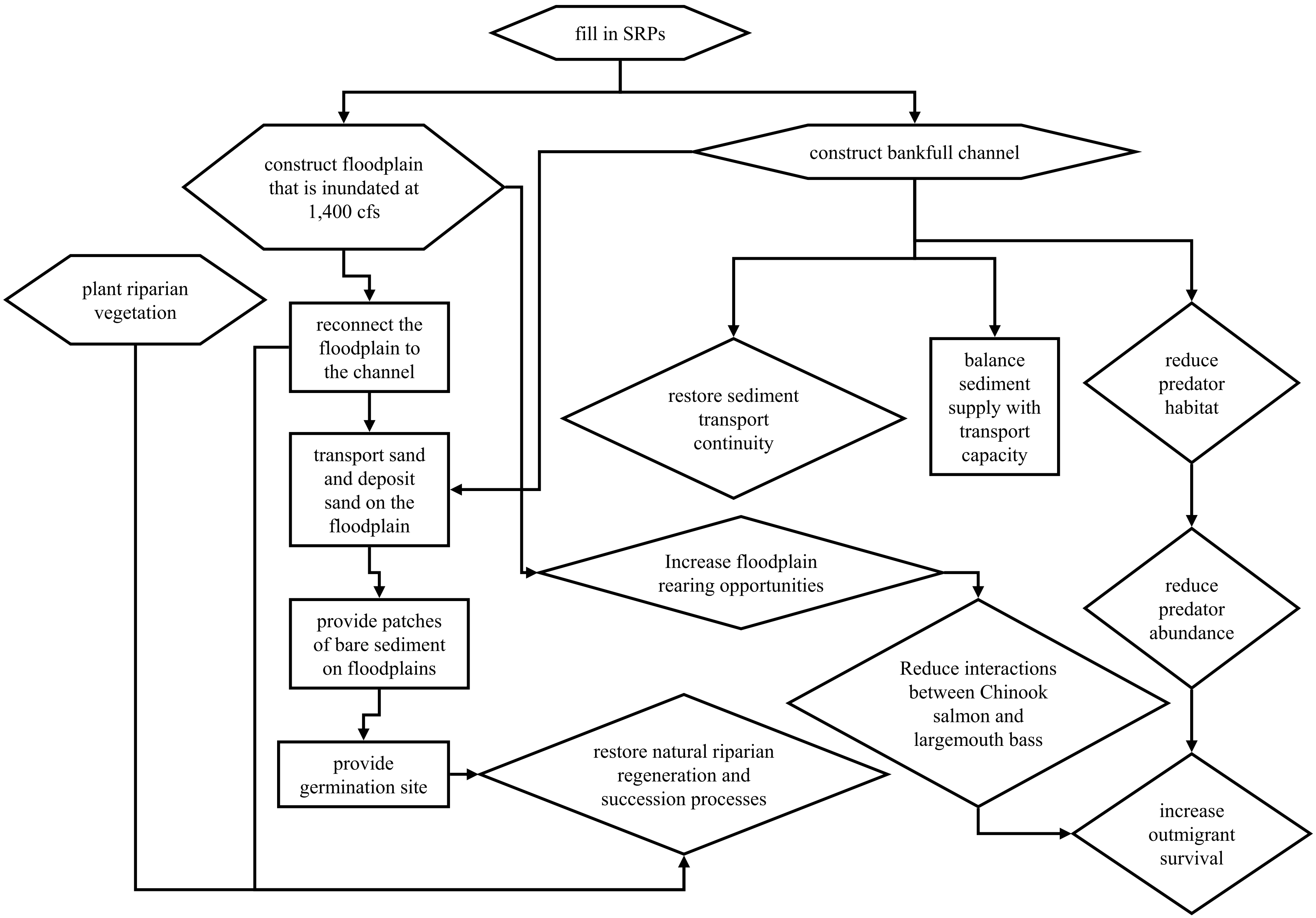


Figure 12. Conceptual model of the effects of the Special Run-Pools (SRPs) 9 and 10 Projects on geomorphic process, riparian vegetation, and Chinook salmon survival

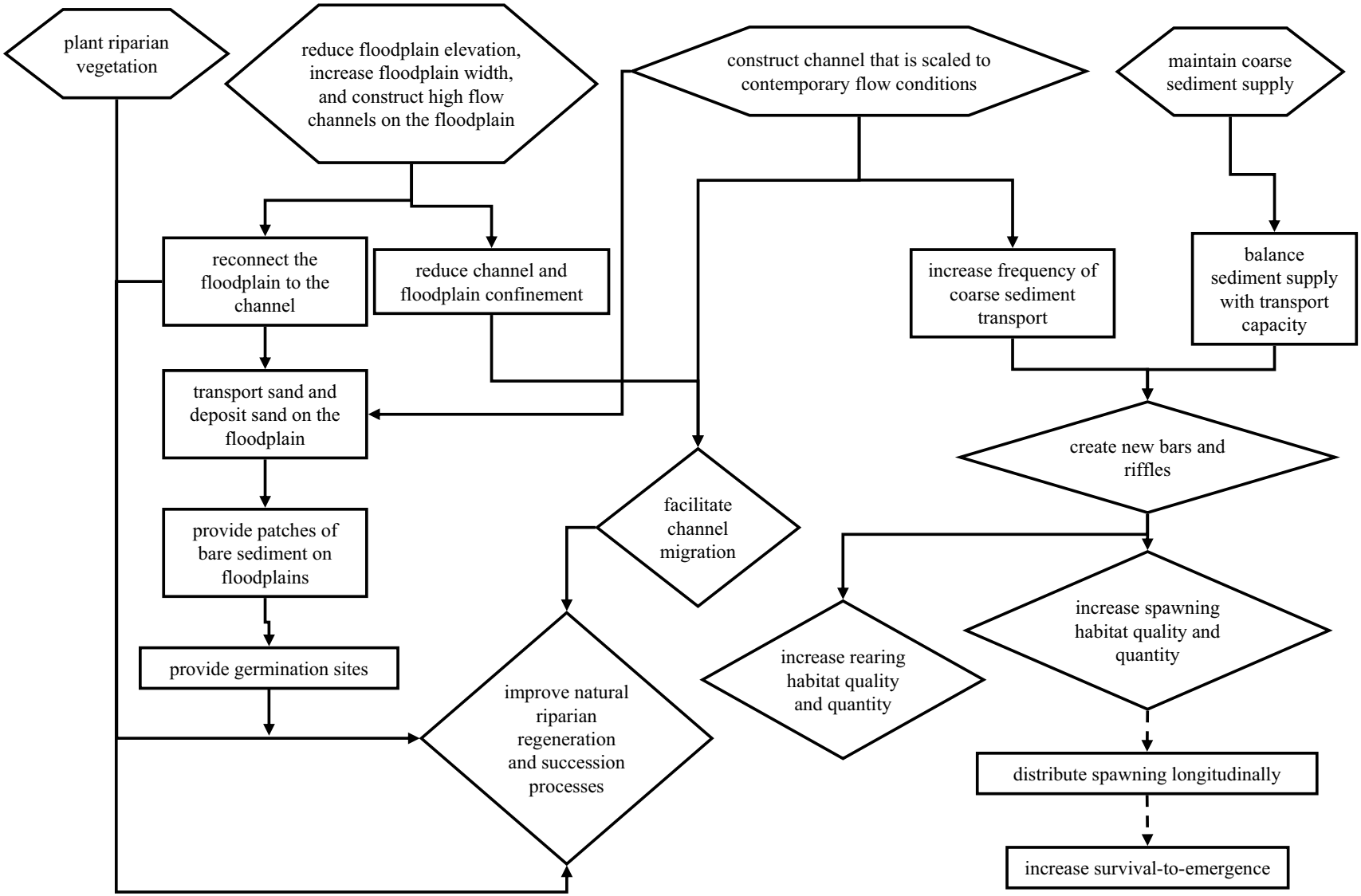


Figure 13. Conceptual model of the effects of the Gravel Mining Reach Project on geomorphic processes, riparian vegetation, and Chinook salmon survival

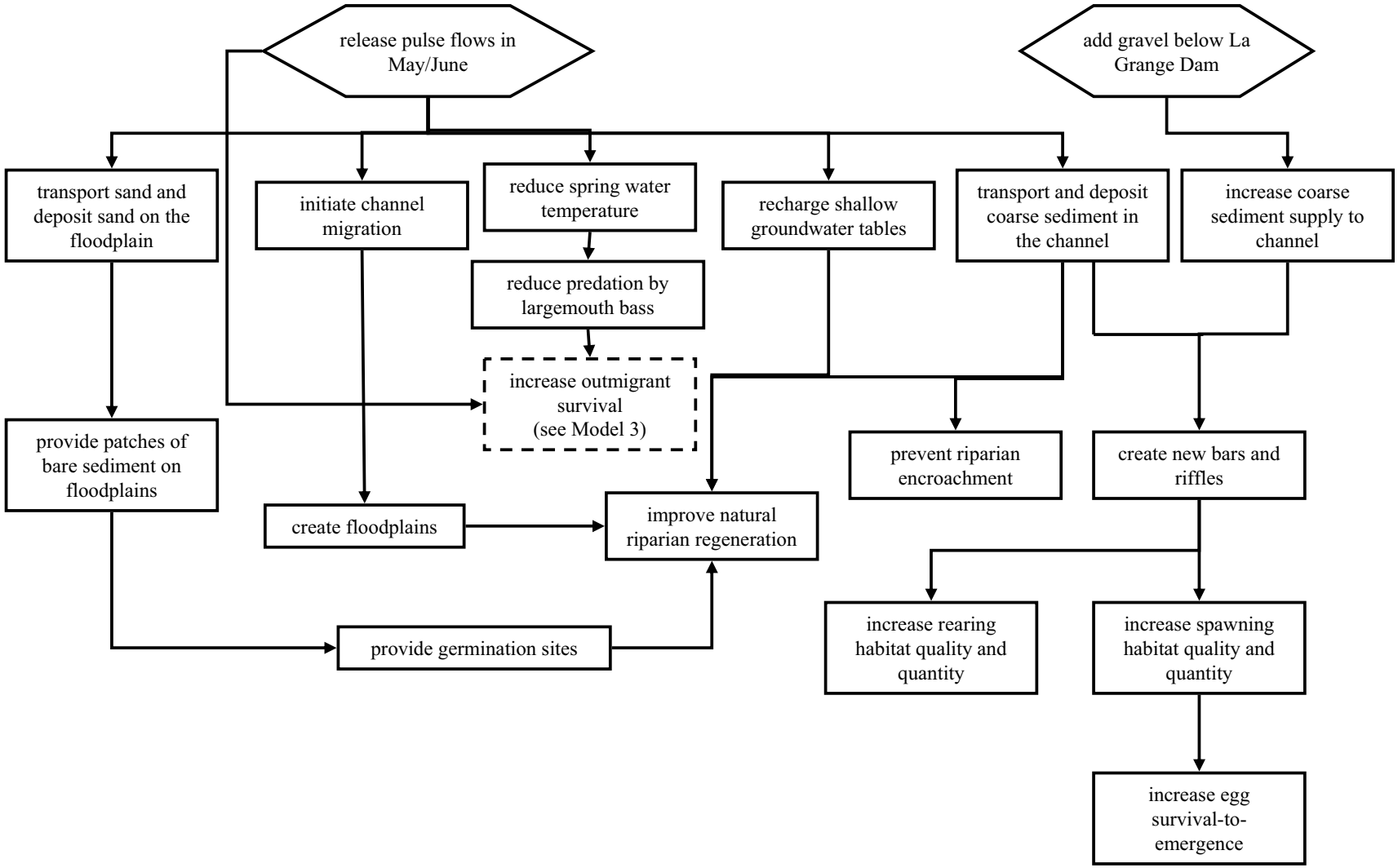


Figure 14. Conceptual model of the effects of flow and coarse sediment management on aquatic and riparian habitat

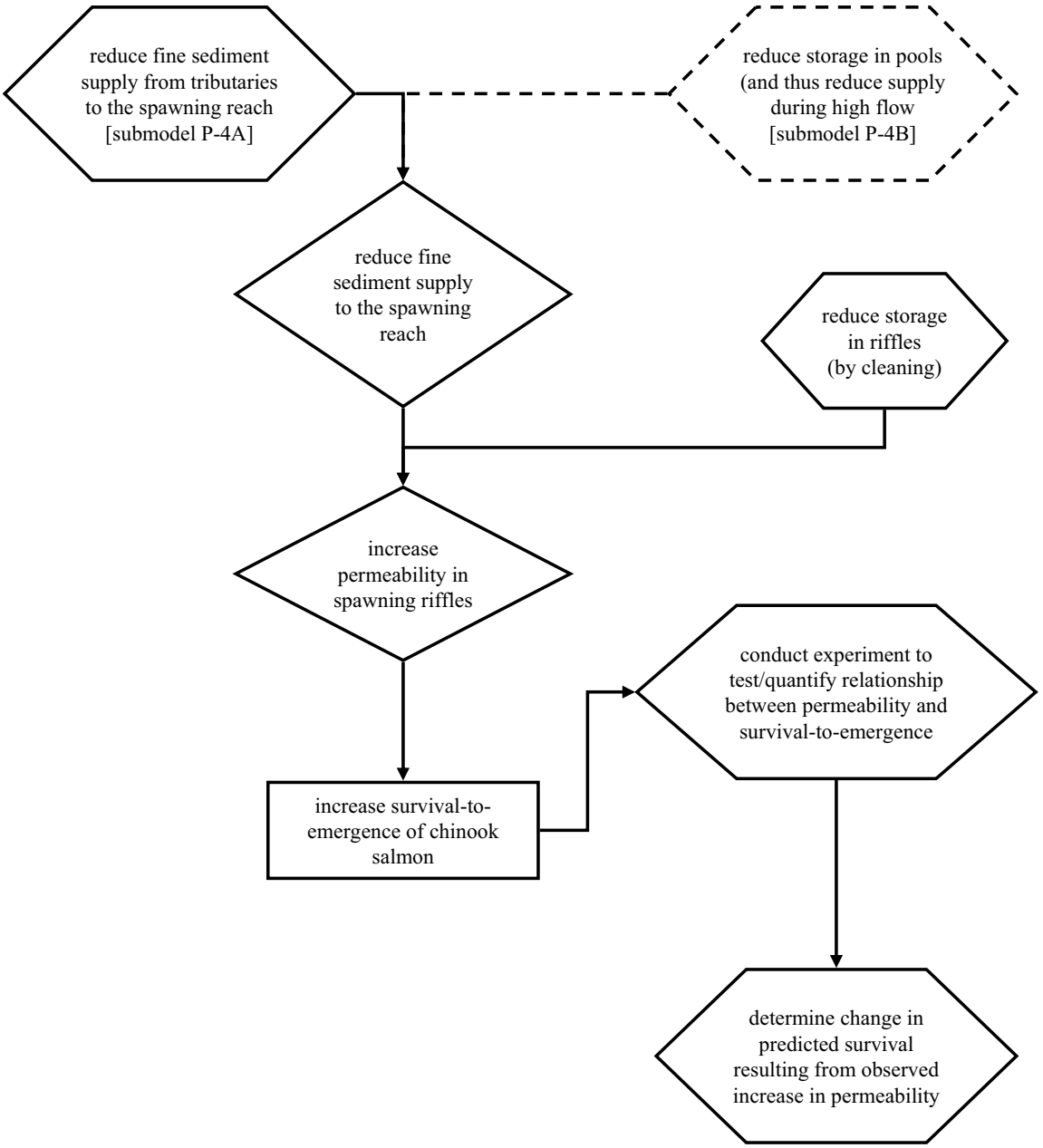
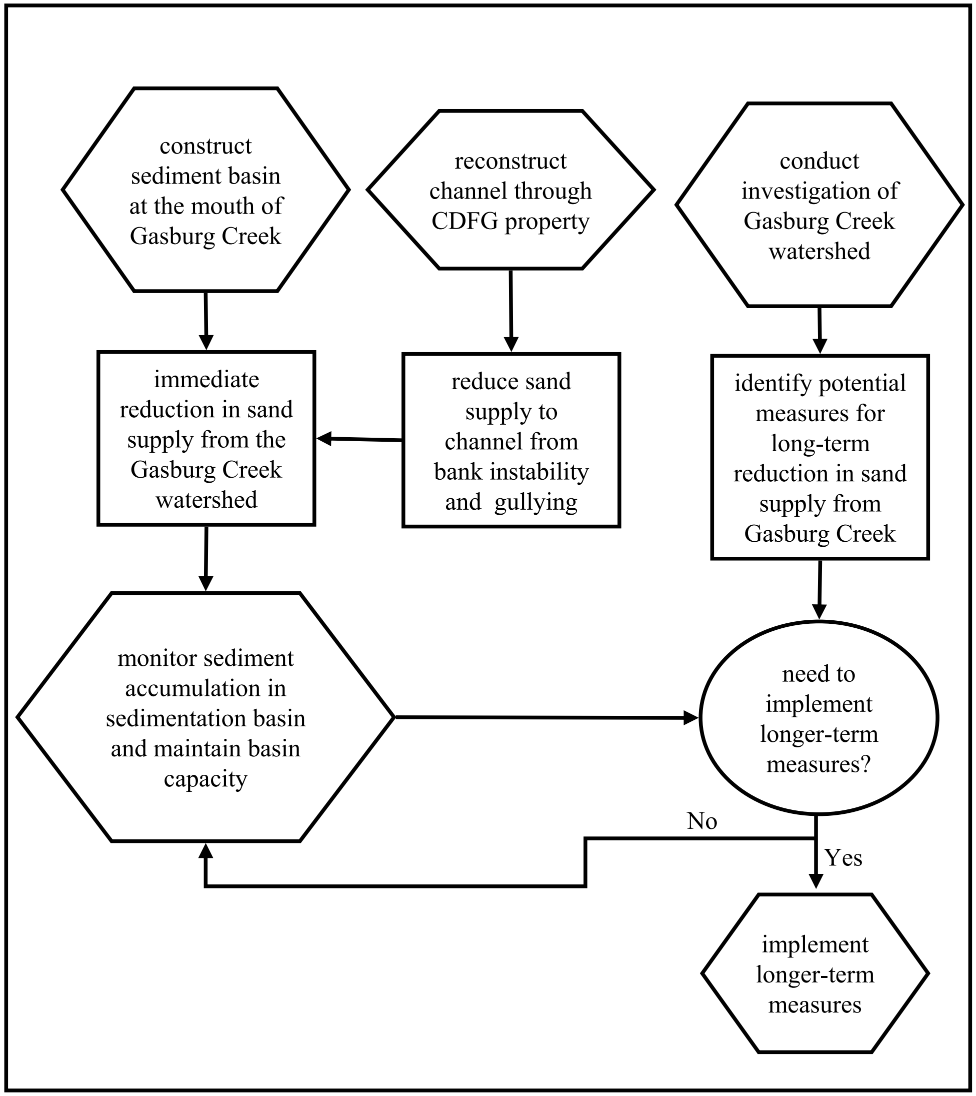
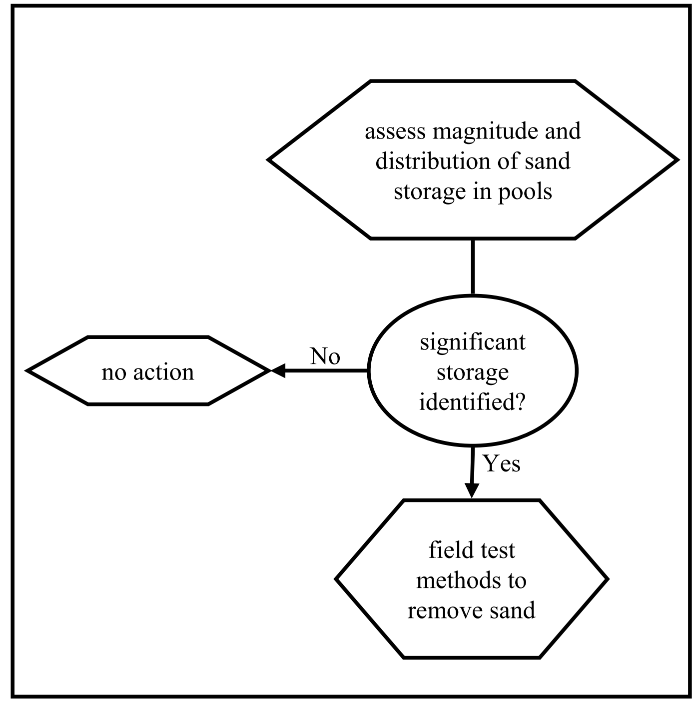


Figure 15. Conceptual model of the effects of fine sediment management on substrate conditions and Chinook salmon survival



Submodel P-4A. Reduce supply from Gasburg Creek



Submodel P-4B. Reduce storage in and supply from pools

Figure 15. Continued, submodel P-4A and P-4B

Table 1. Gravel Mining Reach funding, implementation, and monitoring status.

Project Reach (ERP and AFRP Project IDs) [Grantee]	Project Implementation Status	Project Monitoring Status
7/11 Reach (ERP-97-M09, AFRP-1997-03, ERP-98-F06) [TID]	The 7/11 Reach was funded by the CBDA for $2,801,000 and AFRP for $4,196,000, with additional funding and in-kind contributions of $448,000 from TID, MID, and CCSF. Construction of this project is complete. Grading occurred from April 2002 through March 2003, with in-channel grading limited to the summer work window defined by project permits. Planting was conducted from February through April 2003, with additional follow-up planting in January 2004. Irrigation and plant maintenance ended in September 30, 2004.	Completed monitoring includes: • Pre-project and as-built pebble counts; • Pre-project and as-built aerial photography, topography, cross sections, and profile; • Riparian vegetation as-built planting and survival (2 yrs); • Pre- and post-project Chinook salmon habitat mapping; and • Annual Chinook salmon redd counts (conducted by CDFG) • Marked rocks will be placed winter 2005 for monitoring post-project bed mobility thresholds. High flow water surface elevations will be monitored in 2005. No additional monitoring is funded at this site. Pre-project monitoring results are reported in McBain and Trush and Stillwater Sciences (1999, 2000). The as-built monitoring report is in preparation. The final report will be available in April 2005.
MJ Ruddy Segment (AFRP-1999-09) [TID]	The Project has been fully funded in the amount of $7,737,000 with $115,000 from the Districts and $7,622,000 from the AFRP. The design work is complete, ROW acquisition is underway, and construction in anticipated in the spring of 2005 with revegetation in the fall of 2005. Maintenance of revegetation plantings will extend through September 2006.	Completed monitoring includes: • Pre-project and as-built pebble counts; • Pre-project and as-built aerial photography, topography, cross sections, and profile; • Pre-project Chinook salmon habitat mapping; and • Annual Chinook salmon redd counts (conducted by CDFG) Due to a shortage of funds, CBDA eliminated post-construction monitoring from the scope of work funded by their grant. Proposed monitoring included: • As-built topography, cross sections, profile, and pebble counts; • Two repeat cross section and profile surveys with pebble counts; • Marked rock placement and maintenance for two years; • Survival, cover, and growth of planted riparian vegetation; and • Chinook salmon habitat mapping at one flow. Pre-project monitoring results are reported in McBain and Trush and Stillwater Sciences (1999, 2000). Post-project monitoring will begin in 2005.

Table 1. Continued

Warner-Deardorff (ERP-02-P19-D, AFRP-2001-02) [TID]	The Project has been fully funded with $518,670 from the US Fish & Wildlife AFRP and $10,800,000 from the CBDA. The design and permitting of the MJ Ruddy and Warner Deardorff segments has been done as one project under the District's contribution for the MJ Ruddy Segment. The design work is 90% complete; ROW acquisition will commence after completion of the MJ Ruddy ROW acquisition, and construction in anticipated in the spring of 2006 with revegetation in the fall of 2006. Maintenance of the revegetation planting will extend through September 2007.	Funded pre- and post-construction monitoring includes: • Aerial photography, topography, cross sections, profile, and pebble counts; • One repeat cross section and profile survey with pebble counts; • Marked rock placement and maintenance for one year; • Survival, cover, and growth of planted riparian vegetation; and • Chinook salmon habitat mapping at one flow. No pre-project monitoring has been conducted at this time.
Reed Segment [N/A]	While the Reed Segment has been identified as the fourth project in the Mining Reach there has been no funding by the State, Federal, or District pledged or awarded for the project at this time. In 1999 the estimated cost for this project was $3,170,000. The funding Agencies have asked to see the first three segments completed first before considering funding for the Reed Segment.	No monitoring is funded at this time.

Table 2. SRPs 9 and 10 funding, implementation, and monitoring status.

Project Reach (ERP and AFRP Project IDs) [Grantee]	Project Implementation Status	Project Monitoring Status
SRP 9 (ERP-97-M08, AFRP-1997-01) [TID]	The SRP 9 phase was funded by CBDA for $2,232,000 and AFRP for $271,000, with additional funding and in-kind contributions of $227,000 from TID, MID, and CCSF. Project construction is complete. Grading was conducted from June 1, 2001 through October 15, 2001. Revegetation was accomplished from November 1 through December 31, 2001; irrigation and planting maintenance continued through September 2003.	Completed monitoring includes: • Pre-project and as-built pebble counts; • Pre-project and as-built aerial photography, topography, cross sections, and profile; • Riparian vegetation as-built planting and survival (2 yrs); • Pre- and post-project largemouth bass and Chinook salmon habitat mapping; and • Pre- and post-project largemouth bass, smallmouth bass, and Chinook salmon habitat suitability modeling; and • Two years pre-project and one year post-project bass abundance and fish community (electrofishing) surveys. Two years of pre-project Chinook salmon survival tests were also conducted. These tests were not successful in quantifying survival through the project reach and were abandoned. Pre-project monitoring results (including survival experiments) are reported in McBain and Trush and Stillwater Sciences (1999, 2000). The as-built monitoring report is in preparation. The final report will be available in April 2005. One year of additional post-project bass abundance surveys and one year of additional assessment of Chinook salmon migration and survival was funded through an amendment in September 2004. Bass abundance surveys were attempted in October 2004 but halted sur to the presence of salmon in the river. Chinook salmon survival and bass predation assessment is scheduled for spring 2005.

Table 2. Continued

SRP 10 (ERP-99-F01, AFRP-2000-12, ERP-01-N03) [TID]	The dike repair funded by AFRP-2000-12 was completed in 2001. The remaining portions of the project are divided into two phases. Phase I involved design, ROW appraisals, and permits that has been funded by CBDA in the amount of $543,350. The design is 85% complete. Phase II has not been funded and will involve ROW acquisition, construction, and revegetation at an estimated cost of $4,250,000. It is anticipated that CBDA will have a construction funding PSP available in early 2005. Assuming the project is awarded funding by the fall of 2005 it may be possible to acquire ROW and construct in 2006. This would place revegetation in fall 2006 with maintenance extending through September 2007.	Pre-project monitoring for SRP 10 was the same as for SRP 9 and was conducted at the same time. Pre-project monitoring results (including survival experiments) are reported in McBain and Trush and Stillwater Sciences (1999, 2000). No as-built monitoring or post project monitoring is funded at this time.

Table 3. Coarse sediment augmentation funding, implementation, and monitoring status.

Project Reach (ERP and AFRP Project IDs) [Grantee]	Project Implementation Status	Project Monitoring Status
Coarse Sediment Management Plan (AFRP-2000-41) [TID]	The Tuolumne River Coarse Sediment Management Plan was completed and published in November 2003. Subsequent review of the Plan identified concerns that the coarse sediment augmentation methods and site locations included in the CSMP could adversely impact existing *O. mykiss* habitat and may not provide sufficient immediate benefit to Chinook salmon and *O. mykiss* spawning habitat. The revised CSMP was completed in July 2004.	Surveys and analyses completed for the CSMP and reported in McBain and Trush (2004) included: • Assessment of historic and current coarse sediment supply; • Baseline channel morphology surveys from La Grange Dam (RM 52) to Roberts Ferry Road (RM 39.5), including 25 channel cross sections and numerous pebble count locations; • Fine sediment and sand source evaluation and mapping of mainstem channel sand storage from La Grange Dam (RM 52) to Roberts Ferry Road (RM 39.5); • Mesohabitat mapping from La Grange Dam (RM 52) to Roberts Ferry Road (RM 39.5), including mapping of potentially important *O. mykiss* habitats. • Habitat assessment at four reference spawning riffles; • Reach-scale numerical modeling of bed mobilization thresholds and tracer rock experiments at four sites; • Reach-scale numerical modeling of bedload transport rates and bedload transport monitoring (for flows ranging from 4,020 cfs to 6,700 cfs); • Quantification of historic (pre-dam), pre-1997 flood (1988), and current riffle area; • Analysis of Chinook salmon spawning distribution based on CDFG peak redd counts (1981-2001); and • Predictive modeling of Chinook salmon population response to coarse sediment augmentation.
Spawning Gravel Introduction, Tuolumne River, La Grange at Basso Bridge (ERP-97-C11) [CDFG]	This project has been funded for $250,975 by CBDA. From 1999 through 2003, CDFG implemented several projects to place coarse sediment at Riffle 1A and Riffle A7 near La Grange. In the early 1990s, CDFG and CDWR also implemented two coarse sediment augmentation projects funded by the Four Pumps Mitigation Funf.	Completed monitoring includes: • Channel morphology (using cross section profile surveys) • Channel migration (using permanent cross section surveys) • Bed texture (using pebble counts) • Sediment transport thresholds (using tracer rocks, bulk samples); and • Pre- and post-project Chinook salmon redd counts. Results of the pre-construction and as-built monitoring are reported in CDWR (2000) and subsequent monitoring reports.

Table 3. Continued

Bobcat Flat – RM 43 ERP-00-F01 [FOT] 4 Pumps [TID]	CBDA funded a grant of $1,984,320 to Friends of the Tuolumne (FOT) for property acquisition, floodplain restoration and coarse sediment augmentation. An additional $300,000 in funding was provided to TID for coarse sediment augmentation by the California Department of Water Resources Four Pumps Project Mitigation Fund. Final coarse sediment augmentation designs are complete. Implementation is expected to occur in summer 2005.	Funded pre-project monitoring for the coarse sediment augmentation includes: • Chinook salmon habitat mapping; • Biweekly mapping of Chinook salmon redds; • Bed texture assessment (facies mapping and pebble counts); • Bed substrate assessment (bulk sampling); and • Permeability measurements at spawning riffles. Habitat mapping was completed in 2004. Chinook salmon redd mapping is being conducted November – December 2004. *O. mykiss* redd mapping will be conducted from January through June Bed texture, substrate, and permeability monitoring will be conducted in summer 2005. **No post-project monitoring is funded at this site. FOT is submitting a separate but complementary proposal for post-project *O. mykiss* and predator monitoring at this site. Post-project geomorphic and Chinook salmon monitoring is included in this proposal.**
Tuolumne River Coarse Sediment Transfusion Project (ERP-02-P29) [TID]	This project has been funded for $4,400,000 with the Districts contributing $50,000 and the CBDA contributing $4,350,000. The design and permitting work has started. The scope of the project is being amended to move funds originally slated for developing the coarse sediment sources at two offsite dredger tailings areas to purchasing of the required aggregate through commercially permitted sources. Approximately 140,000 cy of coarse sediment will be placed at in the river from La Grange to Basso Bridge. It is anticipated that placement will take two years, starting in the summer of 2005. There is no revegetation associated with the gravel transfusion project.	This project is currently under review by CBDA for a Level III amendment. If the amendment is approved, funded monitoring will include: • channel bed texture and monitor bed mobility thresholds; • reach-scale channel cross section and profile; • detailed topographic surveys at augmentation sites to quantify net sediment removal; • Reach-scale geomorphic planform and habitat mapping; and • Substrate permeability. Project design tasks in the amendment request include funds to develop a hydraulic and sediment transport model for the reach from upstream of La Grange to Roberts Ferry Bridge (i.e., the upstream end of the Gravel Mining Reach Project). Developing hydraulic and sediment transport models for the river was specifically recommended by the CALFED Adaptive Management Forum (AMF 2001).

Table 4. Fine sediment management funding, implementation, and monitoring status.

Project Reach (ERP and AFRP Project IDs) [Grantee]	Project Implementation Status	Project Monitoring Status
Fine Sediment Management Plan: Part 1 – Riffle Cleaning (ERP-01-N09) [TID]	The project has been funded by CBDA in the amount of $404,230. Project components include: (1) cleaning (i.e. removing sand and fine sediment) five Chinook salmon spawning riffles; and (2) quantifying the relationship between substrate permeability and Chinook salmon survival-to-emergence. The survival to emergence study has been conducted. Experiments to quantify the relationship between substrate permeability and Chinook salmon survival-to-emergence were conducted in 2001. Due to late implementation and the possibility of using eggs from an unripe female, many of the planted eggs died due to disease, parasites, or other factors not related to substrate permeability. Although results generally support project hypotheses, additional funding is being sought to conduct additional experiments that will data points in the mid-range of permeabilities observed in the Tuolumne River. The methods and equipment for cleaning sand from riffles were evaluated and are reported in the CSMP (McBain and Trush 2004). It is anticipated riffle cleaning will be conducted in the summer of 2005.	Funded monitoring includes permeability measurements at cleaned riffles pre-cleaning, immediately following cleaning, and one year after cleaning. Permeability monitoring at cleaned riffles will be conducted in summer 2005.
Fine Sediment Management Plan: Part 2 – Gasburg Creek Sediment Reduction (ERP-01-N09) [TID]	The project has been funded by CBDA in the amount of $590,880. Project components include: (1) quantify sediment supply and sources from Gasburg Creek; (2) design and implement restoration in lower Gasburg Creek; and (3) design and construct an interim sedimentation basin in lower Gasburg Creek. The Gasburg Creek sediment source analysis is complete and is reported in Stillwater Sciences (2004). Conceptual sedimentation basin and creek restoration designs are complete. Construction is scheduled for summer 2005. CDFG has requested the option of constructing the works and revegetation rather than going out for bids on the restoration work.	Funded monitoring includes: • As-built and 1 year post-project sedimentation basin surveys; and • As-built and 1 year post-project channel cross sections and vegetation surveys. Gasburg Creek monitoring will be conducted in 2005 and 2006.

Table 5. Monitoring hypotheses, metrics, methods, and relationships to other monitoring across spatial scales for funded and proposed tasks.

7/11, M.J. RUDDY, AND SRP 9 MONITORING (site-scale)

Hypotheses

H1. The constructed channel conveys 5,000 cfs; flows exceeding 5,000 cfs spill over onto the floodplain.
H2. The channel bed is mobilized at flows of 5,000 cfs.
H3. The constructed bankfull channel morphology is stable, where stable is defined as the longer-term channel dimensions under a dynamic channel morphology.
H4. The channel migrates under the current flow regime, although migration rates will be small.
H5. The extent and quality of Chinook salmon spawning and rearing habitat is increased.
H6. Chinook salmon spawning and rearing densities in the project reach will be similar to in nearby "healthy" river reaches and significantly higher than nearby mined reaches.
H7. Planted riparian vegetation will become established on the constructed floodplain.
H8. Natural recruitment of native riparian plant species will occur on the constructed floodplain.
H9. Riparian vegetation will not encroach into the constructed channel.
H10. Establishment of planted riparian vegetation will result in increased abundance and diversity of native, riparian nesting songbirds.

H12. Elimination of the pits will result in reduction of largemouth bass abundance at the project sites and an increase in Chinook salmon outmigrant survival at the project sites.

Hypothesis	Task	Metric	Method	Relationship to Other Monitoring of Other Metrics or Scales
H3, H9	3A	Channel morphology	Digital terrain mapping	Pre- and post-project digital terrain models for 7/11 and SRP 9 are complete.
			Cross sections and profile: Pre-project and as-built. Post-project surveyed after each of two high flow events exceeding 5,000 cfs.	Site-specific cross sections and profiles augment channel surveys that extend from RM 52 to RM 36 (see Task 5B). Twenty-five (baseline) cross sections have been surveyed from La Grange (RM 52) to Basso Bridge (RM 47.5).
	3C	Channel migration	Low altitude aerial photographs: One time following a flow > 9,000 cfs (i.e., the maximum in-channel flow under ACOE flood rules).	Site aerial photographs can also be used to assess riparian vegetation establishment at the restoration site (see Task 3F).
H1	3D, 3E	Hydraulics	Monitoring of water surface elevation during first high flow after construction that meets or exceeds design discharge	Project-specific HEC-RAS models developed for the Gravel Mining Reach can be linked to the HEC-RAS model for the La Grange to Roberts Ferry reach to developed with funds from the Tuolumne River Sediment Transfusion Project design task.
H2	3B	Bed mobility	Tracer rocks representing D_{50} and D_{84} particle sizes at two riffles in the SRP 9 reach placed at monitoring cross sections (see H3/H9 above)	Project-specific bed mobility monitoring will augment reach-scale monitoring proposed in Task 5A.
			Pebble counts and bulk samples at two reconstructed riffles in each phase	Project-specific bed texture and substrate composition data can augment reach-scale data included in Task 5A.
H5	N/A	Habitat structure and suitability	Habitat mapping at low and high flows	Pre- and post-project habitat mapping in the 7/11 Reach and habitat suitability modeling for largemouth and smallmouth bass and juvenile Chinook salmon in the SRP 9 reach is complete. No addition habitat mapping or modeling is proposed.

Table 5. Continued

H6	3H	Spawning utilization and habitat characterization	Biweekly redd counts at each reconstructed riffle in the reach, combined with measurement of flow depth, flow velocity, and temperature during spawning.	Redd counts conducted weekly by CDFG from RM 51.6 to RM 26 from 1981-2004 will provide control sites and baseline data, as well as river-wide context for spawning use at each riffle. Continuation of CDFG redd counts is proposed in Task 6D.
H6	3i	Juvenile salmonid density and size	Weekly seine surveys at least one location in each project reach	Seine surveys conducted annually by TID from 1986 through 2004 will provide control sites and river-wide context for juvenile distribution, density, and size. Continuation of these surveys is proposed in Task 6B.
H7	3F, 3G, 3J	Survival, growth, and cover of planted riparian vegetation	Plot-based survival, percent cover, and growth, with plots located along cross sections established for geomorphic monitoring at Year 0 (as built), Year 2 (end of irrigation), and Years 3 and 5. (Years 3 and 5 are not funded.)	N/A
H8	3G	Seedling establishment (for native woody riparian plants)	Annual plot-based surveys documented seedling species and age on floodplain surfaces. Analysis of flow conditions associated with seedling establishment (from water surface monitoring in 3E combined with nearby streamflow gauge data).	Seedling recruitment and establishment surveys will use methods that are comparable to seedling recruitment studies being conducted on the Merced and Tuolumne rivers by John Stella (university of California - Berkeley) and Stillwater Sciences with funding from the CBDA. Application of similar methods will support comparison of results between watersheds and will improve the utility of the recruitment models being developed to restoration design in the Central Valley.
H10	N/A	Predator abundance (SRPs 9 and 10 only)	Depletion electrofishing (at project and reference sites), baseline: summer 1998 and 1999, post-project: summer 2003.	N/A
H11	N/A	Juvenile Chinook salmon survival (SRPs 9 and 10 only)	Mark-recapture at rotary screw traps: pre-project (1998 and 1999)[1]	N/A. This monitoring was not successful. Implementation was not able to satisfy model assumptions. Results and violations of the assumptions are reported in Stillwater Sciences (1998 and 1999).
H11, H12	N/A	Predation rates on juvenile salmon	Quantification of predation rates at SRP 9 and control SRP and channel sites during spring outmigration	This task is funded under the existing SRP 10 project funds and will be implemented in spring 2004. TID is working with Stillwater Sciences to develop a proposal to submit to the Science Program in January 2005 to assess river-wide predator distribution, abundance, and population dynamics.

Table 5. Continued

FINE SEDIMENT MANAGEMENT (site-scale and reach-scale)

Hypotheses

H1. Gasburg Creek is a major source of fine sediment and sand to the Tuolumne River primary spawning reach. The interim sedimentation basin will reduce fine sediment and sand yield to the river.

H2. The reconstructed Gasburg Creek channel will remain stable in cross section and profile.

H3. Planted riparian vegetation along the reconstructed Gasburg Creek will achieve at least 75% survival following two years after irrigation is ended.

H4. Accumulation of fine sediment and sand in the bed of the Tuolumne River has reduced substrate permeability to levels that limit salmon survival-to-emergence.

H6. In cleaned riffles, substrate permeability will increase to levels that can support at least 80% survival-to-emergence (assuming that temperature or other factors do not limit survival-to-emergence). As sediment accumulates in riffles following project construction, permeability will decrease over a period of years eventually returning to pre-cleaning conditions. (The period of time over which increased permeability is observable is not known.)

H7. Reducing the volume of fine sediment stored in riffles will alter invertebrate habitat, leading to a shift from armored to soft-boded organisms and providing greater productivity and food value for salmonids and other native fish species.

H8. Chinook salmon will preferentially utilize cleaned riffles and coarse sediment augmentation sites for spawning (compared to nearby uncleaned, "natural" riffles with similar

H9. The increase in spawning habitat area (resulting from coarse sediment augmentation) will reduce redd superimposition and shift stock-recruitment curves up (i.e., increase recruitment per female spawner).

Hypothesis	Task	Metric	Method	Relationship to Other Monitoring of Other Metrics or Scales
H1	4A	Sediment accumulation in the sedimentation basin	Repeat total station surveys on the sedimentation basin	Observed sediment accumulation in the sedimentation basin can be used to verify the conclusions of the Gasburg Creek Sediment Source Analysis (Stillwater Sciences 2004).
H2	4B	Channel morphology	Repeat cross section and profile surveys	N/A
H3	4B	Survival and percent cover of planted riparian vegetation	Plot-based survival, percent cover, and growth, with plots located along cross sections established for geomorphic monitoring at Year 0 (as built), Year 2 (end of irrigation), and Years 3 and 5. (Years 3 and 5 are not funded.)	N/A
H1	4C	Suspended sediment transport	Synoptic suspended sediment monitoring in potential high yield tributaries during similar storm events	Potential high yield tributaries were identified through reconnaissance-level field surveys of watershed conditions and sediment storage in the mainstem channel funded by the Coarse Sediment Management Plan grants and are reported in McBain and Trush (2004).
H7	4D	Benthic macroinvertebrate composition, abundance, biomass and diversity	Hess samples (3/site) collected at five sites over three summers (total of seven sample events at each site)	The proposed sample design includes treated and untreated, baseline and post-treatment samples sufficient to conduct a BACI analysis. Additional reach-scale baseline data are available from invertebrate trend monitoring conducted by the Districts in 1996, 1997, 2000–2004. The 2000-2004 monitoring used the CSBP protocols. Continuation of macroinvertebrate trend monitoring is included in Task 6F.

Table 5. Continued

H8, H9	4E	Redd distribution and superimposition	Repeat redd mapping and redd characterization at six monitoring sites extending over Chinook salmon spawning season for three years, combined with measuring flow depth and flow velocity at a subset of redds.	This task also provides data for monitoring effectiveness of coarse sedoment augmentation. Redd counts conducted weekly by CDFG from RM 51.6 to RM 26 from 1981-2004 will provide additional baseline data, as well as river-wide context for spawning use at each riffle. Continuation of CDFG redd counts is proposed in Task 6D.
H6	N/A	Substrate permeability	Permeability measurements at five cleaned riffles for three years using methods and sampling described in Stillwater Sciences 2001 (This sampling approach was developed to provide sufficient power to detect a 20% change in predicted salmon survival to emergence.)	**Continued permeability monitoring at cleaned riffles is included in Task 5E.** One year of post-project permeability monitoring in the five cleaned riffles is included in the current Fine Sediment Management Plan contract. Assuming that cleaning is implemented in 2005, proposed monitoring in Task 5E would add two years to post-project monitoring.

Table 5. Continued

COARSE SEDIMENT MANAGEMENT (site-scale and reach-scale)

Hypotheses

H1. An increase in coarse sediment supply will increase low-flow and bankfull channel confinement and reduce the particle size distribution of the channel bed substrates, thereby lowering bed mobility thresholds and increasing the frequency of bed mobility.

H2. An increase in coarse sediment supply will encourage channel migration, floodplain formation, lateral bar formation important for sediment storage and fry rearing, and

H3. An increase in coarse sediment supply, reduction in particle size distribution, and an increase in the frequency of bed mobilization will increase (over existing conditions) the volume of sediment augmentation needed to maintain equilibrium of in-channel sediment storage and downstream transport.

H4. Increasing sediment supply (in conjunction with periodic high flows) will increase salmonid spawning habitat availability in the gravel-bedded zone to habitat quantities approaching the density in the reach between New La Grange Bridge and Basso Bridge.

H5. The density of fall-run Chinook salmon redds will be higher in unconsolidated introduced coarse sediment than at unrestored, embedded spawning gravels (from CMC 2002a).

H6. Salmonid spawning gravel without fine sediment added to the channel will increase intragravel flow of water in redds (from CMC 2001).

Hypothesis	Task	Metric	Method	Relationship to Other Monitoring of Other Metrics or Scales
H1	5A, 5B	Channel morphology and surface particle mobility thresholds	Survey channel cross sections to document channel readjusting its dimensions as sediment augmentation proceeds; collect pebble counts and install tracer rocks to document mobility thresholds;	As channel dimensions change, particle mobility thresholds should become lower and particle size should become smaller. Sediment transport rates and frequency of bed mobilization will increase due to lower mobility thresholds and smaller particle size;
H2	5B, 5D	Planform mapping	Map geomorphic features as baseline conditions and after implementation of Sediment Transfusion Phase III;	Seining surveys will target sampling reconstructed banks or freshly deposited bar features that have suitable rearing habitat; aerial photos will documents fine sediment deposition on floodplains, especially within project reaches
H3	5A, 5C	Channel morphology and sediment transport measurements	Sediment transport rating curve and sediment routing model	The scale of this hypothesis is across several decades, as enough sediment has been added to affect the particle size and mobility thresholds, bedload impedence reaches are restored, and sediment can route through the entire river system.
H4	5D	Planform habitat mapping	Repeat mapping of spawning habitat area through the gravel-bedded reach to document habitat availability	Increase in spawning habitat area will reduce density-dependent mortality of chinook that results from redd superimposition.
H5	5D	Planform habitat mapping	Use redd mapping data and estimates of habitat area to	Redd mapping is Task 4e
H6	5E	Permeability and particle size composition	Permeability measurements at 14 riffles for two of three years using methods and sampling described in Stillwater Sciences 2001; Data from bulk sampling to estimate percentage of fine sediments detrimental to egg incubation;	Task 5A also employs methods that would allow long-term monitoring of fine sediment deposition into restored spawning gravels.

Table 6. Project Schedule*

	TASKS	2006												2007												2008											
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	**PROJECT MANAGEMENT**																																				
	Quarterly reports			■				■			■			■			■			■			■			■			■			■			■		
2	**PUBLIC PARTICIPATION**																																				
2a.	TRTAC participation			■				■			■			■			■			■			■			■			■			■			■		
2b.	Brochure development																															■					
2c.	CALFED Science Conference + publications																																		■		
3	**CONTINUE 7/11, MJR, AND SRP9 PROJECT MONITORING**																																				
3a.	Resurvey cross sections and a longitudinal profiles	■										■												■								■					
3b.	Deploy and maintain tracer rocks	■										■												■								■					
3c.	Map channel migration and other planform changes											■												■								■					
3d.	Monitor peak flow water surface elevations	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3e.	Continuous water surface monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3f.	Monitor planted vegetation							■													■											■					
3g.	Monitor natural recruitment							■													■											■					
3h.	Map spawning location and habitat characteristics											■	■											■	■											■	■
3i.	Conduct Seine Surveys	■	■	■	■	■								■	■	■	■	■								■	■	■	■	■							
3j.	Monitor Groundwater	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3k.	Monitor avian species					■	■											■	■											■	■						
3l.	Report preparation and distribution																																■	■	■	■	■
4	**CONTINUE FINE SEDIMENT MANAGEMENT MONITORING**																																				
4a.	Quantify annual sediment accumulation							■												■											■					
4b.	Monitor channel stability and riparian vegetation							■												■											■					
4c.	Monitor tributary fine sediment contribution	■	■	■									■	■	■	■									■	■	■	■									
4d.	Benthic Macroinvertebrate monitoring						■	■	■	■										■	■	■	■								■	■	■	■			
4e.	Quantify Chinook salmon spawning habitat selection and redd superimposition											■	■											■	■											■	■
4f.	Report preparation and distribution																																■	■	■	■	■
5	**AUGMENT BASELINE AND POST-PROJECT MONITORING FOR COARSE SEDIMENT AUGMENTATION**																																				
5a.	Map Sediment Facies, Pebble Counts, Install Tracer Rocks, Scour Cores	■										■												■								■					
5b.	Survey XS's, LP's, Topography	■										■												■								■					
5c.	Sediment Transport Measurements at R4B	■	■	■									■	■	■	■									■	■	■	■									
5d.	Planform Mapping (alluvial features and meso/microhabitat)							■												■												■					
5e.	Monitor permeability							■												■												■					
5f.	Report preparation and distribution												■												■								■	■	■	■	■
6	**MONITORING OF CUMULATIVE EFFECTS ON TARGET POPULATIONS [CHINOOK SALMON AND O. MYKISS]**																																				
6A.	Juvenile Chinook salmon production and outmigration timing	■	■	■	■	■	■							■	■	■	■	■	■							■	■	■	■	■	■						
6b.	Juvenile Chinook salmon and O. mykiss distribution, abundance, and size (winter and spring)	■	■	■	■	■								■	■	■	■	■								■	■	■	■	■							
6c.	Juvenile Chinook salmon and O. mykiss distribution (summer)						■	■	■	■										■	■	■	■								■	■	■	■			
6d.	Chinook salmon adult escapement and redd distribution										■	■	■	■										■	■	■	■								■	■	■
6e.	O. mykiss adult distribution and redd distribution	■	■	■	■	■	■					■	■	■	■	■	■	■	■					■	■	■	■	■	■	■							
6f.	Benthic macroinvertebrate composition, abundance, and diversity indices.						■	■	■	■										■	■	■	■								■	■	■	■			
N/A	Report preparation and distribution (In the scope of work, report funds are included in each task.)											■	■											■	■									■	■	■	■
7	**Aerial photography, orthorectification, photogrammetry, and bathymetry**																																				
7a.	Air photo flight from LaGrange to San Joaquin River		■																																		
7b.	Install ground control points	■																																			
7c.	Orthorectify aerial photographs				■	■																															
7d.	Photogrammetry topography					■	■																														
7e.	Survey channel bathymetry							■	■																												

**Schedule assumes CBDA Action by June 2005 (as stated in the PSP, p. 24) and contract issuance by December 31, 2005.*

Table 7. Summary of detailed project task and subtask costs for contractors by year.

		YEAR																		
		2006						2007						2008						2006-2008
		TID	M&T	SS	CDFG	SPC	TOTAL	TID	M&T	SS	CDFG	SPC	TOTAL	TID	M&T	SS	CDFG	SPC	TOTAL	TOTAL
TASK 1.	**PROJECT MANAGEMENT**	**$18,000**	**$0**	**$0**	**$0**	**$0**	**$18,000**	**$18,000**	**$0**	**$0**	**$0**	**$0**	**$18,000**	**$18,000**	**$0**	**$0**	**$0**	**$0**	**$18,000**	**$54,000**
TASK 2.	**PUBLIC PARTICIPATION**	**$0**	**$8,900**	**$0**	**$0**	**$0**	**$8,900**	**$0**	**$9,300**	**$0**	**$0**	**$0**	**$9,300**	**$0**	**$67,500**	**$0**	**$0**	**$0**	**$67,500**	**$85,700**
2a.	TRTAC participation	$0	$8,900	$0	$0	$0	$8,900	$0	$9,268	$0	$0	$0	$9,268	$0	$9,654	$0	$0	$0	$9,654	$27,822
2b.	Brochure development	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,177	$0	$0	$0	$25,177	$25,177
2c.	CALFED Science Conference + publications	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$32,627	$0	$0	$0	$32,627	$32,627
TASK 3.	**CONTINUE 7/11, MJR, AND SRP9 PROJECT MONITORING**	**$0**	**$117,600**	**$0**	**$0**	**$20,500**	**$138,100**	**$0**	**$51,300**	**$0**	**$0**	**$21,000**	**$72,300**	**$0**	**$119,000**	**$0**	**$0**	**$21,500**	**$140,500**	**$350,900**
3a.	Resurvey cross sections and a longitudinal profiles	$0	$28,552	$0	$0	$0	$28,552	$0	$9,027	$0	$0	$0	$9,027	$0	$22,189	$0	$0	$0	$22,189	$59,767
3b.	Deploy and maintain tracer rocks	$0	$8,158	$0	$0	$0	$8,158	$0	$2,579	$0	$0	$0	$2,579	$0	$6,340	$0	$0	$0	$6,340	$17,076
3c.	Map channel migration and other planform changes	$0	$4,079	$0	$0	$0	$4,079	$0	$1,290	$0	$0	$0	$1,290	$0	$3,170	$0	$0	$0	$3,170	$8,538
3d.	Monitor peak flow water surface elevations	$0	$11,220	$0	$0	$0	$11,220	$0	$4,367	$0	$0	$0	$4,367	$0	$3,259	$0	$0	$0	$3,259	$18,846
3e.	Continuous water surface monitoring	$0	$1,800	$0	$0	$0	$1,800	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,800
3f.	Monitor planted vegetation	$0	$21,840	$0	$0	$0	$21,840	$0	$0	$0	$0	$0	$0	$0	$22,890	$0	$0	$0	$22,890	$44,730
3g.	Monitor natural recruitment	$0	$5,470	$0	$0	$0	$5,470	$0	$6,860	$0	$0	$0	$6,860	$0	$12,910	$0	$0	$0	$12,910	$25,240
3h.	Map spawning location and habitat characteristics	$0	$0	$0	$0	$20,500	$20,500	$0	$0	$0	$0	$21,012	$21,012	$0	$0	$0	$0	$21,538	$21,538	$63,050
3i.	Conduct Siene Surveys	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3j.	Monitor Groundwater	$0	$13,254	$0	$0	$0	$13,254	$0	$3,546	$0	$0	$0	$3,546	$0	$3,978	$0	$0	$0	$3,978	$20,777
3k.	Monitor avian species	$0	$15,000	$0	$0	$0	$15,000	$0	$15,000	$0	$0	$0	$15,000	$0	$15,000	$0	$0	$0	$15,000	$45,000
3l.	Report preparation and distribution	$0	$8,201	$0	$0	$0	$8,201	$0	$8,604	$0	$0	$0	$8,604	$0	$29,296	$0	$0	$0	$29,296	$46,101
TASK 4.	**CONTINUE FINE SEDIMENT MANAGEMENT MONITORING**	**$0**	**$8,400**	**$43,300**	**$0**	**$0**	**$51,700**	**$0**	**$33,200**	**$56,200**	**$0**	**$0**	**$89,400**	**$0**	**$58,900**	**$140,300**	**$0**	**$0**	**$199,200**	**$340,300**
4a.	Quantify annual sediment accumulation	$0	$0	$0	$0	$0	$0	$0	$13,106	$0	$0	$0	$13,106	$0	$12,537	$0	$0	$0	$12,537	$25,643
4b.	Monitor channel stability and riparian vegetation	$0	$0	$0	$0	$0	$0	$0	$11,393	$0	$0	$0	$11,393	$0	$19,455	$0	$0	$0	$19,455	$30,848
4c.	Monitor tributary fine sediment contribution	$0	$8,407	$0	$0	$0	$8,407	$0	$8,712	$0	$0	$0	$8,712	$0	$15,415	$0	$0	$0	$15,415	$32,534
4d.	Benthic Macroinvertebrate monitoring	$0	$0	$14,066	$0	$0	$14,066	$0	$0	$23,570	$0	$0	$23,570	$0	$0	$76,341	$0	$0	$76,341	$113,978
4e.	Quantify Chinook salmon spawning habitat selection and redd superimposition	$0	$0	$29,223	$0	$0	$29,223	$0	$0	$32,675	$0	$0	$32,675	$0	$0	$63,984	$0	$0	$63,984	$125,882
4f.	Report preparation and distribution	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$11,475	$0	$0	$0	$11,475	$11,475
TASK 5.	**AUGMENT BASELINE AND POST-PROJECT MONITORING FOR COARSE SEDIMENT AUGMENTATION**	**$0**	**$141,900**	**$27,600**	**$0**	**$0**	**$169,500**	**$0**	**$89,300**	**$17,000**	**$0**	**$0**	**$106,300**	**$0**	**$127,400**	**$11,600**	**$0**	**$0**	**$139,000**	**$414,800**
5a.	Map Sediment Facies, Pebble Counts, Install Tracer Rocks, Scour Cores	$0	$19,221	$0	$0	$0	$19,221	$0	$20,182	$0	$0	$0	$20,182	$0	$21,191	$0	$0	$0	$21,191	$60,594
5b.	Survey XS's, LP's, Topography	$0	$31,945	$0	$0	$0	$31,945	$0	$0	$0	$0	$0	$0	$0	$33,542	$0	$0	$0	$33,542	$65,487
5c.	Sediment Transport Measurements at R4B	$0	$33,938	$0	$0	$0	$33,938	$0	$35,635	$0	$0	$0	$35,635	$0	$37,417	$0	$0	$0	$37,417	$106,990
5d.	Planform Mapping (alluvial features and meso/microhabitat)	$0	$24,830	$0	$0	$0	$24,830	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$24,830
5e.	Monitor permeability	$0	$0	$27,588	$0	$0	$27,588	$0	$0	$16,967	$0	$0	$16,967	$0	$0	$11,594	$0	$0	$11,594	$56,149
5f.	Report Preparation	$0	$31,932	$0	$0	$0	$31,932	$0	$33,529	$0	$0	$0	$33,529	$0	$35,205	$0	$0	$0	$35,205	$100,666
TASK 6.	**MONITORING OF CUMULATIVE EFFECTS ON TARGET POPULATIONS [CHINOOK SALMON AND O. MYKISS]**	**$0**	**$0**	**$118,600**	**$150,700**	**$0**	**$269,300**	**$0**	**$0**	**$129,700**	**$150,700**	**$0**	**$280,400**	**$0**	**$0**	**$184,700**	**$150,700**	**$0**	**$335,400**	**$885,100**
6A.	Juvenile Chinook salmon production and outmigration timing	$0	$0	$0	$131,748	$0	$131,748	$0	$0	$0	$131,748	$0	$131,748	$0	$0	$0	$131,748	$0	$131,748	$395,243
6b.	Juvenile Chinook salmon and O. mykiss distribution, abundance, and size (winter and spring)	$0	$0	$37,609	$0	$0	$37,609	$0	$0	$41,151	$0	$0	$41,151	$0	$0	$69,963	$0	$0	$69,963	$148,723
6c.	Juvenile Chinook salmon and O. mykiss distribution (summer)	$0	$0	$33,095	$0	$0	$33,095	$0	$0	$34,419	$0	$0	$34,419	$0	$0	$35,796	$0	$0	$35,796	$103,311
6d.	Chinook salmon adult escapement and spawning distribution	$0	$0	$0	$18,961	$0	$18,961	$0	$0	$0	$18,961	$0	$18,961	$0	$0	$0	$18,961	$0	$18,961	$56,883
6e.	O. mykiss adult distribution	$0	$0	$34,000	$0	$0	$34,000	$0	$0	$34,000	$0	$0	$34,000	$0	$0	$34,000	$0	$0	$34,000	$102,000
6f.	Benthic macroinvertebrate composition, abundance, and diversity indices.	$0	$0	$13,904	$0	$0	$13,904	$0	$0	$20,091	$0	$0	$20,091	$0	$0	$44,911	$0	$0	$44,911	$78,906
TASK 7.	**Aerial photography, orthorectification, photogrammetry, and bathymetry**	**$0**	**$299,600**	**$0**	**$0**	**$0**	**$299,600**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$299,600**
7a.	Air photo flight from LaGrange to San Joaquin River	$0	$105,000	$0	$0	$0	$105,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$105,000
7b.	Install ground control points	$0	$36,750	$0	$0	$0	$36,750	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$36,750
7c.	Orthorectify aerial photographs	$0	$26,425	$0	$0	$0	$26,425	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$26,425
7d.	Photogrammetry topography	$0	$26,425	$0	$0	$0	$26,425	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$26,425
7e.	Survey channel bathymetry	$0	$105,000	$0	$0	$0	$105,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$105,000
	TOTALS	**$18,000**	**$576,400**	**$189,500**	**$150,700**	**$20,500**	**$955,100**	**$18,000**	**$183,100**	**$202,900**	**$150,700**	**$21,000**	**$575,700**	**$18,000**	**$372,800**	**$336,600**	**$150,700**	**$21,500**	**$899,600**	**$2,430,400**
	2006-2008 TOTALS	**$54,000**	**$1,132,300**	**$729,000**	**$452,100**	**$63,000**	**$2,430,400**													

Note: rounding error may occur in certain columns.

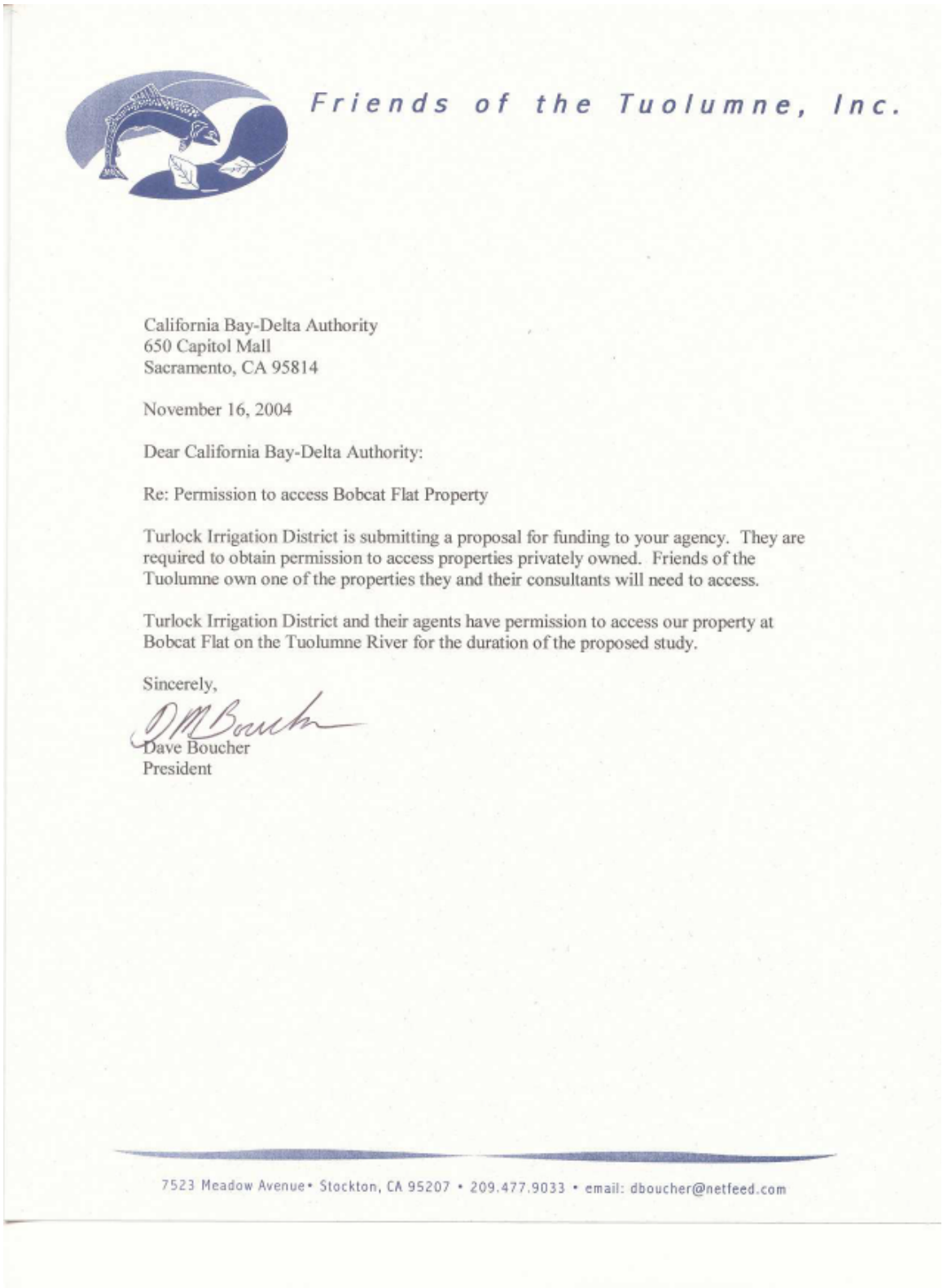
ATTACHMENT A.

CDFG Collection Permit Numbers

STAFF NAME	PERMIT #	EXPIRATION
S.P Cramer and Associates		
Andrea Fuller	801131-05	11/09/06
Rob Fuller	801131-04	11/09/06
Mike Justice	801018-03	04/30/06
Ryan Cuthbert	801137-05	11/09/06
Chrissy Sonke	801137-01	11/09/06
Doug Demko	801131-03	11/09/06
Ryan Fuller	801137-02	11/09/06
Chris Anderson	801200-02	12/17/04
Jesse Anderson	801222-01	10/02/05
Jim Inman	801043-04	04/30/06
Gabe Kopp	801043-05	04/30/06
Stillwater Sciences		
Michael Fainter	801094-03	2006 May
AJ Keith	801095-02	2006 May
Sapna Khandwala	801094-04	2006 May
Steve Kirihara	801184-01	2005 August
Russ Liebig	801087-04	2006 May
Bruce Orr	801094-01	2006 August
Ryan Peek	801183-04	2005 August
Matt Sloat	801193-05	2006 August
Wayne Swaney	801183-05	2005 August
Jesse Wechsler	803051-03	2006 August
Scott Wilcox	801095-04	2006 May

ATTACHMENT B.

Landowner Permission to Access the Bobcat Flat site



Friends of the Tuolumne, Inc.

California Bay-Delta Authority
650 Capitol Mall
Sacramento, CA 95814

November 16, 2004

Dear California Bay-Delta Authority:

Re: Permission to access Bobcat Flat Property

Turlock Irrigation District is submitting a proposal for funding to your agency. They are required to obtain permission to access properties privately owned. Friends of the Tuolumne own one of the properties they and their consultants will need to access.

Turlock Irrigation District and their agents have permission to access our property at Bobcat Flat on the Tuolumne River for the duration of the proposed study.

Sincerely,

Dave Boucher
President

7523 Meadow Avenue • Stockton, CA 95207 • 209.477.9033 • email: dboucher@netfeed.com

TUOLUMNE RIVER TECHNICAL ADVISORY COMMITTEE

DON PEDRO PROJECT - FERC LICENSE 2299

MODESTO IRRIGATION DISTRICT
TURLOCK IRRIGATION DISTRICT
CITY & COUNTY OF SAN FRANCISCO
CALIFORNIA DEPARTMENT OF FISH & GAME
U. S. FISH & WILDLIFE SERVICE

333 East Canal Drive
Turlock, CA 95381-0949
Phone: (209) 883-8275
Fax: (209) 656-2180
Email: tjford@tid.org

TECHNICAL ADVISORY COMMITTEE MEETING

15DEC, 2004, 9:30 a.m.

Turlock Irrigation District, Lunch Room (2nd floor)

DRAFT AGENDA

1. Introduction
   A. Comments on draft agenda
   B. Correspondence since last meeting
2. **ACTION ITEMS**:
   A. 2002 CWT evaluation
   B. CALFED Science proposal
   C. Monitoring activities
3. General FSA Update:
   A. FSA/Order activity and data/report status (incl. annual and 2005 reports)
   B. Agency and NGO updates
   C. Monitoring
   D. River operations and forecasts
   F. Restoration
      1. Funding, planning and implementation
      2. Project monitoring
      3. Other restoration information (TRC, etc.)
4. Additional items
5. Next meeting and topics

TUOLUMNE RIVER TECHNICAL ADVISORY COMMITTEE
DON PEDRO PROJECT - FERC LICENSE 2299

MODESTO IRRIGATION DISTRICT
TURLOCK IRRIGATION DISTRICT
CITY & COUNTY OF SAN FRANCISCO
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TECHNICAL ADVISORY COMMITTEE

DRAFT MEETING SUMMARY

15 December 2004

1. Introduction: Fryer moved to TID Civil Engineering and will remain the restoration project manager; Leibersbach moved to TID Water Planning and will supervise aquatic biology program.
   A. Comments on draft agenda: none; comments were made on September meeting notes
   B. Correspondence since last meeting: revised version as handout; Boucher asked that FERC filings be added to annual report
2. **ACTION ITEMS**:
   A. 2002 CWT evaluation: discussion on analysis of Mossdale data – subgroup should discuss potential recommendations; Yoshiyama/Hume to provide update report and summary for next filings
   B. CALFED Science proposal: several concerns were discussed about predation proposal from Hume, a multi-watershed approach requiring data sharing and workshop – not supported for now, but other comments to Hume by 26DEC
   C. Monitoring activities: permit info goes to Marston for planned seining; discussed snorkel methods - Hume to check on Stanislaus snorkel methods
3. General FSA Update:
   A. FSA/Order activity and data/report status (incl. annual and 2005 reports): reviewed timeline and items for annual report and status and plans for annual report – may not be opportunity to review draft as requested, suggested report topics/items to be provided to Ford by 21JAN; reviewed 2004 FSA expenses – DFG will bill on CWT and RST efforts, funding for Tuolumne biologist will end 30JUN2005; Blakeman will send 2003 spawning report; Ford to send out completed reports to TRTAC
   B. Agency and NGO updates: McLain - Martinez in Florida, steelhead critical habitat proposed, green sturgeon status in review; Mesick mostly working on assisting proposals
   C. Monitoring: Districts temperature data has been updated on SJ basin website; Ford provided initial salmon run data as compared to recent years; previous DFG RST data available on BDAT website; DFG to check for data on other fish species for proposed summary report; DFG and Ford to work on data/assignment for 2004 spawning report as DFG has limited funding and staff
   D. River operations and forecasts: Ford to check on fall flow pattern with Monier as DFG

expressed concern about small reductions; no changes forecasted

E. Restoration
    1. Funding, planning and implementation: Fryer provided status update memo
    2. Project monitoring: redd counts at Bobcat Flat
    3. Other restoration information (TRC, etc.): distribution by Fryer of Design Manual on CD – to be posted on AFRP website; Boucher reported that Bobcat Flat funding was extended to SEP2006 – working on permitting/documents; 4-pumps has evaluated several projects; TR Coalition is working on "Framework for the Future" document and held NOV workshop

4. Additional items: Marston will send the Stanislaus WT criteria information
5. Next meeting and topics:

    The next TRTAC meeting will be 10 March 2005 at 9:30 AM.

FERC 2299 TRTAC Meeting
15 December 2004

Name	**Organization**
Tim Ford	TID/MID
Wilton Fryer	TID
Debbie Liebersbach	TID
Roger Masuda	TID
Allison Boucher	FOT
Noah Hume	Stillwater Sciences
Ron Yoshiyama	CCSF
Carl Mesick	FWS/AFRP
Dean Marston	DFG
Tim Heyne	DFG
Dennis Blakeman	DFG
Jeff McLain	NMFS
Steve Walser	CRRF

TURLOCK IRRIGATION DISTRICT

CIVIL ENGINEERING DEPARTMENT
MEMORANDUM

TO: TRTAC
FROM: Wilton Fryer
DATE: 15 December 2004
RE: Restoration Projects - Status Update

Project	Funding	Status
Completed Projects:		
SRP 9	Full	Construction completed, revegetation planted and maintained for two years, and final replacement planting completed in December 2003. NOC filed March 2003.
SRP 10 Dike	Full	Construction complete. NOC filed March 2003.
7\11 Segment	Full	Construction complete with remaining revegetation planted in December 2003. 7\11 Materials NOC filed March 2003. HART NOC filed May 2004. A separate limited irrigation & maintenance agreement is in place for 2004, funded by MWD.
Design Manual	Full	Completed with Final Report submitted 26 February 2004.
Course Sediment	Full	Report was completed with modifications on methods and techniques to protect existing salmonid habitats during implementation.
Active Projects:		
MJ Ruddy	Full	Interior Dept. required that the ROW appraisal be redone using a different set of criteria and include a detailed Minerals Report. Completion of the ROW appraisal has taken considerably longer than anticipated. If acquisition cannot be started in December 2004 there is the potential for the USBR-CN Ops to pull $1.53M from the funding allocation because it has not been spent in the 5 years since it was granted.
Warner-Deardorff	Full	This project is split into 2 phases for funded. Under Phase I the design is at 90% stage with the remaining permitting and ROW appraisal on hold. The ROW is on hold pending the

		outcome of the appraisal process for the MJ Ruddy project because the permits are linked. Work on contract with GCAP Service for remaining committed funds under Phase II is proceeding. The CBDA-ERP has not completed their review of the Directed Action package submitted 21 November 2003.
La Grange Gravel	Full	Amendment request was presented 25 March 04. The CBDA requested CSMP revisions be included in a complete revision of the amendment package as if it were a new PSP. This was submitted in early November 2004. The CBDA peer review will be abbreviated and then the district will be allowed to make SOW revisions with McBain & Trush to delete the aggregate mining and expand inchannel gravel infusion work.
Fine Sediment	Full	DFG has indicated acceptance of the sedimentation basin design, but they would like to have some erosion areas north of the old MID Canal treated to reduce the potential sediment buildup in the settling basin. This will involve the Modesto Irrigation District as a property owner. DFG would also like to handle initial maintenance of the vegetation after planting.
RM 43	Full	Design work is completed. The permits and CEQA process under way as part of the larger Bobcat Flat Project.
SRP 10	Partial	This project has been split into two phases. The design under Phase I is being finalized with input from the SRP 9 post project monitoring results and the use of a 2D model for SRP 9 and SRP 10. There is discussion at CBDA that the Phase II funding for acquisition and construction would be considered in a PSP due out in late winter or spring 2005. AFRP is considering placing $4.5M in their 2006 budget to be used on this project.

1996 FERC Order and 1995 FSA Reports

The 1996 FERC Order for the Don Pedro Project specified several reporting requirements.

-- The Discussion portion of the Order refers to the "Districts' final report" to be filed by April 1, 2005.

-- In Item (F), in the amended Article 58, the Order requires:

1. The Licensees, after consulting with CDFG and FWS, shall implement a monitoring program,
2. The monitoring information obtained under the program will be reported annually by April 1,
3. The Licensees shall file the results of any completed fishery studies not yet filed by April 1, 2005.

-- In Item (G), the Order requires:

1. The Licensees shall include, in the annual reports, a description of non-flow mitigative measures implemented in the prior year and planned in the coming year,
2. The Licensees shall include in the results of fishery studies to be filed by April 1, 2005, all results and a discussion of the results of all monitoring studies related to the effects of flow release fluctuations on the salmon resources,
3. The filing shall identify all non-flow mitigative measures implemented to date,
4. The filing shall include the results of all monitoring related to the non-flow measures.

The 1995 FSA, Section 15, states the Districts, CDFG, and FWS agree to provide monitoring information and other data relevant to the condition of the fishery resources to the TRTAC in a timely manner and that the monitoring information is to be documented in annual reports filed with FERC by April 1.

The Districts have provided their monitoring information in a timely manner to the TRTAC and have filed the required annual reports each year by April 1. The Districts will file another annual report and their required "final" report by April 1, 2005.

Friends of the Tuolumne, Inc.

November 3, 2004

To: Tuolumne River Technical Advisory Committee:

Re: Friends of the Tuolumne CALFED PSP monitoring request

Bobcat Flat RM 43 Post -construction Monitoring Plan

RM 43 is a joint project between Friends of the Tuolumne (FOT) and the TID/MID. FOT and TID have both acquired funds to accomplish restoration on this reach of the river. Both will contribute these funds to portions of the project to accomplish instream, scour channel, and riparian restoration.

Instream restoration will conform to the revised Coarse Sediment Management Plan for the Lower Tuolumne River. Implementation is scheduled for the Summer of 2005. It will be the first new restoration following the new plan format.

Monitoring the new habitat use by resident and migratory fish is an important aspect of the restoration. Intensive investigation will be conducted to identify fish species using the site. Baseline monitoring will begin January 1, 2005 to establish pre-project habitat use.

This CALFED monitoring proposal will provide the resources to follow up the pre-project baseline study and conduct a three year post project study to determine the new use patterns of the restored reach and answer questions about restoration impacts.

A detailed habitat map will be created identifying important habitat types with GPS locations. Adult fish will be angled for using proven hook and line techniques and pertinent data collected . Redd surveys for salmon and O. *mykiss* will be conducted and mapped. Predator fish species will be identified and mapped. We will attempt to identify the full spectrum of species occupying the Bobcat Flat reach.

Questions to be addressed include:

- Does micro-habitat create increases in habitat suitable to Chinook salmon and O. *mykiss* trout in the same site?
- What affect does the restoration have on predator populations?
- Does the restoration increase fish density
- Document presence

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Friends of the Tuolumne, Inc.

Public Outreach Activities by Friends of the Tuolumne, Inc.

Present Conceptual Restoration Plan for Bobcat Flat to the general public, March 8, 2004.

Speak with class from Mildred Perkins School, Salida School District, August 21, 2004 at Tuolumne River Regional Park.

Speak with Waterford Planning Commission October 26 and November 23, 2004.

Sponsored juried photo exhibition November 1 – 26, 2004 at Anderson Gallery in Modesto. Photos were of the Lower Tuolumne River.

Gave drift boat tour for Modesto Bee Newspaper reporter and photographer, December 5, 2004.

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Friends of the Tuolumne, Inc.

Don Pedro FERC Settlement Agreement

$500,000 Riparian Funded by
City and County of San Francisco

Administered by the East Stanislaus
Resource Conservation District

$500,000	Amount funded
138,467	Match for purchase of Bobcat Flat--2001
22,000	Match for purchase of Big Bend--2002
22,500	Match for purchase of Waterford property--2002
32,500	Boating access in Waterford--2002
70,000	Pledge for purchase of 7 ½ acres in Waterford
32,500	Boating access at County Riverdale Park—February 2003
4,539	Insurance--several years
7,500	Increased pledge for Caro Property purchase by Waterford –March 11, 2003
20,000	Increased pledge for 7 ½ acres in Waterford--March 11, 2003
$149,994	Balance available

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