COMPREHENSIVE MONITORING AND ADAPTIVE MANAGEMENT PROGRAM FOR LOWER SILVER CREEK PROCESS-BASED STREAM RESTORATION AND FLOOD CONTROL PROJECT

Project Information

1. **Proposal Title:**

   COMPREHENSIVE MONITORING AND ADAPTIVE MANAGEMENT PROGRAM FOR LOWER SILVER CREEK PROCESS-BASED STREAM RESTORATION AND FLOOD CONTROL PROJECT

2. **Proposal applicants:**

   CHRISTIAN ELIAS , Santa Clara Valley Water District
   MATT KONDOLF, UNIVERSITY OF CALIFORNIA AT BERKELEY
   GILBERT CARROLL, GUADALUPE-COYOTE RESOURCE CONSERVATION DISTRICT

3. **Corresponding Contact Person:**

   CHRISTIAN C. ELIAS
   SANTA CLARA VALLEY WATER DISTRICT
   5750 ALMADEN EXPRESSWAY SAN JOSE, CA 95118
   408 265-2600
   celias@scvwd.dst.ca.us

4. **Project Keywords:**

   Aquatic Ecology
   Fluvial Geomorphology
   Urban Stream Restoration

5. **Type of project:**

   Research

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

   No

7. **Topic Area**:

   Channel Dynamics and Sediment Transport

8. **Type of applicant:**

   Local Agency

9. **Location - GIS coordinates:**

   Latitude: 37.36

   Longitude: -121.82

   Datum:

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

   Lower Silver Creek is between the confluence of Coyote Creek and Lake Cunningham. Coyote Creek flows into South San Francisco Bay

10. **Location - Ecozone:**

    Code 16: Inside ERP Geographic Scope, but outside ERP Ecozones

11. **Location - County:**

    Santa Clara

12. **Location - City:**

    Does your project fall within a city jurisdiction?

    Yes

    If yes, please list the city: San Jose

13. **Location - Tribal Lands:**

    Does your project fall on or adjacent to tribal lands?

    No

14. **Location - Congressional District:**

    CA-16

15. **Location:**

    California State Senate District Number: 13

    California Assembly District Number: 23

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

    3

17. **Requested Funds:**
    a) Are your overhead rates different depending on whether funds are state or federal?

No

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

Single Overhead Rate: 106.03

Total Requested Funds: $456,017

b) Do you have cost share partners already identified?

Yes

If yes, list partners and amount contributed by each:

GUADALUPE-COYOTE RESOURCE CONSERVATION DISTRICT $12,480

SANTA CLARA VALLEY WATER DISTRICT $45,698

c) Do you have potential cost share partners?

No

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

No

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

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

No

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

Yes

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

61	**Almaden Reservoir Watershed Restoration Project**	**CALFED Watershed Program**
103	**Stewardship Plans for the West Valley, Guadalupe, and Lower Penninsula Watersheds**	**CALFED Watershed Program**

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

    No

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

    No

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

    No

    Please list suggested reviewers for your proposal. (optional)

PAUL AMOTO	**SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD**	**510-622-2429**	**pa@rb2.swrcb.ca.gov**
CHUCK HANSON	**HANSON ENVIRONMENTAL**	**925-937-4606**	**chansonenv@aol.com**

21. **Comments:**

Environmental Compliance Checklist

COMPREHENSIVE MONITORING AND ADAPTIVE MANAGEMENT PROGRAM FOR LOWER SILVER CREEK PROCESS-BASED STREAM RESTORATION AND FLOOD CONTROL PROJECT

1. **CEQA or NEPA Compliance**
   a) Will this project require compliance with CEQA?

      No
   b) Will this project require compliance with NEPA?

      No
   c) If neither CEQA or NEPA compliance is required, please explain why compliance is not required for the actions in this proposal.

      This project is a scientific study of the transformation of Lower Silver Creek flood control and stream restoration project and as such is exempt from CEQA and NEPA.

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

   CEQA Lead Agency:
   NEPA Lead Agency (or co-lead:)
   NEPA Co-Lead Agency (if applicable):

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

   CEQA
   -Categorical Exemption
   -Negative Declaration or Mitigated Negative Declaration
   -EIR
   Xnone

   NEPA
   -Categorical Exclusion
   -Environmental Assessment/FONSI
   -EIS
   Xnone

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

4. **CEQA/NEPA Process**
   a) Is the CEQA/NEPA process complete?

      None

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

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

LOCAL PERMITS AND APPROVALS

Conditional use permit

Variance

Subdivision Map Act

Grading Permit

General Plan Amendment

Specific Plan Approval

Rezone

Williamson Act Contract Cancellation

Other

STATE PERMITS AND APPROVALS

Scientific Collecting Permit

CESA Compliance: 2081

CESA Compliance: NCCP

1601/03 Required

CWA 401 certification

Coastal Development Permit

Reclamation Board Approval

Notification of DPC or BCDC

Other

FEDERAL PERMITS AND APPROVALS

ESA Compliance Section 7 Consultation

ESA Compliance Section 10 Permit

Rivers and Harbors Act

CWA 404

Other

PERMISSION TO ACCESS PROPERTY

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

Permission to access state land.
Agency Name:

Permission to access federal land.
Agency Name:

Permission to access private land.
Landowner Name:

6. **Comments.**

No permit is needed for this project. If any permit for any work, it will be covered under permits being processed for the Lower Silver Creek watershed project.

Land Use Checklist

COMPREHENSIVE MONITORING AND ADAPTIVE MANAGEMENT PROGRAM FOR LOWER SILVER CREEK PROCESS-BASED STREAM RESTORATION AND FLOOD CONTROL PROJECT

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

   No

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

   No

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

   No

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

   Research only

4. **Comments.**

Conflict of Interest Checklist

COMPREHENSIVE MONITORING AND ADAPTIVE MANAGEMENT PROGRAM FOR LOWER SILVER CREEK PROCESS-BASED STREAM RESTORATION AND FLOOD CONTROL PROJECT

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

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

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

Applicant(s):

CHRISTIAN ELIAS , Santa Clara Valley Water District
MATT KONDOLF, UNIVERSITY OF CALIFORNIA AT BERKELEY
GILBERT CARROLL, GUADALUPE-COYOTE RESOURCE CONSERVATION DISTRICT

Subcontractor(s):

Are specific subcontractors identified in this proposal? No

Helped with proposal development:

Are there persons who helped with proposal development?

Yes

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

DR. GILBERT CARROLL	**GUADALUPE-COYOTE RESOURCE CONSERVATION DISTRICT**

Comments:

Budget Summary

COMPREHENSIVE MONITORING AND ADAPTIVE MANAGEMENT PROGRAM FOR LOWER SILVER CREEK PROCESS-BASED STREAM RESTORATION AND FLOOD CONTROL PROJECT

Please provide a detailed budget for each year of requested funds, indicating on the form whether the indirect costs are based on the Federal overhead rate, State overhead rate, or are independent of fund source.

Federal Funds

Year 1												
Task No.	**Task Description**	**Direct Labor Hours**	**Salary *(per year)***	**Benefits *(per year)***	**Travel**	**Supplies & Expendables**	**Services or Consultants**	**Equipment**	**Other Direct Costs**	**Total Direct Costs**	**Indirect Costs**	**Total Cost**
1	Project Management						20784			20784.0		20784.00
2	Biannual Data Summary Report						21558			21558.0		21558.00
3	Field Monitoring Protocols						17768			17768.0		17768.00
4	Compile Existing Data						23197			23197.0		23197.00
5	Install Stage Recorder					100	3097	7500		10697.0		10697.00
6	Stage Data Management						6220			6220.0		6220.00
7	Install Temp Recorder					100	2189	3500		5789.0		5789.00
8	Temp Data Management						3388			3388.0		3388.00
9	Establish monitoring Cross Sections					100	7634			7734.0		7734.00
10	Reach 1-4 Precon Surveys					100	19032			19132.0		19132.00
11	Install monironingx-sections					100	10822	15000		25922.0		25922.00
12	Reaches 1 & 2 Quaterly monitoring					100	12873			12973.0		12973.00
13	Reach 1&2 Quaterly surveys					200	16778			16978.0		16978.00
14	Project Web site						20287			20287.0		20287.00
		0	0.00	0.00	0.00	800.00	185627.00	26000.00	0.00	212427.00	0.00	212427.00

Year 2												
Task No.	**Task Description**	**Direct Labor Hours**	**Salary *(per year)***	**Benefits *(per year)***	**Travel**	**Supplies & Expendables**	**Services or Consultants**	**Equipment**	**Other Direct Costs**	**Total Direct Costs**	**Indirect Costs**	**Total Cost**
1	Proj. Management						11664			11664.0		11664.00
2	Biannual Data Summary Report						21282			21282.0		21282.00
3	Reach 5&6 Pre-con surveys					200	19170			19370.0		19370.00
4	Stage Data Management						3887			3887.0		3887.00
5	Temp Data Management						2880			2880.0		2880.00
6	Reach 1&2 Quartely surveys					200	7388			7588.0		7588.00
7	Reach 3&4 Quaterly surveys					100	6864			6964.0		6964.00
8	Geomorphic x-sect monitoring					100	8040			8140.0		8140.00
9	Reach 3&4 quarterly geomorphic x-section monitoring					100	7360			7460.0		7460.00
10	Project Web Site Update						9704			9704.0		9704.00
		0	0.00	0.00	0.00	700.00	98239.00	0.00	0.00	98939.00	0.00	98939.00

Year 3												
Task No.	**Task Description**	**Direct Labor Hours**	**Salary *(per year)***	**Benefits *(per year)***	**Travel**	**Supplies & Expendables**	**Services or Consultants**	**Equipment**	**Other Direct Costs**	**Total Direct Costs**	**Indirect Costs**	**Total Cost**
1	Project Management						16032			16032.0		16032.00
2	Biannual Data Summary Report						21558			21558.0		21558.00
3	Stage Data Management						3887			3887.0		3887.00
4	Temp Data Management						2880			2880.0		2880.00
5	Install moniroring x- sections					100	6634	7500		14234.0		14234.00
6	Reach 1&2 Quartely surveys					200	7880			8080.0		8080.00
7	Geomorphic x-sect monitoring					100	6440			6540.0		6540.00
8	Reach 3&4 Quaterly surveys					200	21940			22140.0		22140.00
9	Reach 3&4 geom x-section monitoring					100	5424			5524.0		5524.00
10	Reaches 5&6 Quater Sampling					200	17760			17960.0		17960.00
11	Reach 5&6 geomorphic x-sect monitoring					100	5424			5524.0		5524.00
12	Update Project Web Site						9068			9068.0		9068.00
13	Final Data Summary Report						17857			17857.0		17857.00

14	Urban Stream Restoratiion Guidelines						17857			17857.0		17857.00
		0	0.00	0.00	0.00	1000.00	160641.00	7500.00	0.00	169141.00	0.00	169141.00

Grand Total=480507.00

Comments.

Budget Justification

COMPREHENSIVE MONITORING AND ADAPTIVE MANAGEMENT PROGRAM FOR LOWER SILVER CREEK PROCESS-BASED STREAM RESTORATION AND FLOOD CONTROL PROJECT

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

These are matching contributions by the Santa Clara Valley Water District and the Guadalupe Coyote Resource Conservation District Marc Klemencic 200 hours Jose Ortiz 240 hours Gilbert Carroll 80 hours

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

Marc Klemencic 200 hours $156/hour Jose Ortiz 240 hours $108/hour Gilbert Carroll 80 hours $156/hour

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

Marc Klemencic In house District Labor (32.19% benefit) Jose Ortiz In house District Labor (32.19% benefit) Gilbert Carroll 80 hours $156/hour (Guadalupe Coyote Resource Conservation District)

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

Not Applicable as travel will be local.

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

$0.00

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

Consultant = Raines, Melton and Carella (RMC): All tasks to be performed are listed in the attached PDF file Dr. Rene Langis 132 hours $120/hour $15,840 Tim Hameker 192 hours $120/hour $23,040 Mark Tompkins 1,776 hours $95/hour $168,720 Jay Aldeen 152 hours $133/hour $20,140 Dr. Mark Kondolf 272 hours $120/hour $32,640 Tim Hill 324 hours $120/hour $38,880 Earl Byron 208 hours $120/hour $24,960 Graduate Students 1,056 hours $26/hour $27,456 Clercial work 88 hours $65/hour $5,720

Equipment. Identify non-expendable personal property having a useful life of more than one (1) year and an acquisition cost of more than $5,000 per unit. If fabrication of equipment is proposed, list parts and materials required for each, and show costs separately from the other items.

$33,500 for stage recorder, cellular phone link for data download, data loggers, temperature recorders, samplers,

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

project oversight.

Santa Clara Valley Water District will manage this Project at a cost of $58,198 which constitutes approximately 17% match committed by the District and the Guadalupe Coyote Resource Conservation District.

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

$0.00

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

Overhead rates include costs associated with general office requirements such as rent, phones, furniture, general office staff, accounting, human resources, payroll, purchasing, vehicle pool, etc. at 73.84%

Executive Summary

COMPREHENSIVE MONITORING AND ADAPTIVE MANAGEMENT PROGRAM FOR LOWER SILVER CREEK PROCESS-BASED STREAM RESTORATION AND FLOOD CONTROL PROJECT

The watershed alterations that accompany urbanization fundamentally change the natural fluvial processes of stream corridors. Increased impervious area in urban watersheds results in a decrease in the infiltration rate of precipitation in the basin. This leads to an increase in the volume of surface runoff, as well as an increase in the rate at which that surface runoff is conveyed to streams and converted to stream discharge. Urbanization can also produce large changes in erosion and delivery of sediment to the stream channel. In addition, complex flood control systems commonly constrict the width of the riparian corridor and sever the connection of the stream channel to its floodplain. This can increase the magnitude of the effects of altered fluvial processes on streams in urban watersheds. The combination of these changes associated with urbanization frequently results in channel configurations that are out of balance with the natural fluvial processes required to maintain complex and diverse aquatic and riparian habitat. The problem that this proposed project addresses is the lack of a collective base of knowledge to aid in the development of stream restoration projects based on natural fluvial processes to effectively restore sustainable hydrologic functions and ecological values in urban streams within flood control systems. The proposed project is a comprehensive monitoring and adaptive management program for a unique and innovative flood control and stream restoration project on approximately six miles of Lower Silver Creek in San Jose, California. This project will effectively transform the Lower Silver Creek flood control and stream restoration project into a viable pilot project in the adaptive management framework of CALFED. This project has three specific objectives that feed into the primary goal of this work (i.e. the development of design guidelines for process-based stream restoration within urban flood control systems): (1) Establish the baseline physical and biological conditions of Lower Silver Creek. 2) Monitor the post-project evolution of physical and biological conditions of Lower Silver Creek. 3) Implement adaptive management measures based on the findings of Objectives 1 and 2 to improve the performance of the stream corridor restoration elements of the Lower Silver Creek flood control project and to refine process-based restoration guidelines.

Proposal

Santa Clara Valley Water District

COMPREHENSIVE MONITORING AND ADAPTIVE MANAGEMENT PROGRAM FOR LOWER SILVER CREEK PROCESS-BASED STREAM RESTORATION AND FLOOD CONTROL PROJECT

CHRISTIAN ELIAS , Santa Clara Valley Water District
MATT KONDOLF, UNIVERSITY OF CALIFORNIA AT BERKELEY
GILBERT CARROLL, GUADALUPE-COYOTE RESOURCE CONSERVATION DISTRICT

Comprehensive Monitoring and Adaptive Management Program for the Lower Silver Creek Process-Based Stream Restoration and Flood Control Project

A. Project Description: Project Goals and Scope of Work

1. Problem

The watershed alterations that accompany urbanization fundamentally change the natural fluvial processes of stream corridors. Increased impervious area in urban watersheds results in a decrease in the infiltration rate of precipitation in the basin. This leads to an increase in the volume of surface runoff, as well as an increase in the rate at which that surface runoff is conveyed to streams and converted to stream discharge. Urbanization can also produce large changes in erosion and delivery of sediment to the stream channel (Kondolf and Keller, 1991). In addition, complex flood control systems (incorporating some combination of levees, dams, and stream channel modifications) commonly constrict the width of the riparian corridor and sever the connection of the stream channel to its floodplain. This can increase the magnitude of the effects of altered fluvial processes on streams in urban watersheds. The combination of these changes associated with urbanization frequently results in channel configurations that are out of balance with the natural fluvial processes required to maintain complex and diverse aquatic and riparian habitat. Historically, this degradation of stream corridors in urban environments was seen as a necessary element of flood control (Brown, 2000).

However, the view of urban stream corridors as merely conveyance routes for stormwater has slowly eroded in the United States since the 1970s. Increasingly, stream corridors draining urban watersheds are expected to provide not only stormwater conveyance, but habitat for fish and wildlife, and aesthetic benefits as well. This has resulted in many stream restoration efforts associated with flood control projects in urban areas. In fact, most urban and suburban stream restoration work (perhaps better termed environmentally sensitive flood control work) in the United States is financed by flood control projects. In cases where the environmental values of the existing channel are degraded, a new flood control channel may effectively restore hydrologic functions and ecological values to a degraded system (Kondolf, 1996). Unfortunately, despite the many stream restoration projects that have been completed to date, very few post-project results have been reported. **The problem that this proposed project addresses is the lack of a collective base of knowledge to aid in the development of stream restoration projects based on natural fluvial processes to effectively restore sustainable hydrologic functions and ecological values in urban streams within flood control systems.**

The proposed project is a comprehensive monitoring and adaptive management program for a unique and innovative flood control and stream restoration project on approximately six miles of Lower Silver Creek in San Jose, California. This project will effectively transform the Lower Silver Creek flood control and stream restoration project into a viable pilot project in the adaptive management framework of CALFED.

Lower Silver Creek is a tributary to Coyote Creek, which flows into the southern end of the San Francisco Bay, and drains approximately 44 square miles of San Jose (Figure 1). The flood control project will be constructed on the reaches of Lower Silver Creek between Lake Cunningham and the confluence with Coyote Creek. Ninety five percent of the Lower Silver Creek watershed has been developed. As its watershed has urbanized, Lower Silver Creek has been narrowly confined between flood control levees constructed to protect the area from flooding. The combination of a constrained riparian corridor and flashy hydrology has resulted in three major problems:

1) The riparian and aquatic habitat in Lower Silver Creek has been degraded to a condition of limited utility for fish and wildlife.

2) The sediment transport characteristics of Lower Silver Creek have been degraded and currently impact the flood flow dynamics and ecological values of the creek.

3) The existing channel geometry of Lower Silver Creek is out of balance with the natural fluvial processes required to maintain complex and diverse aquatic and riparian habitat.

In addition, despite the flood control system currently in place along Lower Silver Creek, major floods have occurred in the watershed in 1952, 1955, 1958, 1967, 1982, 1983, and 1986, causing significant damage to homes and businesses. In an effort to improve the degraded habitat and flood control characteristics of Lower Silver Creek, the Santa Clara Valley Water District (SCVWD) has developed an innovative and environmentally sensitive flood control project that was founded on natural fluvial processes. The goal of the SCVWD project is to meet local flood control requirements using an approach that restores channel geometry and ecological values maintained by natural processes to the maximum extent possible in Lower Silver Creek. It is important to note that the natural processes that can be restored in this heavily urbanized watershed are limited, however, as the San Francisco Bay watershed continues to urbanize the restoration opportunities offered by urban streams like Lower Silver Creek will become increasingly important.

The final flood control and stream restoration plan (currently undergoing detailed engineering design) for Lower Silver Creek is based on state-of-the-art analyses of the sediment transport characteristics and natural fluvial processes in the Lower Silver Creek watershed. The plan specifies a general channel geometry (Figure 2) intended to maximize the effects of natural fluvial processes on the development of improved aquatic and riparian habitat and sediment transport characteristics in Lower Silver Creek. The design geometry includes a functional floodplain, a sediment transport channel, and a naturally formed base flow channel. The flood control project will also connect Lower Silver Creek to Lake Cunningham during extreme flow events (i.e. greater than the 25-year flow) to attenuate flood flows and reduce the impacts of the artificially high flood flows associated with the urbanization of the Lower Silver Creek watershed. When coupled with the changes in channel geometry of Lower Silver Creek, this change in hydrology should result in a stream corridor that is better balanced with the natural fluvial processes operating in the system, and that is capable of naturally maintaining ecologically valuable aquatic and riparian habitat. However, there is considerable uncertainty in this design due to the data gaps that exist regarding the post-project performance of stream restoration and flood control projects based on natural fluvial processes.

The primary goal of this proposed project is to develop guidelines for process-based stream restoration within urban flood control systems. Specifically, this project will determine the dimensions and configuration of the effective floodplain and sediment transport channel required so that ecologically valuable aquatic and riparian habitat can be maintained by natural processes. This will require a comprehensive, storm event-driven monitoring plan and an adaptive management program that details the evolution of the reconstructed Lower Silver Creek channel and provides insight to improve the project and to guide future projects. An excellent opportunity exists to take advantage of an innovative, large-scale stream restoration project that is separately funded and will be constructed between 2002 and 2005 as a setting for experiments on process-based stream restoration. The project was designed in accordance with the mission of the SCVWD, which includes a commitment to protect and restore healthy ecosystems for fish, plants, and wildlife in creeks and in San Francisco and Monterey bays, while providing flood-protection needs and wholesale water reliability to Santa Clara County's nearly 1.7 million residents. This mission is consistent with the restoration of ecological processes associated with streamflow, stream channels, watersheds, and floodplains, a foundation of the CALFED Ecosystem Restoration Program (ERP).

However, due to the resource limitations of the SCVWD, the monitoring program for this innovative flood control project is currently designed only to satisfy specific state and federal regulatory requirements related to the vegetation and flood control elements of the project. It is highly unlikely that the currently funded level of monitoring will contribute to the development of the science of process-based restoration of urban streams within flood control projects. As discussed above, the proposed project will effectively transform the Lower Silver Creek flood control and stream restoration project into a viable pilot project in the adaptive management framework of CALFED.

This project has three specific objectives that feed into the primary goal of this work (i.e. the development of design guidelines for process-based stream restoration within urban flood control systems):

1) Establish the baseline physical and biological conditions of Lower Silver Creek.

2) Monitor the post-project evolution of physical and biological conditions of Lower Silver Creek.

3) Implement adaptive management measures based on the findings of Objectives 1 and 2 to improve the performance of the stream corridor restoration elements of the Lower Silver Creek flood control project and to refine process-based restoration guidelines.

Achieving these goals will allow the SCVWD to address the hypotheses that serve as the foundation for this project. The hypotheses are listed below.

1) Channel designs based on natural fluvial processes are sustainable with minimal maintenance for streams in urban flood control systems.

2) Design dimensions and configurations can be determined for effective floodplains and sediment transport channels that will be maintained by natural processes in flood control systems.

3) Flood control channels designed to maximize the effects of natural fluvial processes will exhibit improved physical habitat conditions.

4) Flood control channels designed to maximize the effects of natural fluvial processes will exhibit increased fish, wildlife, and vegetation diversity.

5) Flood control channels designed to maximize the effects of natural fluvial processes will exhibit decreased water temperatures due to improved shading by riparian vegetation.

Successfully completed, this project will provide extremely useful information for other stream restoration projects in the South Bay region, throughout the state of California, and across the country.

2. Justification

The conceptual model for the flood control and stream restoration project is shown in Figure 3. It is important to note that this conceptual model is for a project that will be funded outside of the CALFED Program. This proposal is for a comprehensive monitoring and adaptive management project to evaluate and learn from the process-based stream restoration elements of the SCVWD flood control project on Lower Silver Creek. The conceptual model in Figure 3 illustrates the underlying basis for the proposed work.

The existing Lower Silver Creek channel is characterized by uniform geometry and degraded riparian and aquatic habitat. The degraded physical conditions of the channel are maintained by the flashy hydrology of Lower Silver Creek. Water surface elevations in Lower Silver Creek increase mainly in depth (without significant increases in cross-sectional area) during storm events. This results in a rapid increase in the shear stress acting on the channel banks and bed. The combination of the existing hydrology and channel geometry creates a situation where relatively high shear stresses are experienced in Lower Silver Creek during frequent storm events. This limits natural channel forming processes from recreating more natural channel forms and leads to degraded conditions for fish, wildlife, and riparian vegetation and detrimental sediment transport characteristics.

The objective of the design of the flood control project with a floodplain, sediment transport channel, and naturally formed base flow channel (Figure 2) was to create a system that can appropriately adjust in scale to fit the natural processes present in the urbanized Lower Silver Creek system. The sediment transport channel is basically a template for the development of the base flow channel. The sediment transport channel was designed to allow sediment to be mobilized within the channel during flow events with return intervals that are ecologically relevant (i.e. flow events that occur frequently enough to maintain habitat diversity and complexity). It is the relatively frequent occurrence of erosion and deposition during storm events that is expected to shape and reshape the area inundated during base flow conditions, and over time lead to a channel in dynamic equilibrium that naturally maintains riparian and aquatic habitat. Larger, less frequent storm events will flow out of the sediment transport channel and onto a wider floodplain area within the flood control channel. This will dissipate the energy associated with these higher flows and help maintain a more appropriately sized “low flow” area within the channel.

This proposed monitoring and adaptive management project will test the hypotheses introduced above using comprehensive physical and biological monitoring programs. The

monitoring programs will establish pre-project baseline conditions and track the post-project evolution of the restored channel in reaches with a variety of constraints and configurations. One key uncertainty associated with the proposed project could arise in the monitoring and analyses of the in-channel floodplain width associated with the successful natural formation of ecologically valuable base flow channels. To minimize this uncertainty we will establish duplicate permanent monitoring cross sections in reaches with a range of effective floodplain widths. Another key uncertainty could arise in the monitoring and analyses of the channel design discharges that naturally form base flow channels that are ecologically valuable. We intend to perform detailed streamflow monitoring paired with storm event-driven physical monitoring (i.e. physical channel surveys after significant storm events) at permanent cross sections to minimize this potential source of uncertainty. We will continuously gauge the effectiveness of the monitoring program in producing useful information for future process-based restoration of urban streams. If the experimental design we identify in this proposal appears inappropriate as this monitoring project is implemented, we will reassess the project goals and objectives, along with the restoration project conditions, to develop new experimental approaches that will better address the stated goals and objectives of this effort.

This proposed monitoring project intersects with the center ("Initiate Restoration Actions") of the adaptive management diagram presented in Chapter 2 of the Draft Stage 1 Implementation Plan for the CALFED ERP. This project will take advantage of a unique opportunity to undertake targeted research on a stream restoration and flood control project that was developed through a process that mirrored the CALFED procedure of identifying the problem, establishing goals and objectives, specifying conceptual models, and finally initiating restoration actions. The results of the targeted research on SCVWD's large-scale restoration project will produce information that will allow us to assess and adaptively manage this specific natural process-based restoration project and refine the conceptual models that will serve as the basis for future process-based restoration efforts on urban streams within flood control systems. Again, this project will effectively transform the Lower Silver Creek flood control and stream restoration project into a viable pilot project in the adaptive management framework of CALFED.

The fluvial geomorphology and stream restoration literature repeatedly acknowledges the lack of post-implementation monitoring of restoration projects (California Department of Fish and Game, 1993) and stresses the need for such monitoring so that future projects can benefit from the successes and failures of past projects (Kondolf and Micheli, 1995). This project provides a relatively low-cost opportunity to fill in critical gaps in the knowledge base contributing to process-based restoration of streams in urban and non-urban environments, and could serve to advance the effectiveness of restoration projects in streams with a more direct role in the rehabilitation of listed fish and wildlife species in California.

3. Approach

This proposed project is an effectiveness and validation monitoring project as described by Kershner (1997). Effectiveness monitoring asks if the restoration project was effective in attaining the desired future condition and in meeting project objectives. Validation monitoring is a research tool with which to examine the basic scientific understanding of an ecosystem. Effectiveness and validation monitoring are necessary steps to evaluate

adaptive management prescriptions. The approach outlined below combines these two types of monitoring for an innovative fluvial process-based channel design incorporated into a large flood control project. The ultimate goal of the monitoring program is to develop useful guidelines for the design of future restoration projects and the adaptive management of this and future urban stream restoration projects.

The proposed approach for this project is for a three year study that documents baseline physical and biological conditions and then monitors the physical and biological conditions after implementation of the three phases of the Lower Silver Creek Flood Control Project. The flood control project will be constructed in three separate phases to take place during the summer and fall of 2002, 2003, and 2004. The sampling procedures for each project objective are presented below.

Objective 1: Establish the baseline physical and biological conditions of Lower Silver Creek.

1. Develop detailed field monitoring protocols.
2. Compile existing geomorphic data for the project area of Lower Silver Creek (channel cross sections, long profiles, sediment size distributions, aerial photography analyses, and other geomorphic data as specified in Kondolf (2000)).
3. Compile existing hydrology data for the Lower Silver Creek watershed (precipitation, temperature, flow records, etc.).
4. Compile existing riparian and wetland vegetation survey data for the project area of Lower Silver Creek (species, percent cover, age, etc.).
5. Install automated stage / discharge recording station at the downstream end of Lower Silver Creek.
6. Collect, organize, and analyze stage / discharge data from the recording station at the downstream end of Lower Silver Creek before construction of flood control project.
7. Establish a continuous temperature recorder at the upstream and downstream ends of the project area prior to construction.
8. Collect, organize, and analyze temperature data before construction of flood control project.
9. Establish permanent geomorphic monitoring cross sections upstream and downstream of the project area before construction of flood control project.
10. Perform qualitative (kicknet sampling) and quantitative (Surber sampling) aquatic invertebrate sampling in each project reach of Lower Silver Creek before construction of the flood control project.
11. Perform quantitative fish population sampling in each project reach of Lower Silver Creek before construction of the flood control project.
12. Perform storm-event driven sediment transport monitoring in each project reach of Lower Silver Creek prior to project implementation.
13. Create a project web site that includes a Geographic Information System (GIS) for the project area that summarizes the baseline physical and biological conditions of Lower Silver Creek.

Objective 2: Monitor the post-project evolution of physical and biological conditions of Lower Silver Creek.

1. Establish automated stage / discharge recorders in each project reach upon completion of construction.
2. Collect, organize, and analyze stage / discharge data from the recording stations in each project reach for the duration of the project.
3. Establish permanent cross sections and long profiles in each project reach upon completion of construction.
4. Resurvey each geomorphic monitoring cross section and profile quarterly and after each storm event with a return period greater than six months.
5. Perform quarterly qualitative (kicknet sampling) and quantitative (Surber sampling) aquatic invertebrate sampling in each project reach of Lower Silver Creek upon completion of construction.
6. Perform quarterly quantitative fish population sampling in each project reach of Lower Silver Creek.
7. Perform storm-event driven sediment transport monitoring (bedload and suspended load) in each project reach of Lower Silver Creek and perform gravel tracer experiments during selected storm events.
8. Perform quarterly vegetation assessment in each project reach.
9. Create quarterly GIS layers to display the physical and biological data collected in Lower Silver Creek on the project web page.

Objective 3: Implement adaptive management measures based on the findings of Objectives 1 and 2 to improve the performance of the stream corridor restoration elements of the Lower Silver Creek flood control project and refine process-based restoration guidelines.

1. Compare the actual post-project biological and physical conditions to design conditions and evaluate project goals.
2. Analyze quarterly GIS layers to identify trends in the physical and biological evolution of the new channel and the correlation of those trends with specific features in the restored Lower Silver Creek channel.
3. Redefine conceptual model (if necessary) and implement new restoration actions.
4. Refine experimental design (if necessary) and adjust monitoring program accordingly.
5. Write process-based restoration guidelines for streams within urban flood control systems.
6. Expand project web page to include all project data and outcomes.

The selected approach is expected to maximize information richness and value to decision makers working on process-based stream restoration in urban and non-urban watersheds. The studies described above in this section are designed to isolate specific natural processes (e.g. erosion and deposition, vegetation recruitment, etc.) to determine the importance of each process on the natural formation and maintenance of an ecologically valuable stream corridor in an urban flood control system. The approach will take advantage of the phased construction of the SCVWD project to collect data on the evolution of newly created, process-based stream channels exposed to varying initial climate and hydrologic conditions over a three year construction period. This approach also takes advantage of the spatial aspects of the construction project by collecting data on the performance of the process-

based stream channels in stream reaches with varying cross-sectional areas and upstream and downstream physical conditions.

The combination of physical data and biological data collected under this approach will also add to the value of this work to decision makers in the field. This paired data set will provide information on not only the physical and biological conditions that develop over time, but the critical linkages between the physical and biological conditions as well.

This approach will also maximize the rate at which useful information is passed on to decision makers. The GIS tool developed for this project will allow real-time presentation and analysis of the data to occur. The GIS layers depicting the pre-project conditions and then the quarterly conditions for the duration of the project will also help pinpoint where adaptive management actions are needed on this specific project, and what channel forms and boundary conditions can be expected to be important in future process-based stream restoration projects within urban flood control systems.

4. Feasibility

The described approach is both feasible and appropriate to the proposed work, as the final engineering design is already underway, funding for implementation has already been allocated, and construction has been scheduled to begin in 2002. Even if weather or other exigencies delay implementation of some part of the project, we will be able to collect data on the phases of the project that have been completed or are in progress.

The described approach is closely integrated with the phased implementation of the restoration and flood control project and takes advantage of the phased creation of new stream channels to establish baseline conditions and monitor the evolution of physical and biological conditions over time. The data collected during this monitoring effort will help determine the critical processes for successful restoration of highly constrained streams systems.

The SCVWD will maintain access to all project reaches for the duration of this monitoring and adaptive management project. Therefore, the only permits that will be required are collection permits for the biological monitoring portions of this proposed work.

5. Performance Measures

Performance metrics for the proposed monitoring project channel will include annual data reports, publications, presentations, and, most importantly, a manual for process-based stream corridor restoration in the context of flood control projects in urban watershed. In addition, performance measures for the restoration and flood control project itself will be developed. All of these materials will enable us to increase the base of knowledge that will help future researchers and decision-makers grappling with similar problems.

6. Data Handling & Storage

As outlined in the approach section, all data will be incorporated into a GIS database for eventual presentation on a project world wide web page. Standard field data sheets will be created for all field measurements. These field data sheets will be duplicated and archived

after each quarterly sampling period is completed. All electronic data will be archived daily on the SCVWD computer system.

7. Expected Products/Outcomes

This section lists planned and potential materials that will be generated from the data and findings of this project. Completion of the planned materials is integrated into the project budget and schedule. Planned materials include, but are not limited to, biannual project data summary reports, world wide web project GIS page updates, and biannual updates to the draft guidelines for process-based restoration of urban streams in flood control systems. The types and schedule for production of potential materials can not be guaranteed at this point. However, every effort will be made to maximize the sharing of information generated by this project. Potential materials include, but are not limited to, research paper publications in relevant scientific journals, presentations at professional technical conferences, masters theses from university students, and educational materials regarding process-based urban stream restoration in flood control systems.

8. Work Schedule

Work on this project will start in October 2001 in anticipation of CALFED funding to support continued work on the project. Baseline data collection on Reaches 1 and 2 (where construction will begin before CALFED funding is available) will begin in October 2001 and will be funded by the SCVWD. Tasks for Reaches 1 and 2 will include, but are not necessarily limited to, aquatic invertebrate sampling, fish sampling, geomorphic cross section establishment, and hydrology monitoring. Most of the identified tasks will take place during and after the construction of each reach of the flood control and stream restoration project. The construction schedule for the six project reaches is listed below.

Reaches 1 and 2 – Begin construction April 2002 and end October 2003

Reaches 3 and 4 – Begin construction April 2003 and end October 2004

Reaches 5 and 6 – Begin construction April 2004 and end October 2005

Figure 4 is a detailed schedule showing expected initiation and completion dates for all the major tasks described for this three year project. The project milestones (biannual data summary reports and the process based stream restoration guidelines) are shown at the top of the schedule. All of the project activities are keyed to the phased construction process.

This monitoring project is composed of separable tasks and useful information could be developed from this work even if only a portion of the project were to be funded. The biological monitoring tasks (aquatic invertebrate sampling, fish sampling, and vegetation sampling) could be eliminated if only the physical evolution of the channel was of concern. However, we feel it will be critical to complete all of the proposed monitoring to maximize the information richness this project can provide to decision makers.

This project could also be funded incrementally if the need arises. Funding could be allocated to the monitoring efforts at each reach in step with the phased construction of the six project reaches. Payment for this monitoring project will be keyed to the biannual production of the project data summary reports, GIS web page updates, and updates to the draft guidelines for process-based restoration of urban streams in flood control systems.

Given the complex and involved nature of this proposed monitoring project, organized and efficient project management will be critical to the long-term success of this effort. Project management is identified in the project schedule as an ongoing and independent task for the duration of the project.

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

1. ERP, Science Program and CVPIA Priorities

The proposed project addresses a critical element of draft Stage 1 PSP priority BR-1 (Restore Wetlands in Critical Areas Throughout The Bay, Either Via New Projects or Improvements That Add To Or Help Sustain Existing Projects). One element of this priority stresses the importance of the restoration of riparian corridors designed and sized to provide multiple benefits. This monitoring and adaptive management project will fill in critical data gaps in the assessment of the performance of process-based stream restoration projects. This will allow future restoration projects to be designed and sized to more successfully provide naturally maintained multiple ecosystem benefits.

This project also addresses draft Stage 1 Implementation Plan priorities for other regions. Priorities SR-4 and SJ-2 (Restore geomorphic processes in stream and riparian corridors), for the Sacramento River Region and the San Joaquin River Region, respectively, point out the critical need for enhancements in the scientific understanding and basis for potential restoration actions. This proposed project is designed to provide new information that will add to the scientific understanding and basis of stream restoration projects and process-based channel design regardless of the condition of the watershed. Findings from this study will be directly exportable to other California streams. In addition, there will undoubtedly be future stream restoration efforts that are important to the restoration of threatened and endangered species in California that are associated with flood control projects in the Sacramento and San Joaquin regions. The guidelines developed from the monitoring proposed here for the SCVWD flood control and stream restoration project will provide useful insight into the keys to success for such future projects.

The proposed project also directly addresses CALFED ERP priorities. Strategic Goal 2 (Ecosystem Processes and Biotic Communities) recognizes the need for restoration plans to include better restoration and maintenance of ecosystem processes. The SCVWD flood control and restoration project will result in a system designed to maximize the ability of natural fluvial processes to maintain the ecological values of the stream corridor, and significant new information regarding process-based stream restoration will be developed if this proposed monitoring and adaptive management project is executed.

The CALFED Science Program goals provide perhaps the strongest support for this proposed work. The proposed project will help in the development of relevant performance measures for restoration projects. This project is also an adaptive management experiment that could lead to improved restoration approaches, better understanding of restoration impediments, and new ways to retrofit elements of adaptive management. One of the most significant benefits of this project with respect to the CALFED Science Program goals is the potential of the results of this work to advance the understanding of physical, ecological, and perhaps even social processes relevant to the effectiveness of restoration and

to accomplishing CALFED goals. This project also meets the Science Program goal of establishing integrated science programs in complicated field settings. This project brings the skills and experience of fluvial geomorphologists, fisheries biologists, wetland ecologists, water resources engineers, and water district operations personnel to bear on a stream and riparian restoration project in a highly constrained setting where the potential to restore ecological values in addition to upgrading a flood control system still exists. This project will provide advances in not only the scientific basis for this type of restoration effort, but also in the programmatic elements as well. This is a project that has tremendous potential to help improve the understanding of the intertwined implications of all CALFED program actions, especially for situations where flood control and ecosystem restoration meet. It must be stressed here again that this project is an excellent, relatively low cost opportunity to gather new information about stream and riparian restoration based on natural processes. However, without this proposed monitoring and adaptive management project, little or no new information will be collected after the construction of the SCVWD flood control and stream restoration project to help guide future process-based restoration efforts.

2. Relationship to Other Ecosystem Restoration Projects

Approaches based on natural fluvial processes are now the state-of-the-art in river restoration. However, given the complexity and uncertainty associated with most river restoration projects, and the significant lack of post-project performance monitoring data, the critical elements of process-based stream restoration projects are still unclear. These uncertainties can only be minimized through the sort of detailed post-project monitoring proposed for this project.

The importance of restoring floodplains is increasingly being recognized as a critical aspect of process-based restoration of aquatic and riparian habitats. Recent CALFED funded projects on the Tuolumne River, Merced River, and Clear Creek have all emphasized the restoration of functional floodplains in relatively unconstrained watersheds. However, very little is known about the scale required for floodplain restoration to work in constrained settings. This monitoring project will examine the effects of the restoration of a range of floodplain sizes, and will fill a critical gap in the understanding of the scale considerations of floodplain restoration.

3. Request for Next-Phase Funding

This is a new project. We are not requesting next-phase funding for an existing ecosystem restoration project currently funded by the CALFED Program or the CVPIA.

4. Previous Recipients of CALFED or CVPIA funding ID projects previously receiving CALFED or CVPIA funds

The SCVWD has recently received funding from the CALFED Bay-Delta Program for other efforts in the Coyote Creek watershed. The projects are listed below with details of the current status of each project.

1) Almaden Reservoir Watershed Restoration Project; Funded under the 2000-2001 CALFED Watersheds Program; Notice of award received in August, 2001; Project work to begin soon.

2) Stewardship Plans for the West Valley, Guadalupe, and Lower Peninsula Watersheds; Funded under the 2000-2001 CALFED Watersheds Program; Project work to begin soon.

3) Landscape and Agricultural Area Measurement and Water Use Budgets; Funded under the 2001 CALFED Water Use Efficiency Program. State portion of the project appropriation recently received; Project work to begin soon.

5. System-wide Ecosystem Benefits

This project will have several important synergistic effects on other ecosystem restoration work funded by the CALFED Bay-Delta Program and other entities. The investigations proposed for this project will fill a critical gap in the stream restoration knowledge base and allow future restoration projects in constrained stream systems to build on the findings of this work. Flood control projects have rarely been designed to restore natural fluvial processes to the extent attempted in the Lower Silver Creek Flood Control project, and the data set that will be collected during this project will be difficult to duplicate. The performance of future process-based flood control and stream restoration projects will be greatly improved by the lessons learned from this project.

6. Proposals Containing Land Acquisition

This proposal does not contain a land acquisition component.

C. Qualifications

An interdisciplinary team of local flood control operations experts from the SCVWD, consulting scientists and engineers, and university researchers has been assembled to design and implement this comprehensive, targeted monitoring and adaptive management project. Brief biographical sketches are provided below for the key members of the project team.

Marc Klemencic, P.E.

B.S., Civil Engineering – Registered Professional Engineer

Marc J. Klemencic is a registered civil engineer in California and is currently an Assistant Operating Officer in the Watershed Division at the Santa Clara Valley Water District. He is responsible for about $200 million in capital construction projects and a $10 million annual operation and maintenance budget in the Coyote, Uvas and Llagas Creek Watersheds. He received a BSCE degree in 1983 from San Jose State University with a concentration in water resources. He has over 18 years of experience with the Santa Clara Valley Water District in the areas of flood control and water supply planning, ordinance enforcement, land use review, flood control design, flood control and water supply maintenance and operations. Marc has held the positions of treasurer, secretary and vice-president for the ASCE San Jose Branch and is also a member of APWA, AWWA, FMA, NFSMA, and Chi Epsilon.

Jose Ortiz, P.E.

B.S., Civil Engineering – Registered Professional Engineer

Mr. Ortiz is a registered civil engineer in the State of California with over 25 years of civil engineering experience in both the private and public sector. He received a BSCE degree in 1976 from San Jose State University with a concentration in construction and transportation.

In addition to railroad engineering and land development engineering experience, he has acted as project manager on several multi-objective flood management projects, developed work programs and budgets for stream and water utility maintenance programs, and has been responsible for obtaining state and federal permits for stream maintenance and operations.

Jose has played a key role in formulating resources protection policies that ensure that environmental resources are protected or enhanced to the furthest extent feasible during routine stream maintenance projects. He is currently the watershed program support manager for the Coyote and Uvas/Llagas Watersheds in the Watershed Management Division at the Santa Clara Valley Water District.

Gilbert C. Carroll--GCRCD

MD, Resource conservation district

Dr. Carroll is a director of the GCRCD and has agreed to lead the liaison between the project and the GCRCD. He holds a B.A. in biology. He worked part time as an industrial assessment limnologist and estuarine biologist for several years. He was chief of field party and biostatistician for a year long project designed to asses the effects of ocean discharge of large quantities of baywater which was proposed to permit expansion of nuclear power generation. He has written critiques of a quantitative method for invertebrate sampling, an analysis of fish egg distributions in a large tidal system, and a study on the seasonal variation of oxygen consumption in a pulmonate snail. He has also conducted several surveys of community structure to assess the assimilative capacity of streams affected by industrial discharges.

Matt Kondolf – Geomorphology and Stream Restoration

Ph.D., Geography and Environmental Engineering; MS, Earth Sciences; AB, Geology

Dr. Matt Kondolf is a fluvial geomorphologist whose research concerns environmental river management, influences of land-use on rivers (notably the effects of mining and dams on river systems), interactions of riparian vegetation and channel form, geomorphic influences on habitat for salmon and trout, alternative flood management strategies, and application of fluvial geomorphology to river restoration. Dr. Kondolf is an associate professor of Environmental Planning and Geography, affiliated faculty member of the Energy and Resources Group, and instructor in the Environmental Sciences Program at the University of California at Berkeley. He also is a past member of the CALFED Ecosystem Restoration Program (ERP) Science Board. Matt has conducted hydrologic, historical, channel stability, and spawning gravel analyses on numerous streams in California including the Lower Yuba River, Rush Creek, Lee Vining Creek, Battle Creek, Stony Creek, the Sacramento River between Deer Creek and Stony Creek, and others. Dr. Kondolf has conducted hydrological and geomorphologic analyses for restoration design and an assessment of restoration success and restoration potential in floodplain gravel pits.

Mark Tompkins – Ecological Engineering, Fluvial Geomorphology, and Stream Restoration

M.S., Environmental Engineering; B.S., Civil Engineering

Mr. Tompkins is a project engineer and stream restoration specialist at CH2M HILL where he developed the firm's national Stream Restoration Initiative. He has extensive project experience in ecological engineering, water resources engineering, hydrology, fisheries biology, fluvial geomorphology, and stream restoration. Mr. Tompkins has performed geomorphic assessments for stream restoration projects on Best Slough and Lower Silver Creek in California, and on Sugarland Run in Maryland. He also assisted in the development of engineering design documents for the stream restoration projects on each of these river systems. Mr. Tompkins has also assessed the effects of potential changes in hydrology and sediment transport on the Sacramento River. In addition to his stream restoration work, Mr. Tompkins has completed designs for wetland creation and restoration projects for the Nature Conservancy and the U.S. Fish and Wildlife Service.
Mr. Tompkins also has expertise with hydraulic and hydrologic models, and has completed detailed analyses of proposed channel modifications on major river systems in California. Mr. Tompkins is also presently a Ph.D. student researching fluvial geomorphology and stream restoration in the Environmental Planning Department at the University of California, Berkeley.

Rene Langis – Wetland Restoration

Ph.D., Water Science; M.S., Environmental Engineering; B.S., Environmental Biology

Dr. Rene Langis is a wetland specialist with CH2M HILL. He has been active in the area of wetland science for over twelve years. As a post-doctoral fellow at San Diego State University, Dr. Langis conducted and published research projects on the functional assessment of created and natural wetlands, as well as on the use of constructed wetlands for nutrient and metal removal. Since joining CH2M HILL, Dr. Langis has been addressing wetland issues in the context of environmental documents under both CEQA and NEPA as well as by preparing and negotiating wetland permits with the U.S. Army Corps of Engineers, the Regional Water Quality Control Board, California Department of Fish and Game, US Fish and Wildlife Service and others. Since January 2000, Dr. Langis has been responsible for providing environmental and permitting guidance for the Coyote Watershed Program, a Santa Clara Water District entity responsible for developing natural restoration and flood protection for the Coyote Watershed creeks.

Earl Byron

Ph.D., Ecology and Limnology; B.A., Marine Biology

Dr. Byron specializes in lake, reservoir, and stream water quality, as well as fisheries and aquatic biology. Many of his project assignments have involved NPDES fisheries and watershed management issues and Ecological Risk Assessment. He has 17 years of experience in managing environmental programs, experimental design, and the statistical analysis of large data sets. Dr. Byron's recent experience has emphasized the characterization of ecological risk. These projects are concerned with bioaccumulation and toxicity to aquatic organisms and their consumers with an emphasis on selenium, mercury, other metals, and organochlorine contaminants. He has used empirical models to estimate water quality characteristics for nutrient and heavy metal control alternatives.

Tim Hamaker

B. S., Fisheries Biology; American Fisheries Society - Certified Fisheries Scientist

Mr. Hamaker has more than 23 years of experience with CH2M HILL in fishery habitat and population inventory studies, including channel and streambank realignment and restoration, numerous fisheries studies under the Endangered Species Act, and EIS/EIRs. He has assisted in the planning of aquatic habitat elements for the SCVWD flood control and stream restoration project to eliminate fish passage impediments to anadromous salmonids and include habitat enhancement features in the engineering designs. Mr. Hamaker also developed wetland, aquatic, and riparian habitat designs for the realignment and restoration of Best Slough at Beale Air Force Base in northern California. Mr. Hamaker was the task manager for the fisheries component of the Mainstem Trinity River Fisheries Restoration EIS/EIR for the U.S. Bureau of Reclamation, Hoopa Valley Tribe, and Trinity County. He is also a member of the Trinity River Fisheries and Channel Restoration Technical Committee. As part of the fisheries impact assessment team, Mr. Hamaker developed methods and analyzed the long-term consequences of implementing the 1992 CVPIA.

Tim Hill

M.S., Natural Resources; B. S., Forestry Management

Mr. Hill is currently responsible for the production of all raster data produced at CH2M HILL's Geospatial Technologies Group. His duties include staff supervision and training, softcopy photogrammetric workstation administration, digital orthophoto production, project cost estimating and scheduling, project management, workflow analysis, and automation. Mr. Hill supports a variety of projects and applications, including imagery to produce photogrammetric mapping for transportation projects, natural resource and land use planning, hydrography, land ownership, land and resource surveys, field sampling, and many others.

Jay Aldean

B. S., Civil Engineering; M.B.A.

Mr. Aldean has 23 years of engineering experience, including project management, planning, and design of transportation, stormwater, water, and wastewater facilities. His engineering experience includes developing and implementing systematic processes and methodologies for evaluating the condition of sewer and storm drain systems; storm and wastewater management; design and construction of water reclamation facilities; master planning; conducting preliminary investigations; and performing feasibility studies. He holds a Master's of Business Administration and a Bachelor's degree in civil engineering. Mr. Aldean is responsible for senior review of hydrologic and hydraulic planning and design issues with respect to the Coyote Creek Watershed Management Program. He also provided assistance in the form of QA/QC of proposed design for channel improvements for the Lower Guadalupe Flood Control project and managed hydrology tasks on the Adobe Creek Reach 5 project, both for the District. Mr. Aldean managed the Sanitary Sewer and Storm Drain System Inventory Evaluation and Data Collection for the City of Reno. As Director of Public Works for the Carson City Public Works Department, he developed plans for a stormwater utility. He also planned for the traffic and transportation needs of the city,

including street reconstruction program, transit system, and street and drainage system maintenance. He served as Director of the Stormwater Department for the San Antonio Water System.

D. Cost

1. Budget

The budget for each year of requested support is included in the web forms for this proposal. The three-year total requested funding is for $480,509, with $212,428 to be provided in year one, $98,938 in year two, and $169,143 in year three.

2. Cost-Sharing

The SCVWD has already invested approximately $30,000 in the development of the process-based channel design for the flood control project on Lower Silver Creek. These funds have supported the efforts of a fluvial geomorphologist who has worked with the engineering design teams to ensure that each reach was designed according to process-based criteria. The SCVWD intends to provide approximately $46,000 for SCVWD staff to assist with project management and field activities associated with this project. The SCVWD also intends to support the tasks in this proposal that must be completed before CALFED funding is awarded. The estimated cost of these tasks and associated equipment is approximately $25,000. The Guadelupe-Coyote Resource Conservation District (GCRCD) intends to provide approximately $12,500 in staff time to assist in the development of the design guidelines for future urban stream restoration projects and in selected field activities. These cost-sharing efforts result in a match of approximately 17% of the requested CALFED funds.

E. Local Involvement

This project was developed and will be enthusiastically supported by the SCVWD, the local entity tasked with maintaining the flood control elements of Lower Silver Creek in an ecologically sound manner. This project is also supported by the Guadelupe-Coyote Resource Conservation District, a local environmental group that has had significant input on the development of the Lower Silver Creek flood control and stream restoration project. It is the intent of the project investigators to involve interested GCRCD members in data collection efforts throughout the life of the project. Members of the GCRCD will also review the manual of process-based urban stream corridor restoration guidelines that will be produced as part of this project. Gilbert C. Carroll at the GCRCD has expressed interest in taking a leadership role in the GCRCD's involvement with this project.

There has already been extensive local involvement in the development of the flood control and stream restoration project that this proposed effort will monitor. Activities designed to encourage local participation in the development of the flood control project have included a watershed "Open House," a creek tour, and reach-specific neighborhood meetings. Additional opportunities for public involvement have been scheduled for the coming months as the first phases of the flood control and stream restoration work near implementation. This monitoring project will enhance the positive local involvement that already exists on Lower Silver Creek.

F. Compliance with Standard Terms and Conditions

The SCVWD will comply with all of the standard State and Federal contract terms and conditions described in attachments D and E of the 2002 the CALFED PSP.

G. Literature Cited

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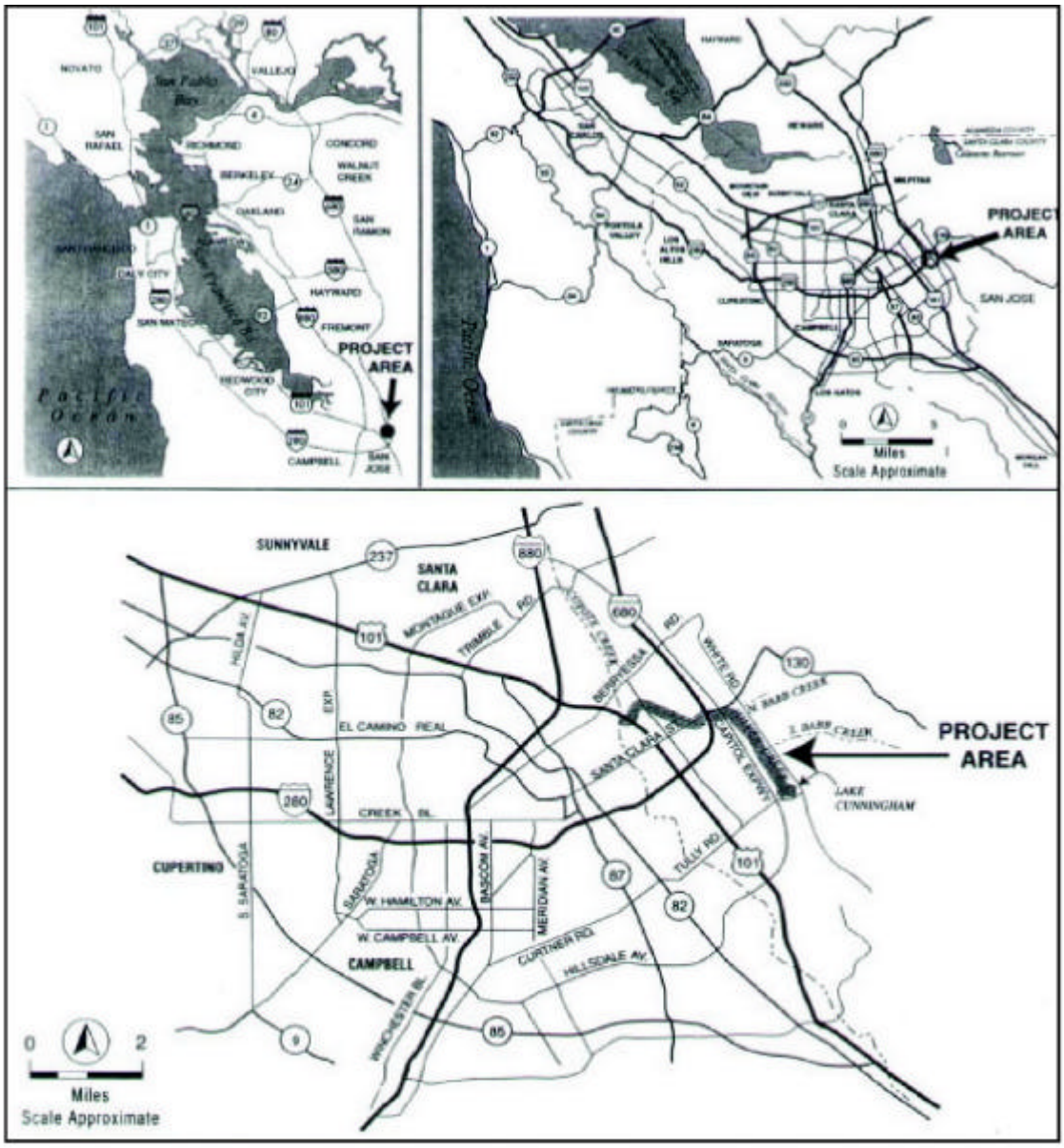


Figure 1
Project Location Maps

E0620001011SAC Exhibit 101

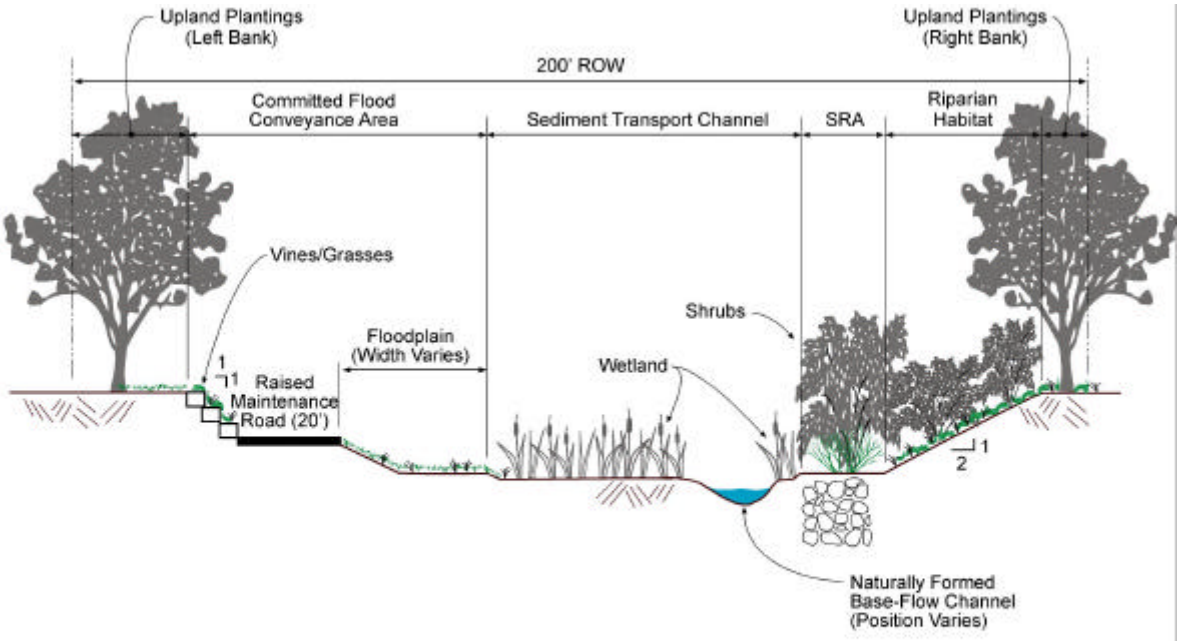
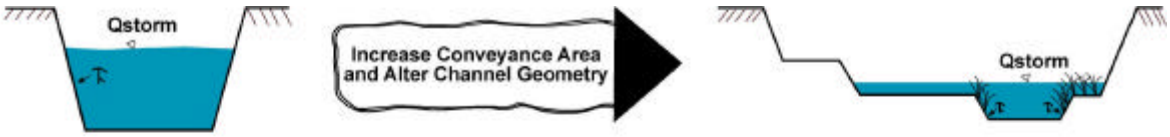


Figure 2
Conceptual restored cross section for lower Silver Creek showing floodplain, sediment transport channel, and naturally formed base-flow channel

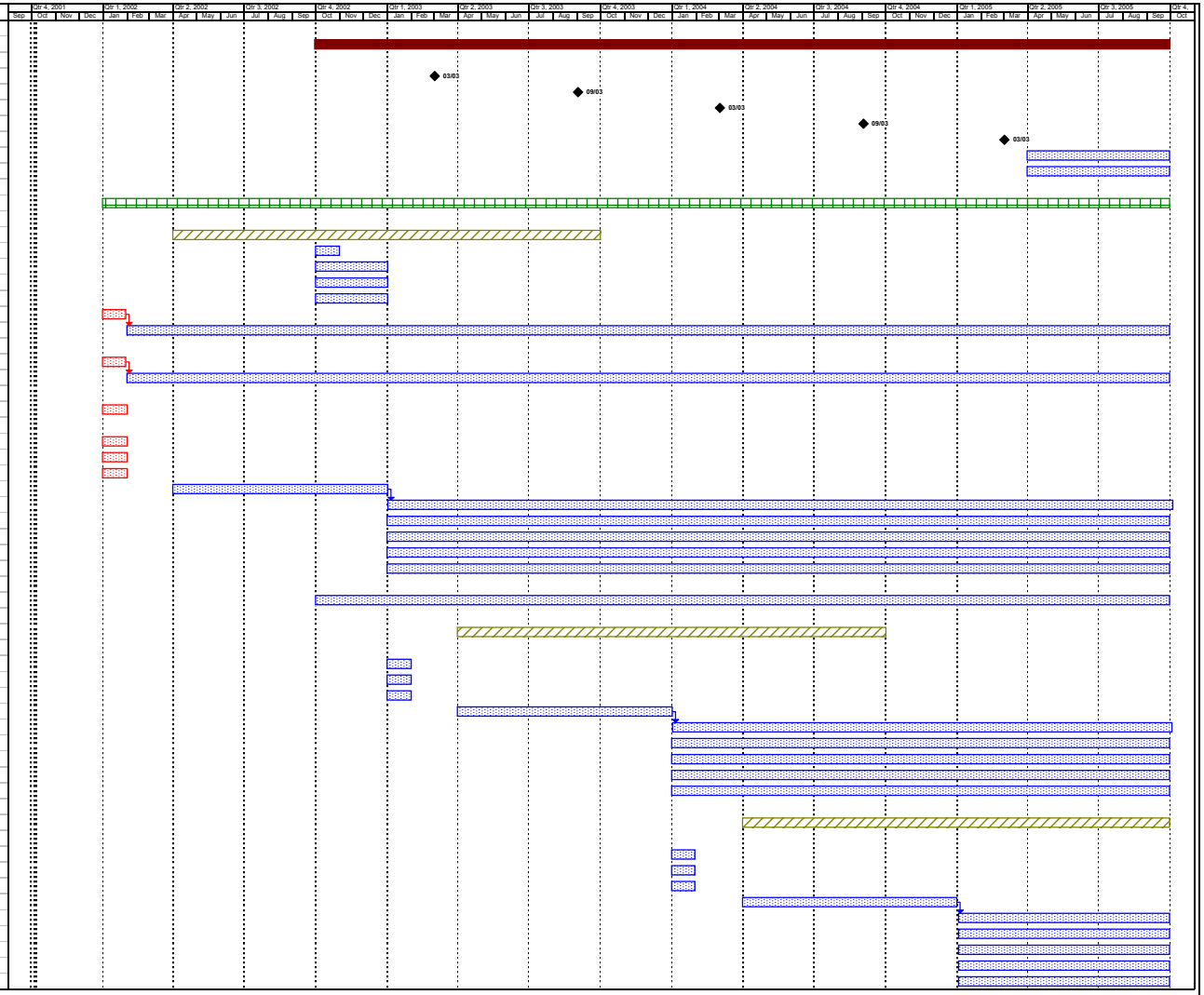


Existing Conditons
Storm flows cause high shear stress that leads to uniform geometry and degraded aquatic and riparian habitat

Post-Flood Control Project Conditions
Presence of effective floodplain reduces storm flow shear stress and allows natural formation and maintenance of ecologically valuable aquatic and riparian habitat

Figure 3
Conceptual Model

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1						
2	3-YEAR CALFED FUNDING PERIOD	785 days	Mon 09/30/02	Fri 09/30/05		
3						
4	Biannual Data Summary Report 1	1 day	Mon 03/03/03	Mon 03/03/03		
5	Biannual Data Summary Report 2	1 day	Wed 09/03/03	Wed 09/03/03		
6	Biannual Data Summary Report 3	1 day	Wed 03/03/04	Wed 03/03/04		
7	Biannual Data Summary Report 4	1 day	Fri 09/03/04	Fri 09/03/04		
8	Biannual Data Summary Report 5	1 day	Thu 03/03/05	Thu 03/03/05		
9	Final Data Summary Report	131 days	Fri 04/01/05	Fri 09/30/05		
10	Urban Stream Restoration Guidelines	131 days	Fri 04/01/05	Fri 09/30/05		
11						
12	Project Management	979 days	Tue 01/01/02	Fri 09/30/05		
13						
14	Reach 1 and 2 construction	393 days	Mon 04/01/02	Wed 10/01/03		
15	Develop field monitoring protocols	23 days	Tue 10/01/02	Thu 10/31/02		
16	Compile existing geomorphic data	67 days	Tue 10/01/02	Wed 01/01/03		
17	Compile existing hydrology data	67 days	Tue 10/01/02	Wed 01/01/03		
18	Compile existing vegetation data	67 days	Tue 10/01/02	Wed 01/01/03		
19	Install automated stage/discharge recorder	22 days	Tue 01/01/02	Wed 01/30/02		
20	Data management for stage discharge recorder	956 days	Fri 02/01/02	Sat 10/01/05	19	
21						
22	Install automated temperature recorder	22 days	Tue 01/01/02	Wed 01/30/02		
23	Data management for temperature recorders	956 days	Fri 02/01/02	Fri 09/30/05	22	
24						
25	Establish upstream and downstream geomorphic monitoring cross sections	24 days	Tue 01/01/02	Fri 02/01/02		
26						
27	Reaches 1 and 2 pre-construction aquatic invertebrate sampling	24 days	Tue 01/01/02	Fri 02/01/02		
28	Reaches 1 and 2 pre-construction fish sampling	24 days	Tue 01/01/02	Fri 02/01/02		
29	Reaches 1 and 2 pre-construction sediment transport sampling	24 days	Tue 01/01/02	Fri 02/01/02		
30	Install geomorphic monitoring cross sections in Reaches 1 and 2	198 days	Mon 04/01/02	Wed 01/01/03		
31	Reaches 1 and 2 quarterly geomorphic cross section monitoring	719 days	Thu 01/02/03	Tue 10/04/05	30	
32	Reaches 1 and 2 quarterly aquatic invertebrate sampling	718 days	Wed 01/01/03	Fri 09/30/05		
33	Reaches 1 and 2 quarterly fish sampling	718 days	Wed 01/01/03	Fri 09/30/05		
34	Reaches 1 and 2 quarterly sediment transport sampling	718 days	Wed 01/01/03	Fri 09/30/05		
35	Reaches 1 and 2 quarterly vegetation assessment	718 days	Wed 01/01/03	Fri 09/30/05		
36						
37	Create and update project website with GIS	784 days	Tue 10/01/02	Fri 09/30/05		
38						
39	Reach 3 and 4 construction	394 days	Tue 04/01/03	Fri 10/01/04		
40						
41	Reaches 3 and 4 pre-construction aquatic invertebrate sampling	23 days	Wed 01/01/03	Fri 01/31/03		
42	Reaches 3 and 4 pre-construction fish sampling	23 days	Wed 01/01/03	Fri 01/31/03		
43	Reaches 3 and 4 pre-construction sediment transport sampling	23 days	Wed 01/01/03	Fri 01/31/03		
44	Install geomorphic monitoring cross sections in Reaches 3 and 4	198 days	Tue 04/01/03	Thu 01/01/04		
45	Reaches 3 and 4 quarterly geomorphic cross section monitoring	457 days	Fri 01/02/04	Mon 10/03/05	44	
46	Reaches 3 and 4 quarterly aquatic invertebrate sampling	457 days	Thu 01/01/04	Fri 09/30/05		
47	Reaches 3 and 4 quarterly fish sampling	457 days	Thu 01/01/04	Fri 09/30/05		
48	Reaches 3 and 4 quarterly sediment transport sampling	457 days	Thu 01/01/04	Fri 09/30/05		
49	Reaches 3 and 4 quarterly vegetation assessment	457 days	Thu 01/01/04	Fri 09/30/05		
50						
51	Reaches 5 and 6 construction	392 days	Thu 04/01/04	Fri 09/30/05		
52						
53	Reaches 5 and 6 pre-construction aquatic invertebrate sampling	22 days	Thu 01/01/04	Fri 01/30/04		
54	Reaches 5 and 6 pre-construction aquatic fish sampling	22 days	Thu 01/01/04	Fri 01/30/04		
55	Reaches 5 and 6 pre-construction sediment transport sampling	22 days	Thu 01/01/04	Fri 01/30/04		
56	Install geomorphic monitoring cross sections in Reaches 5 and 6	197 days	Thu 04/01/04	Fri 12/31/04		
57	Reaches 5 and 6 quarterly geomorphic cross section monitoring	195 days	Mon 01/03/05	Fri 09/30/05	56	
58	Reaches 5 and 6 quarterly aquatic invertebrate sampling	195 days	Mon 01/03/05	Fri 09/30/05		
59	Reaches 5 and 6 quarterly fish sampling	195 days	Mon 01/03/05	Fri 09/30/05		
60	Reaches 5 and 6 quarterly sediment transport sampling	195 days	Mon 01/03/05	Fri 09/30/05		
61	Reaches 5 and 6 quarterly vegetation assessment	195 days	Mon 01/03/05	Fri 09/30/05		



Project: tsc_schedule
Date: Fri 10/05/01

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary