Merced River Corridor Restoration Plan Phase IV: Dredger Tailings Reach

Project Information

1. **Proposal Title:**

   Merced River Corridor Restoration Plan Phase IV: Dredger Tailings Reach

2. **Proposal applicants:**

   Jennifer Vick, Stillwater Sciences
   Tim Heyne, California Department of Fish and Game

3. **Corresponding Contact Person:**

   Jennifer Vick
   Stillwater Sciences
   2532 Durant Avenue, Suite 201 Berkeley, CA 94704
   510 848-8098
   jen@stillwatersci.com

4. **Project Keywords:**

   Anadromous salmonids
   Channel Dynamics
   Habitat Restoration, Instream

5. **Type of project:**

   Implementation_Pilot

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

   No

7. **Topic Area**:

   Channel Dynamics and Sediment Transport

8. **Type of applicant:**

   Private for profit

9. **Location - GIS coordinates:**

Latitude:	37.521
Longitude:	-120.429
Datum:	NAD27

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

The project is located in the vicinity of Snelling on the Merced River, a tributary to the San Joaquin River. The project planning reach encompasses the Dredger Tailings Reach of the Merced River (RM 52.0-RM 45.2). The floodplain pilot project (Merced River Ranch) extends from RM 50.3-RM 51.1.

10. **Location - Ecozone:**

    13.3 Merced River

11. **Location - County:**

    Merced

12. **Location - City:**

    Does your project fall within a city jurisdiction?

    No

13. **Location - Tribal Lands:**

    Does your project fall on or adjacent to tribal lands?

    No

14. **Location - Congressional District:**

    18

15. **Location:**

    California State Senate District Number: 12

    California Assembly District Number: 26

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: 131.14%

       Total Requested Funds: $8,547,284.66

b) Do you have cost share partners already identified?

No

c) Do you have potential cost share partners?

No

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

No

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

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

Yes

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

2000 E-05 Merced River Corridor Restoration Plan Phase III ERP

98 E-09 Merced River Corridor Restoration Plan Phase II ERP

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

Yes

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

99-B152	**A Mechanistic Approach to Riparian Restoration in the San Joaquin Basin**	**ERP**
Service Agreement #010801	**Tuolumne River Coarse Sediment Management Plan**	**CALFED Service Agreement**
2001-C200	**Merced River Salmon Habitat Enhancement: Robinson Ranch Site-Revised Phase II**	**ERP**
1998-C16	**Developing a Method to Accurately Simulate Entrainment of Fish**	**ERP**

2001-E201	**Hill Slough West Habitat Restoration Demonstration Project, Phase II**	**ERP**
2001-K218	**Butte Creek, Big Chico Creek, and Sutter Bypass Chinook Salmon and Steelhead Evaluation**	**ERP**

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

Yes

If yes, identify project number(s), title(s) and CVPIA program (e.g. AFRP, AFSP, b(1) other).

99173	**Merced River Corridor Restoration Plan Phase I**	**AFRP**

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

Yes

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

CVPIA 11332-9-MO79	**Merced River: Ratzlaff Project**	**AFRP**
CVPIA 11332-9-MO80	**Stanislaus River: 2 Mile Bar**	**AFRP**
CVPIA 11332-0-MO09	**Stanislaus River: Smolt Survival**	**AFRP**
99-L A-7	**Ratzlaff Reach: Merced River Corridor Restoration Project Phase II (joint w/ DWR)**	**AFRP**
CVPIA 11332-1-GO06	**Calaveras Salmonid Limiting Factors Study**	**AFRP**
00-L D-10	**Feasibility of Long Term Aggregate Source for San Joaquin Tributary Channel Restoration Projects**	**AFRP**

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)

David Montgomery	**University of Washington**	**(206) 543-4270**	**dave@bigdirt.geology.washington.edu**
John Buffington	**University of Idaho**	**(208) 364-4082**	**jbuff@uidaho.edu**
Patrick Redmond	**Piedmont Engineering**	**(406) 388-9828**	

21. **Comments:**

Environmental Compliance Checklist

Merced River Corridor Restoration Plan Phase IV: Dredger Tailings Reach

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

      Yes
   b) Will this project require compliance with NEPA?

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

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

   CEQA Lead Agency: CA Department of Fish and Game
   NEPA Lead Agency (or co-lead:) US Fish and Wildlife Service
   NEPA Co-Lead Agency (if applicable):

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

   CEQA
   -Categorical Exemption
   XNegative Declaration or Mitigated Negative Declaration
   -EIR
   -none

   NEPA
   -Categorical Exclusion
   XEnvironmental Assessment/FONSI
   -EIS
   -none

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

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

      No

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

      CEQA/NEPA process will be completed by the end of 2003.

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

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

LOCAL PERMITS AND APPROVALS

Conditional use permit	Required
Variance	
Subdivision Map Act	
Grading Permit	Required
General Plan Amendment	
Specific Plan Approval	
Rezone	
Williamson Act Contract Cancellation	
Other	

STATE PERMITS AND APPROVALS

Scientific Collecting Permit	
CESA Compliance: 2081	Required
CESA Compliance: NCCP	
1601/03	Required
CWA 401 certification	Required
Coastal Development Permit	
Reclamation Board Approval	Required
Notification of DPC or BCDC	
Other	

FEDERAL PERMITS AND APPROVALS

ESA Compliance Section 7 Consultation	Required
ESA Compliance Section 10 Permit	
Rivers and Harbors Act	
CWA 404	Required
Other	

PERMISSION TO ACCESS PROPERTY

Permission to access city, county or other local agency land. Agency Name: Merced County, Merced Irrigation District	Required, Obtained
Permission to access state land. Agency Name: CA Department of Fish and Game	Required, Obtained
Permission to access federal land. Agency Name:	
Permission to access private land. Landowner Name: Mr. and Mrs. Alderman, Dick Braden, Jack Collins, Harvy Wade, Art Hardin, John Smalley for the Ellinwood Family	Required, Obtained

6. **Comments.**

Land Use Checklist

Merced River Corridor Restoration Plan Phase IV: Dredger Tailings Reach

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

   No

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

   Yes

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

   Yes

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

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

      60

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

      Removal of dredger tailings to restore floodplain elevation and establish native riparian vegetation.

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

Category	Current	Proposed (if no change, specify "none")
Land Use	**Dredger tailings field**	**none**
Zoning	**Exclusive Agriculture**	**none**
General Plan Designation	**Agricultural**	**none**

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

      No

   e) Is the land mapped as Prime Farmland, Farmland of Statewide Importance, Unique Farmland or Farmland of Local Importance under the California Department of Conservation's Farmland Mapping and Monitoring Program?

      No

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

CA Department of Fish and Game

4. Comments.

Conflict of Interest Checklist

Merced River Corridor Restoration Plan Phase IV: Dredger Tailings Reach

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):

Jennifer Vick, Stillwater Sciences
Tim Heyne, California Department of Fish and Game

Subcontractor(s):

Are specific subcontractors identified in this proposal? Yes

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

Steve Kellogg URS Greiner

Darrel Ramus KSN, Inc.

Helped with proposal development:

Are there persons who helped with proposal development?

Yes

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

Kevin Faulkenberry CA Department of Water Resources

Ted Selb Merced Irrigation District

Darrell Slotten UC Davis

John Bair **McBain and Trush**

Michael Fainter **Stillwater Sciences**

Comments:

Budget Summary

Merced River Corridor Restoration Plan Phase IV: Dredger Tailings Reach

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

Independent of Fund Source

Year 1												
Task No.	Task Description	Direct Labor Hours	Salary *(per year)*	Benefits *(per year)*	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Cost
1A	Conduct field surveys	1343	$32,607	$11,012	$16,120	0	$196,000	0	$2,119	0.0	$72,814	0.00
1B	Develop and apply sediment transport model	384	$18,485	$6,242	0	0	$7,000	0	$560	0.0	$29,889	0.00
1C	Determine volume and texture of dredger tailings	40	$1,320	$446	0	0	$70,500	0	$42	0.0	$9,135	0.00
1D	Develop and apply HEC-RAS model	66	$3,074	$1,038	0	0	$19,384	0	68	68.0	$6,790	68.00
1F	Implement baseline monitoring	1006	$25,651	$8,662	$8,321	0	$35,722	0	1708	1708.0	$45,002	1708.00
1G	Coordinate with Merced R. TAC and stakeholder group	320	$10,182	$3,438	0	0	$11,546	0	274	274.0	$17,229	274.00
1H	Project management	640	$24,513	$8,278	0	0	$4,500	0	849	849.0	$39,168	849.00
2A	Merced River Ranch floodplain restoration design: grading and vegetation	802	$26,756	$9,036	$3,200	$1,000	$93,500	0	1194	1194.0	$52,058	1194.00
2B	Assess occurrence and risk of mercury at Merced River Ranch	380	$13,937	$4,706	0	0	$85,968	0	511	511.0	$30,613	511.00
2C	Vegetation experimentation	1278	$31,333	$10,581	$6,906	$6,750	$72,946	0	2090	2090.0	$58,252	2090.00
2D	Project management	330	$11,063	$3,736	0	0	0	0	0	0.0	$17,436	0.00
3A	Environmental documentation and permitting	242	$9,070	$3,063	0	0	$142,539	0	227	227.0	$28,571	227.00
3B	Project management	211	$7,117	$2,403	0	0	0	0	0	0.0	$11,217	0.00
4A	Implement Merced River Ranch floodplain restoration		$24,349	$8,223	0	0	0	0	0	0.0	$38,375	0.00
4B	Implement in-channel gravel infusion		$20,076	$6,780	0	0	0	0	0	0.0	$31,640	0.00
4C	Conduct post-implementation monitoring		$118,573	$40,042	0	0	0	0	0	0.0	$186,876	0.00
		7042	0.00	0.00	0.00	0.00	0.00	0.00	6921.00	6921.00	0.00	6921.00

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**
1E	**Complete draft & final implementation plan for floodplain restoration and gravel augmentation**	**250**	**$9,027**	**$3,049**	**0**	**0**	**$25,178**	**0**	**298**	**298.0**	**$16,775**	**298.00**
1F	**Implement baseline monitoring**	**1048**	**$32,652**	**$11,027**	**$6,090**	**0**	**$20,167**	**0**	**1743**	**1743.0**	**$54,261**	**1743.00**
1G	**Coordinate with Merced R. TAC and stakeholder group**	**195**	**$6,414**	**$2,166**	**0**	**0**	**$12,893**	**0**	**169**	**169.0**	**$11,415**	**169.00**
1H	**Project management**	**195**	**$8,172**	**$2,760**	**0**	**0**	**$1,500**	**0**	**245**	**245.0**	**$13,053**	**245.00**
3A	**Environmental documentation and permitting**	**146**	**$5,757**	**$1,944**	**0**	**0**	**$132,076**	**0**	**116**	**116.0**	**$22,292**	**116.00**
3B	**Project management**	**189**	**$6,420**	**$2,168**	**0**	**0**	**0**	**0**	**0**	**0.0**	**$10,118**	**0.00**
4A	**Implement Merced River Ranch floodplain restoration**	**380**	**$16,460**	**$5,559**	**0**	**0**	**$77,843**	**0**	**437**	**437.0**	**$29,877**	**437.00**
4B	**Implement in-channel gravel infusion**	**680**	**$20,879**	**$7,051**	**$9,900**	**0**	**$3,745,356**	**0**	**980**	**980.0**	**$220,511**	**980.00**
4D	**Project management**	**120**	**$4,421**	**$1,493**	**0**	**0**	**0**	**0**	**0**	**0.0**	**$6,968**	**0.00**
		3203	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3988.00**	**3988.00**	**0.00**	**3988.00**

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
1G	Coordinate with Merced R. TAC and stakeholder group	188	$6,355	$2,146	0	0	$3,015	0	164	164.0	$10,334	164.00
1H	Project management	39	$1,463	$494	0	0	0	0	37	37.0	$2,309	37.00
4A	Implement Merced River Ranch floodplain restoration	204	$9,218	$3,113	0	0	$41,916	0	235	235.0	$16,647	235.00
4B	Implement in-channel gravel infusion	0	0	0	0	0	$1,283,459	0	0	0.0	$64,173	0.00
4C	Conduct post-implementation monitoring	4748	$128,248	$43,310	$52,070	$1,000	$72,000	0	7956	7956.0	$211,828	7956.00
4D	Project management	560	$20,837	$7,037	0	0	0	0	0	0.0	$32,840	0.00
		5739	0.00	0.00	0.00	0.00	0.00	0.00	8392.00	8392.00	0.00	8392.00

Grand Total=19301.00

Comments.
On-line budget forms do not appear to be adding task or year totals correctly. Complete budget forms are also attached to proposal package.

Budget Justification

Merced River Corridor Restoration Plan Phase IV: Dredger Tailings Reach

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

Employee Hours Peter Baker 88 Ethan Bell 32 Christian Braudrick 2113 Christine Champe 408 Yantao Cui 626 Zooey Diggory 4483 Lauren Dusek 266 Michael Fainter 24 Anthony Falzone 690 Greg Fanslow 88 Craig Fixler 158 Noah Hume 320 Sapna Khandwala 1206 Frank Ligon 150 Bruce Orr 898 Dirk Pedersen 548 Angela Percival 368 Leonard Sklar 55 Jay Stallman 200 John Stella 1032 Martin Trso 228 Jenifer Vick 1994 Scott Wilcox 8

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

Employee Rate Peter Baker $37.57 Ethan Bell $24.07 Christian Braudrick $26.50 Christine Champe $43.33 Yantao Cui $46.71 Zooey Diggory $19.71 Lauren Dusek $16.31 Michael Fainter $38.02 Anthony Falzone $23.62 Greg Fanslow $28.98 Craig Fixler $50.62 Noah Hume $40.59 Sapna Khandwala $23.62 Frank Ligon $50.30 Bruce Orr $46.34 Dirk Pedersen $30.10 Angela Percival $30.10 Leonard Sklar $43.82 Jay Stallman $20.25 John Stella $28.26 Martin Trso $30.73 Jenifer Vick $43.60 Scott Wilcox $48.68

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

Stillwater pays 33.78% in benefits to employees in all categories.

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

All travel is from the Bay Area or Sacramento to the Merced River, and includes the cost of mileage, lodging and meals. Travel costs to conduct field surveys, monitoring, vegetation experiments, and project implementation are estimated to total $49,627.

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

Estimated break-down of supply costs: Office supplies: $2,000.00 Computing supplies: $750.00 Field supplies: $5,000.00

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.

In Task 1, Kjeldsen, Sinnock & Neudeck (KSN) provides long profile surveying ($78,000) and mapping services ($64,000). No time estimate was provided, as this was a bid based on the number of river miles being surveyed and mapped. An estimate was also received from URS Corp, Who estimated a higher price. Also, the bid price was substantially consistent with prices paid to Del Terra for similar work recently conducted on Clear Creek. The primary subcontractor is URS Corp who provides engineering, permitting, and construction for the project. In Task 1, URS documents the volume and texture of dredger tailings ($55,150), conducts hydrologic modeling ($15,384), and assists in planning, coordination, and completing the draft and final implementation plan for gravel augmentation for a Task 1 total cost of $106,754. In Task 2, URS supports development of grading and vegetation preliminary/conceptual ($85,968) and other support for a Task 2 total cost of $113,251. In Task 3,

URS takes the lead role in environmental documentation and permitting for a total Task 3 cost of $489,620. In Task 4, URS takes the lead role in project implementation for a total Task 4 cost of $5,028,015. (See attachments for more detail on URSs cost proposal.) California Department of Fish and Game will provide project oversight and coordination throughout the duration of the project.

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.

New equipment will be not be purchased for the project.

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.

Field activities, coordination with subconsultants, agencies, stakeholders, and the Technical Advisory Committee, data management, and project administration are the principal project management activities in Tasks 1 and 2. Task 1 project management costs total $77,307. Task 2 project management costs total $32,236. The focus of project management in Task 3 associated with environmental documentation and permitting is on agency and subcontractor coordination. Task 3 project management costs total $ 20,738. Task 4, the implementation and construction phase, has no discrete project management costs identified, as they are included in the subcontractor (URS) budget.

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

Costs associated with computer systems and networks are included in Other Direct Costs.

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.

Stillwaters indirect costs include office expenses (rent, utilities, telephones, computer supplies, data connectivity, etc.), office staff, insurance, legal and accounting costs, proposal expenses and depreciation for capital items such as furniture and office equipment. As no specific place was provided, contractor fee was also included in the Indirect Costs column.

Executive Summary

Merced River Corridor Restoration Plan Phase IV: Dredger Tailings Reach

We propose to design and implement in-channel and floodplain restoration on the Dredger Tailings Reach of the Merced River, a tributary to the San Joaquin River. The Dredger Tailings Reach extends seven miles downstream from Crocker-Huffman Dam, the upstream limit for salmonids migrating up the Merced River. As a result of gold dredging in the early twentieth century, the channel in this reach is confined by piles of dredger tailings that have replaced the natural floodplain forest. In addition, due to the combined effects of gold dredging and the interception of coarse sediment by upstream dams, the channel in this reach is depleted of the coarse sediment needed for spawning habitat. The objectives of the project are to (1) immediately increase coarse sediment storage in the reach, (2) balance coarse sediment supply with sediment transport competence and capacity, and (3) establish a floodplain at an elevation that functions under the current regulated flow conditions and supports riparian recruitment processes. To achieve these objectives, we propose to: · complete field surveys and numerical modeling necessary to develop a detailed restoration implementation plan for the entire reach; · design and implement the first phase of a gravel augmentation program for the whole reach; · design and implement a pilot floodplain restoration project at the CDFG Merced River Ranch parcel; and · continue stakeholder and landowner outreach to ensure strong support for the project. This project represents Phase IV of the Merced River Corridor Restoration Plan, which was jointly developed by the Merced County Planning and Community Development Department and Stillwater Sciences, working closely with CDFG, CDWR, Merced Irrigation District, and local stakeholders. The implementation of this project will contribute to achieving many of the geomorphic, biological, and social goals of the ERP Implementation Plan.

Proposal

Stillwater Sciences

Merced River Corridor Restoration Plan Phase IV: Dredger Tailings Reach

Jennifer Vick, Stillwater Sciences
Tim Heyne, California Department of Fish and Game

Tables, Figures and Attachments

Table 2. Summary of Hypotheses to be Tested, Monitoring Parameters, and Timing for Floodplain Restoration and Gravel Augmentation.

Relevant to Floodplain Restoration or Gravel Augmentation	Hypothesis	Monitoring Method	Timing of Surveys		
			Baseline	As-built	Post-Project
Hydraulics					
Floodplain restoration	H1. The channel will convey the design flow (~1,700 cfs). H2. Flows exceeding the design flow will spill out of the channel and inundate the floodplain.	Record water surface elevation at one cross section at the site. Deploy Global Water WL-14 WaterLogger at the site following project construction and record hourly water surface elevation. Develop a stage-discharge curve using the stage data from the site and flow data from the Merced ID Crocker-Huffman gauge.	N/A	N/A	Fall 2004–end of project
Geomorphic Processes and Attributes					
Gravel augmentation	G1. Adding sediment to the channel will fine the bed surface (from its current cobble-armored condition).	Document baseline bed surface texture by mapping facies units in the entire Dredger Tailings Reach and conducting pebble counts (Wolman 1954) to quantify the bed surface texture in each facies unit category.	Summer 2003	Fall 2004	Summer 2005
Gravel augmentation	G2. Fining the bed surface will reduce the magnitude of the flow at which bed material transport is initiated. Under current conditions, incipient motion of the channel bed occurs at a flow of approximately 4,800 cfs (Q_5). At the sediment augmentation site(s), flow required to initiate bed motion will be approximately 2,100 cfs (Q_2).	Conduct marked rock experiments at 5 cross sections throughout the reach. Marked rocks will be the size of the d_{84} and d_{50} of the facies units in which they are deployed. Rocks will be placed and reassessed after each flow exceeding 2,000 cfs. Rocks will be deployed as soon as possible following issuance of a contract to increase the likelihood that bed-mobilizing flows occur before project construction.	Winter 2002, 2003	N/A	Winter 2004, 2005
Gravel augmentation	G3. Fining the bed surface will increase the depth of scour that occurs for a flow of a given magnitude.	Construct and monitor scour cores at the 5 cross sections at which marked rocks are deployed.	Winter 2002, 2003	N/A	Winter 2004, 2005
Gravel augmentation	G4. Adding sediment to the channel that can be mobilized by current flow	Map the area of active bars from orthorectified aerial photographs (taken in Task 1C) during the	Summer 2003	Summer 2004	Summer 2005

Relevant to Floodplain Restoration or Gravel Augmentation	Hypothesis	Monitoring Method	Timing of Surveys		
			Baseline	**As-built**	**Post-Project**
	conditions will increase the volume and extent of alluvial storage (as indicated by active gravel bars) in the channel at the augmentation sites and downstream.	summer low flow period. Field verify maps during Task 1A field surveys. Conduct total station surveys at five reference riffles to provide detailed topographic assessment of pre-project, as-built, and post-project riffle conditions.			
Gravel augmentation	G5. Adding sediment to the channel and increasing bed mobility will result in increased substrate permeability at the augmentation sites and at downstream deposition sites.	Assess substrate permeability using a modified Mark VI standpipe (Terhune 1958). A sufficient number of samples will be collected to detect a 20% change in predicted chinook salmon survival to emergence. Based on a similar study in the Tuolumne River (Stillwater Sciences 2001c), it is anticipated that 12 samples/riffle will be required. Five reference riffles in the reach will be sampled.	Fall 2003	Fall 2004	Fall 2005
Gravel augmentation	G6. The gravel infusion will not affect the stability of the channel cross-section.	Following placement of gravel for the infusion, re-survey pre-project cross sections surveyed in Task 1A to document as-built conditions. Resurvey cross sections following the winter of 2004/2005 to document any alterations to channel geometry.	N/A	Fall 2004	Summer 2005
Gravel augmentation	G7. Fining the bed texture will increase the sediment transport rate. Under current conditions, the average annual transport rate is estimated to be 550 tons/year. Under post-infusion conditions, the average transport rate is predicted to be 4,500 tons/year.	Measure bedload transport rates using a 6-inch Helley-Smith sampler deployed from a cataraft at the Merced River Ranch site during at least 5 pre-project peak flows and 5 post-project peak flows.	Winter 2002, 2003	N/A	Winter 2004, 2005
Floodplain restoration	G8. Channel cross section width and profile will remain stable, with minor adjustments, following construction.	Document as-built channel conditions by surveying approximately 8 cross sections in the project reach. Monument cross section endpoints using 5/8-inch rebar and record locations using	N/A	Fall 2004	Summer 2005

Relevant to Floodplain Restoration or Gravel Augmentation	Hypothesis	Monitoring Method	Timing of Surveys		
			Baseline	**As-built**	**Post-Project**
		differential GPS. Re-survey cross sections in summer 2005 (following winter 2004/05 high flows).			
Biotic Response					
Gravel augmentation	B1. Increasing the area of suitable chinook salmon spawning habitat will reduce the frequency of redd superimposition. B2. Chinook salmon will use newly formed alluvial deposits (that result from the gravel augmentation) for spawning.	Map area of existing suitable spawning habitat. Apply a redd superimposition model developed for the Tuolumne River (TID/MID 1991) to estimate the number of spawners that the available habitat can accommodate without superimposition. Document the number of chinook salmon redds at each riffle in the reach and determine the number of redds/unit area (ongoing by CDFG). Conduct weekly monitoring and marking of redds at five riffles to document the occurrence and magnitude of redd superimposition.	Summer 2003 Fall 2002, 2003 (data also available for prior years)	Fall 2004	Summer 2005
Gravel augmentation	B3. By increasing the bed mobility, macroinvertebrate species composition will shift from heavily-cased, armored, and relatively unavailable body forms (such as caddisflies) to non-cased, non-sessile, and more available body forms (such as mayflies and chironomids) for fish predators (Power 1992, Power et al. 1994).	Collect quantitative macroinvertebrate samples at the 5 reference sites where permeability and topography are being intensively monitored. Samples will be collected using a Hess sampler.	Spring 2003 and 2004	N/A	Spring 2005
Floodplain restoration	B4. After one year following revegetation, 80% of planted stems will survive and cover will increase by 100% compared with as-built conditions. B5. The created floodplain will support	Establish permanent vegetation plots in the 60-acre revegetation area. At each plot, conduct annual surveys to document the following: • percent survival of planted stems, • cover by planted stems, • stem density and species of recruited woody	N/A	Winter 2004	Fall 2005

Relevant to Floodplain Restoration or Gravel Augmentation	Hypothesis	Monitoring Method	Timing of Surveys		
			Baseline	**As-built**	**Post-Project**
	recruitment of cottonwood and other native woody riparian species.	species, • cover by recruited woody species, • total species composition, and • total cover by species.			
Floodplain restoration	B6. Increasing the area and connectivity of riparian vegetation will increase the abundance and diversity of native nesting bird species at the restoration site.	Conduct avian census surveys at 2 locations on the MRR and 3 additional locations in the reach. Methods will be consistent with ongoing surveys being conducted in the Central Valley and will include a combination of point-count avian census surveys (as modified by Pt. Reyes Bird Observatory from Ralph et al. 1993) and vegetation relevé plots (Sawyer and Keeler-Wolf 1995). Avian census surveys will include five-minute point counts conducted a minimum of three times during the breeding season (May 1 through June 30). At each census point, a vegetation relevé survey will be conducted once annually.	Spring 2003, 2004	N/A	Spring 2005

Table 3. Summary of Hypotheses to be Tested, Monitoring Parameters, and Timing for Vegetation Experimentation

Experimental factor	Hypothesis	Description of treatments	Performance parameter
Restoration type (active planting vs. natural regeneration)	Following floodplain reconstruction, actively planting seeds and seedlings of native riparian species increases the density and diversity of woody riparian vegetation after one year through regeneration by natural seedfall. Active planting also reduces the percent cover of herbaceous vegetation and non-native plant species.	(1) fallow floodplain (2) planting of seeds (3) planting of seedlings	• % cover of woody riparian species • % cover woody vs. herbaceous species • % cover native vs. non-native species • stem density of woody vegetation
Life stage at planting	Planting native riparian tree species as seedlings ensures greater survival after the first year than planting seeds.	(1) seeds (2) seedlings	• stem density after first year • % survival • growth rate • % germination by species
Depth to groundwater	Depth to groundwater affects seedling survival and growth in the first year. Riparian tree seedlings and cuttings planted in areas with a shallow water table survive the first growing season better because of reduced drought stress. Seedling survival and growth varies for riparian species with different life history traits.	(1) shallow groundwater (approx. 1 m) (2) deeper groundwater (>2 m) Assuming that the groundwater level is the same throughout the site (verified with piezometers), treatments will occur on low and high floodplain benches.	• stem density after first year • % survival • growth rate • pre-dawn xylem potential (measured monthly throughout the growing season)
Irrigation	Irrigating seedlings and cuttings after planting increases seedling survival and growth over the first year because of reduced moisture stress. Irrigating throughout the entire growing season (which includes the Mediterranean climate dry season) increases survival over irrigation for the first several months after planting. Seedling survival and	(1) no irrigation (2) drip irrigation	• stem density after first year • % survival • growth rate • pre-dawn xylem potential (measured monthly throughout the growing season)

Experimental factor	Hypothesis	Description of treatments	Performance parameter
	growth varies for riparian species with different life history traits.		
Mulch application	Adding mulch to plantings increases plant survival and growth through the first year because of reduced water stress and reduced competition from herbaceous plants. Seedling survival and growth varies for riparian species with different life history traits.	(1) no addition of mulch (2) mulch addition to each planted stem	• stem density after first year • % survival • growth rate • pre-dawn xylem potential (measured monthly throughout the growing season) • % cover of herbaceous species

Table 5. Projects receiving previous CALFED or CVPIA funding.

Project title	Program/project number	Current status	Project milestones
Stillwater Sciences previous CALFED Program funding			
Merced River Corridor Restoration Plan-Phase II	ERP/ Project #98E-09	complete	(1) social, institutional, and infra-structural opportunities and constraints to restoration analysis; (2) baseline evaluations of geo-morphic and riparian vegetation conditions
Merced River Corridor Restoration Project-Phase III	ERP/Project #2000 E-05	in progress	development of (1) geomorphic-ally functional channel and flood-plain design guidelines; (2) the Merced River Corridor Restoration Plan; (3) conceptual designs for 5 top-priority restoration projects
A Mechanistic Approach to Riparian Restoration in the San Joaquin Basin	ERP/#99-B152	starting-up/in progress	(1) literature and existing data review; (2) development of conceptual model and study plan
Tuolumne River Coarse Sediment Management Plan	Service Agreement #010801	in progress	(1) fine sediment report; EACH and stock recruitment modeling underwa y
M&T Ranch Pump Intake Assessment	Contract 01A120210D	complete	developed mitigating techniques for sediment burial of pump intake
Saeltzer Dam Removal Analysis	Contract B-81491	complete	(1) application of sediment transport model to a dam removal project; (2) pre- and post-dam removal channel monitoring
CDFG previous CALFED funding			
Merced River Salmon Habitat Enhancement: Robinson Ranch Site-Revised Phase II	ERP/2001-C200	in progress	construction is nearly complete
San Joaquin River Chinook Salmon Age Determinations: Phase II	2001-K206	in progress	50% complete with Phase I and agreements have been signed for Phase II
Chinook Salmon Movement in the lower San Joaquin River and South Delta	1998-C11	in progress	fish tagging complete. Entering in Year 2 of field work.
Basso Bridge Land Acquisition	1998-C05	complete	two smaller parcels purchased, third was not
Developing a Genetic Baseline for San Joaquin Salmon	1997-C09	in progress	second year annual report almost completed; third year to be completed by June 2002
Stillwater Sciences previous CVPIA funding			
Merced River Corridor Restoration Plan-Phase I	AFRP/	complete	formation of the Merced River Stakeholder Group and Technical Advisory Committee
Merced River: Ratzlaff Project	AFRP/CVPIA 11332-9-MO79	complete	provide comments on existing and proposed restoration efforts; coordinate with Merced River Restoration Project
Stanislaus River: 2 Mile Bar	AFRP/CVPIA 11332-9-MO80	complete	prepare summary of restoration potential and strategies, focusing on geomo rphic opportunities and constraints
Stanislaus River: Smolt Survival	AFRP/CVPIA 11332-0-MO09	complete	prepare assessment of coded wire tag and multiple mark-recovery smolt survival assessment programs
Calaveras River Spawning Habitat Evaluation	AFRP/	complete	conduct reconnaissance-level evaluation of steelhead and salmon habitat conditions and population dynamics
CDFG previous CVPIA funding			
Feasibility of Long Term	00-L D-10	complete	

Project title	Program/project number	Current status	Project milestones
Aggregate Source for San Joaquin Tributary Channel Restoration Projects			
Ratzlaff Reach: Merced River Corridor Restoration Project Phase II (joint w/DWR)	99-L A-7	complete	monitoring is continuing
Riffle Atlas Update for San Joaquin Tributaries	99-L D-10	in progress	internal draft completed; being evaluated by CDFG personnel

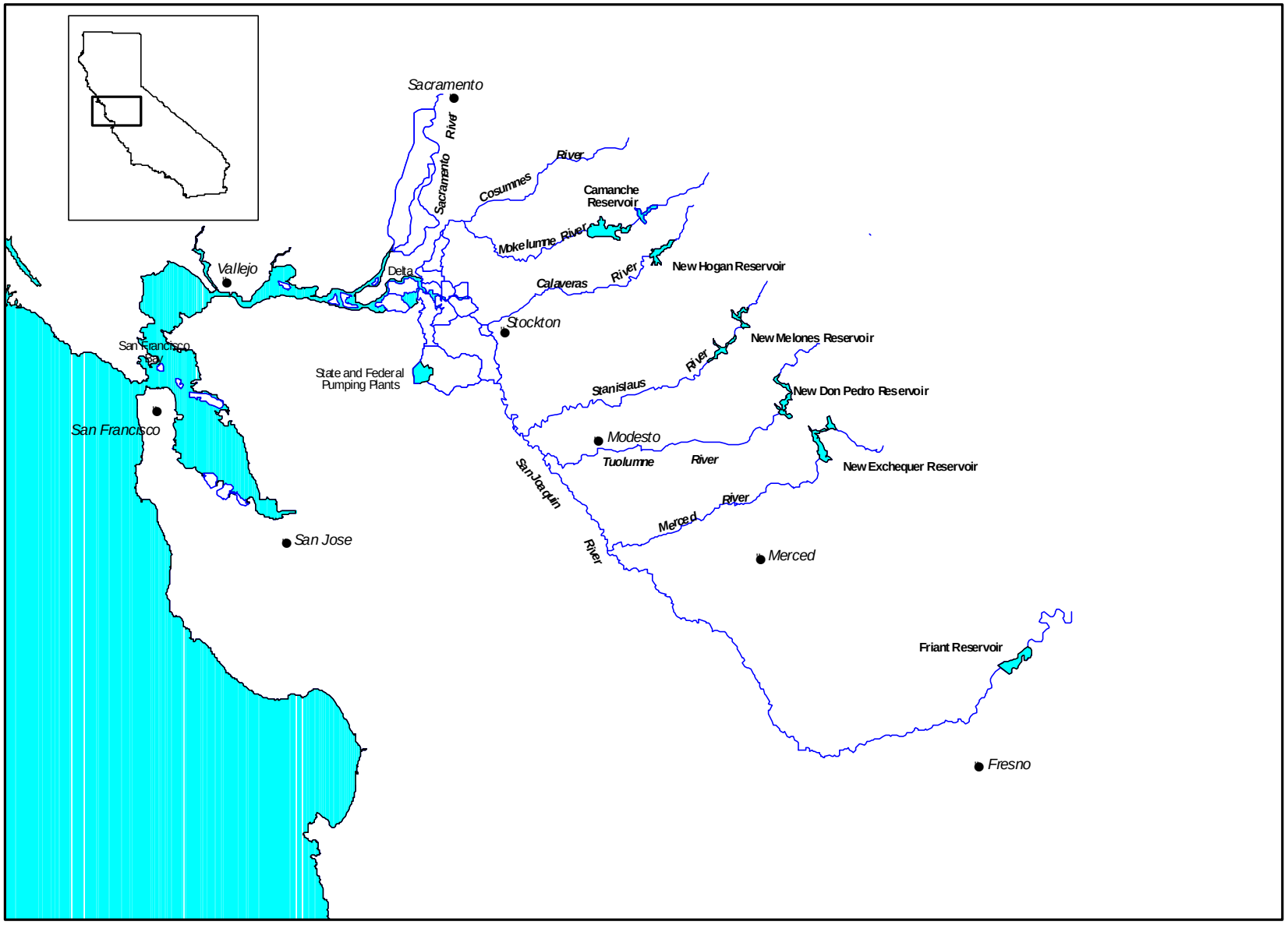

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Figure 1. The vicinity of the Merced River.

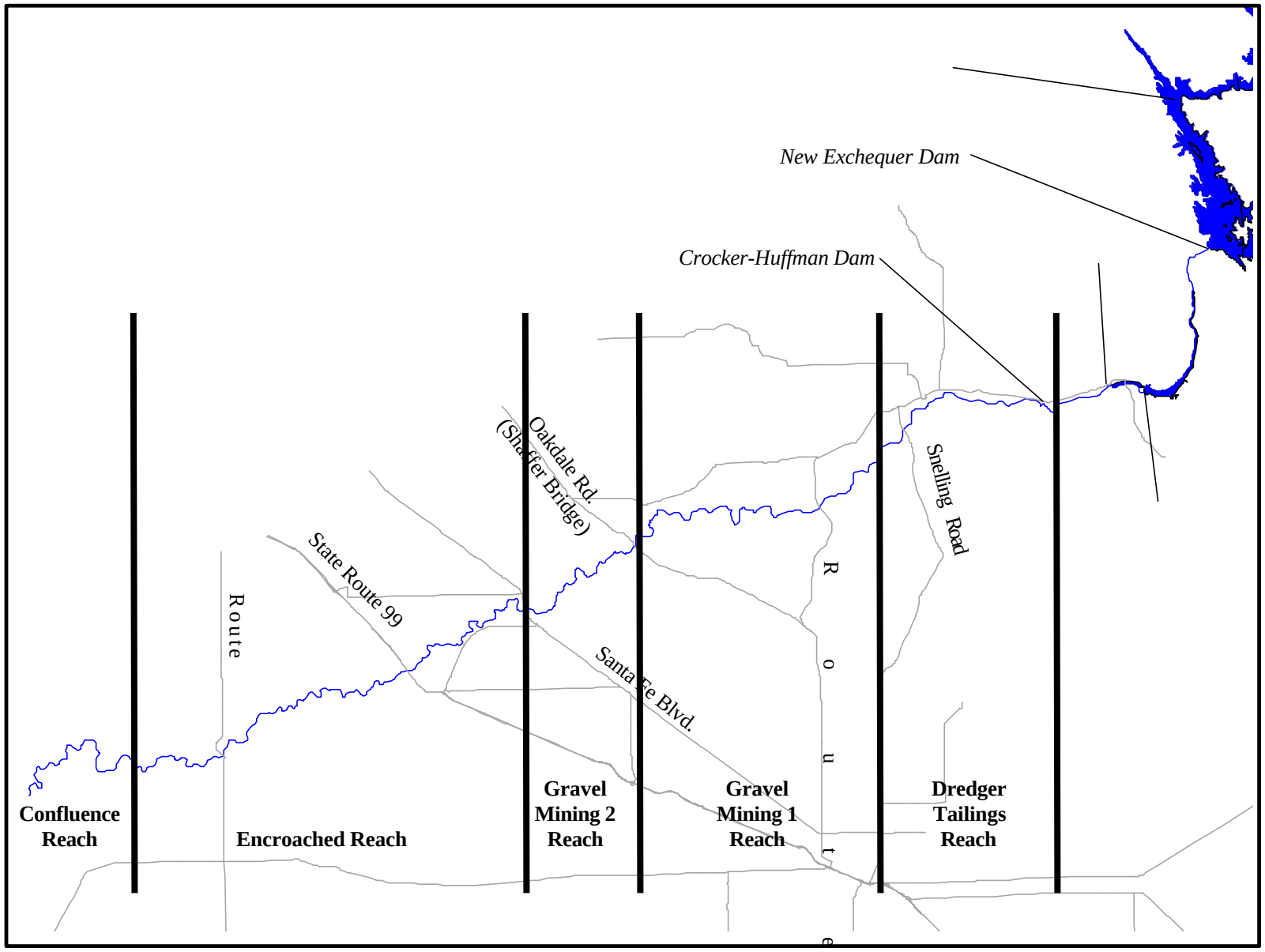

Figure 2. Merced River reach delineation.

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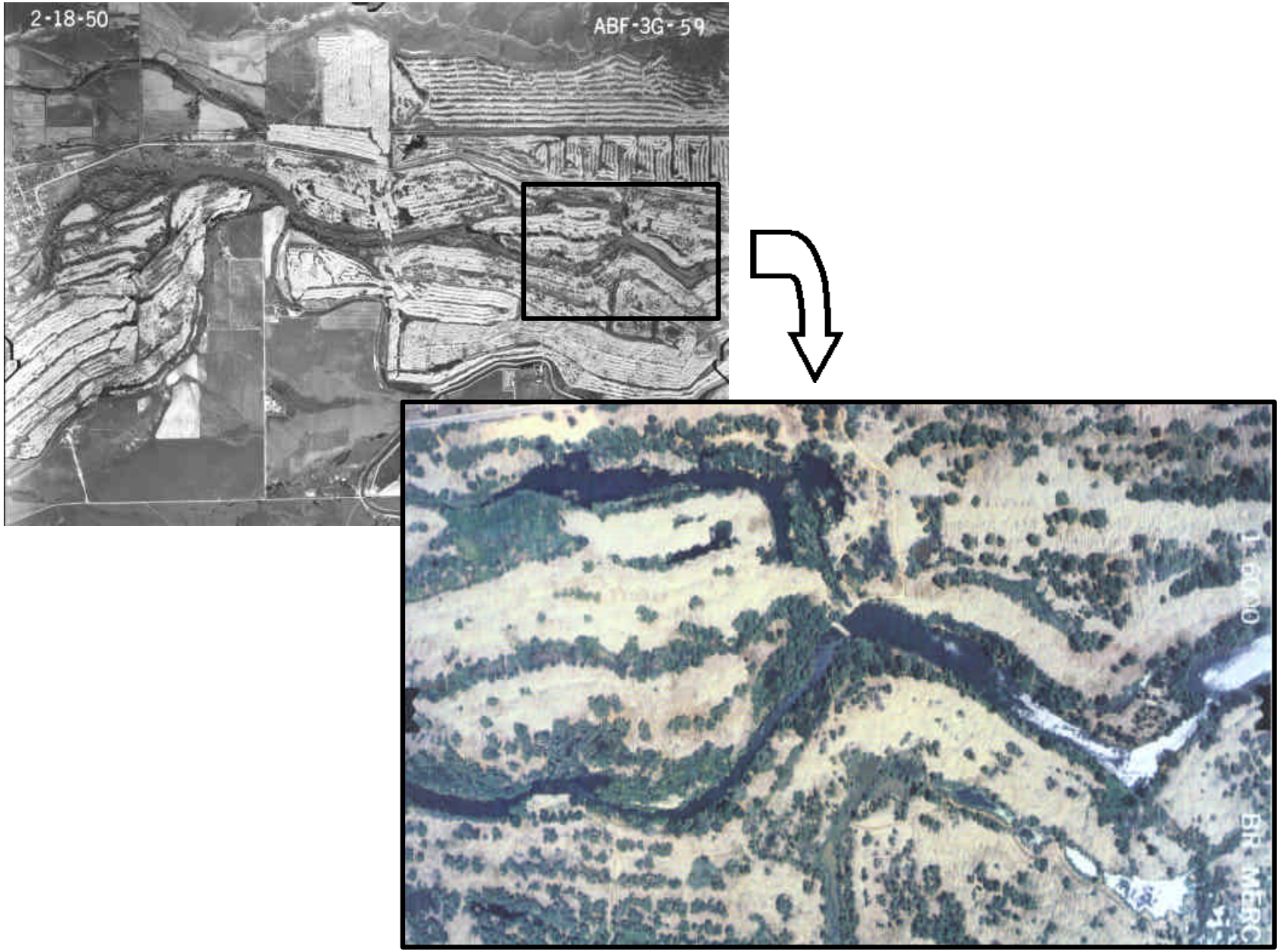

Figure 3. Dredger tailings in the Snelling Vicinity and a detail of riparian vegetation condition within tailings.
Photograph: Agricultural Stabilization and Conservation Service 1950 (top) and U.S. Bureau of Reclamation 1993 (bottom).

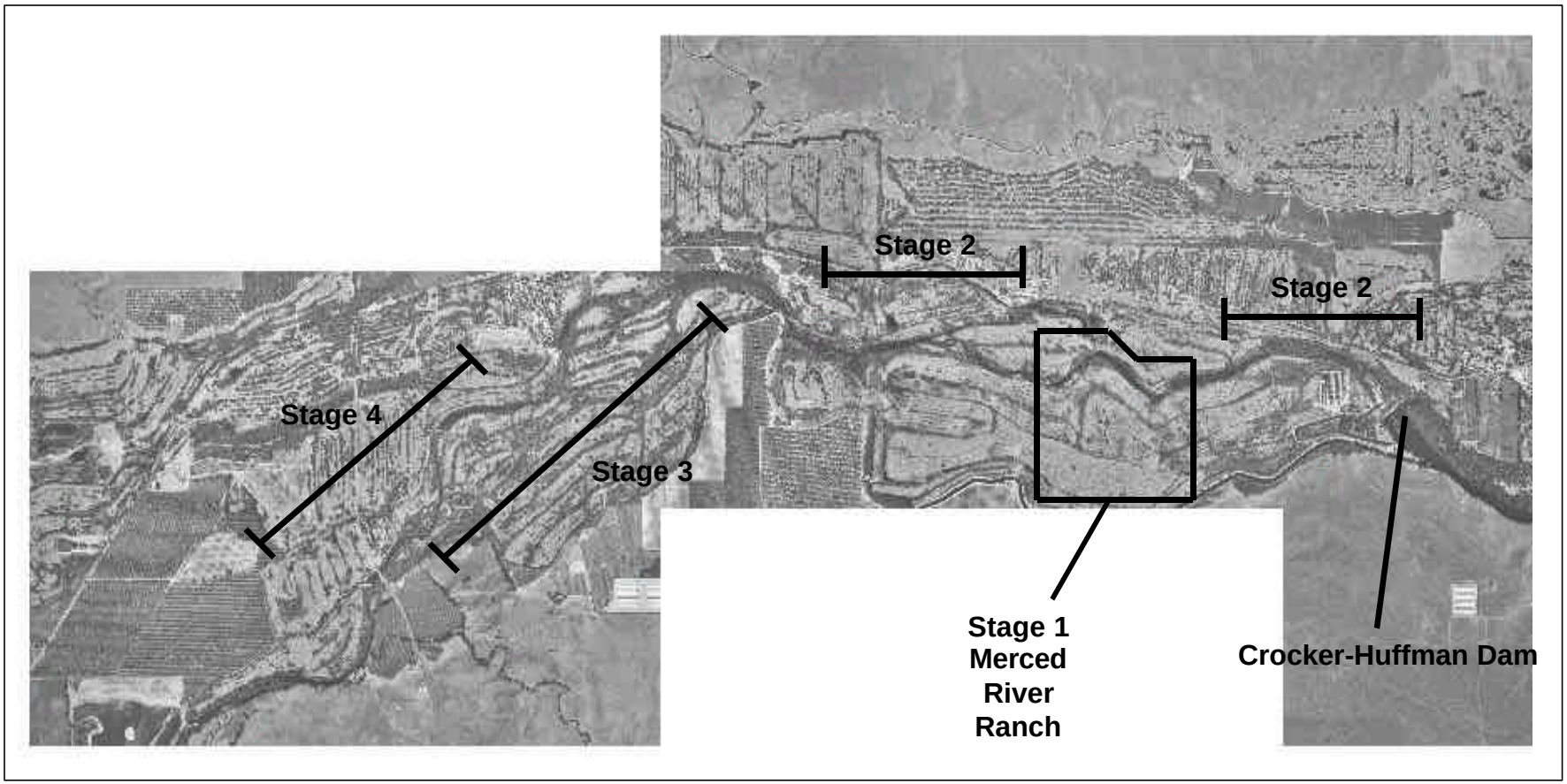

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Figure 4. Preliminary stages of restoration in the Merced River Dredger Tailings Reach. Stage 1 is presented in this proposal. Stages 2, 3, and 4 (identified in the Merced River Corridor Restoration Plan)

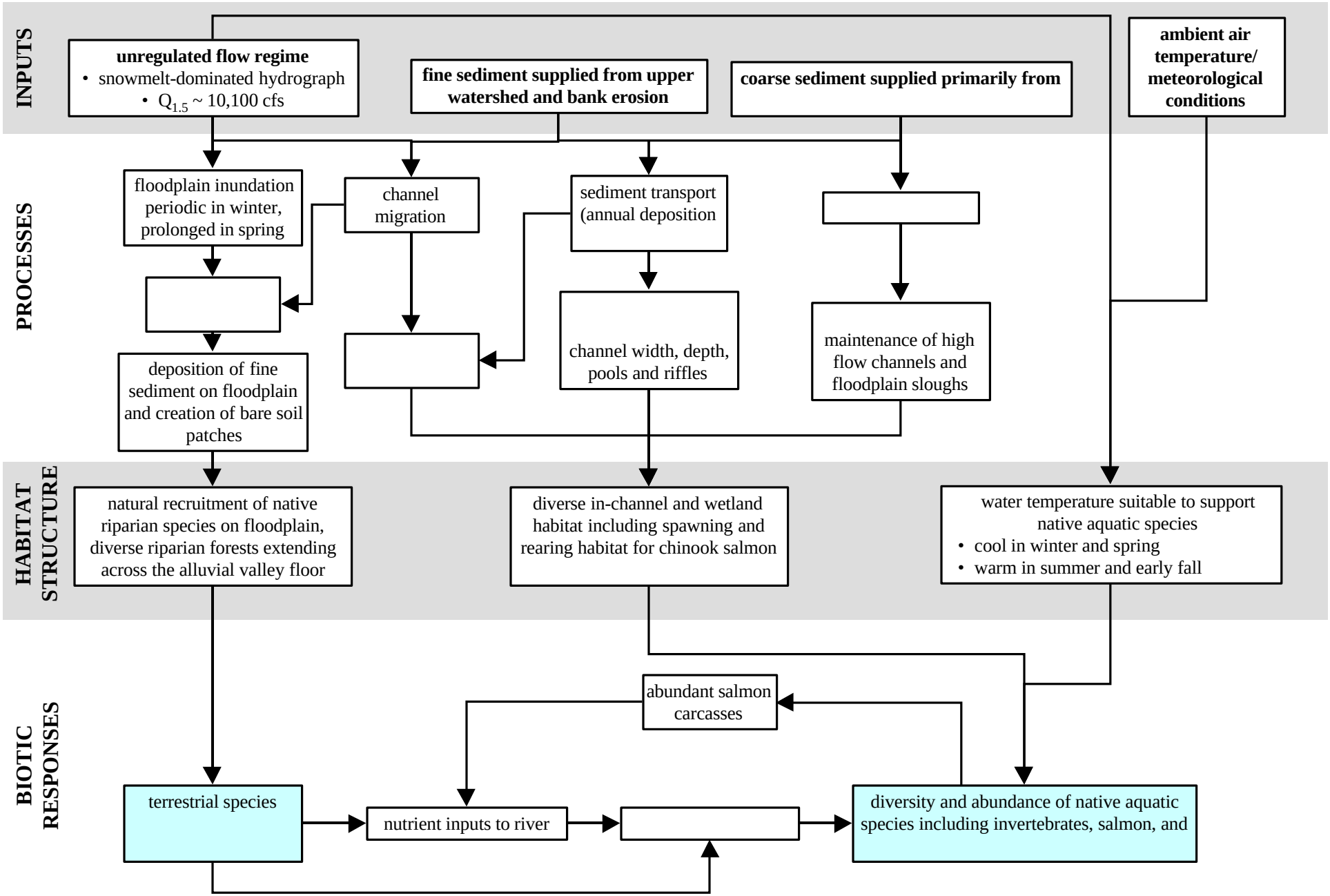


Figure 5. Conceptual model of reference state processes and linkages in the , gravel-bedded reach of the Merced River, including the

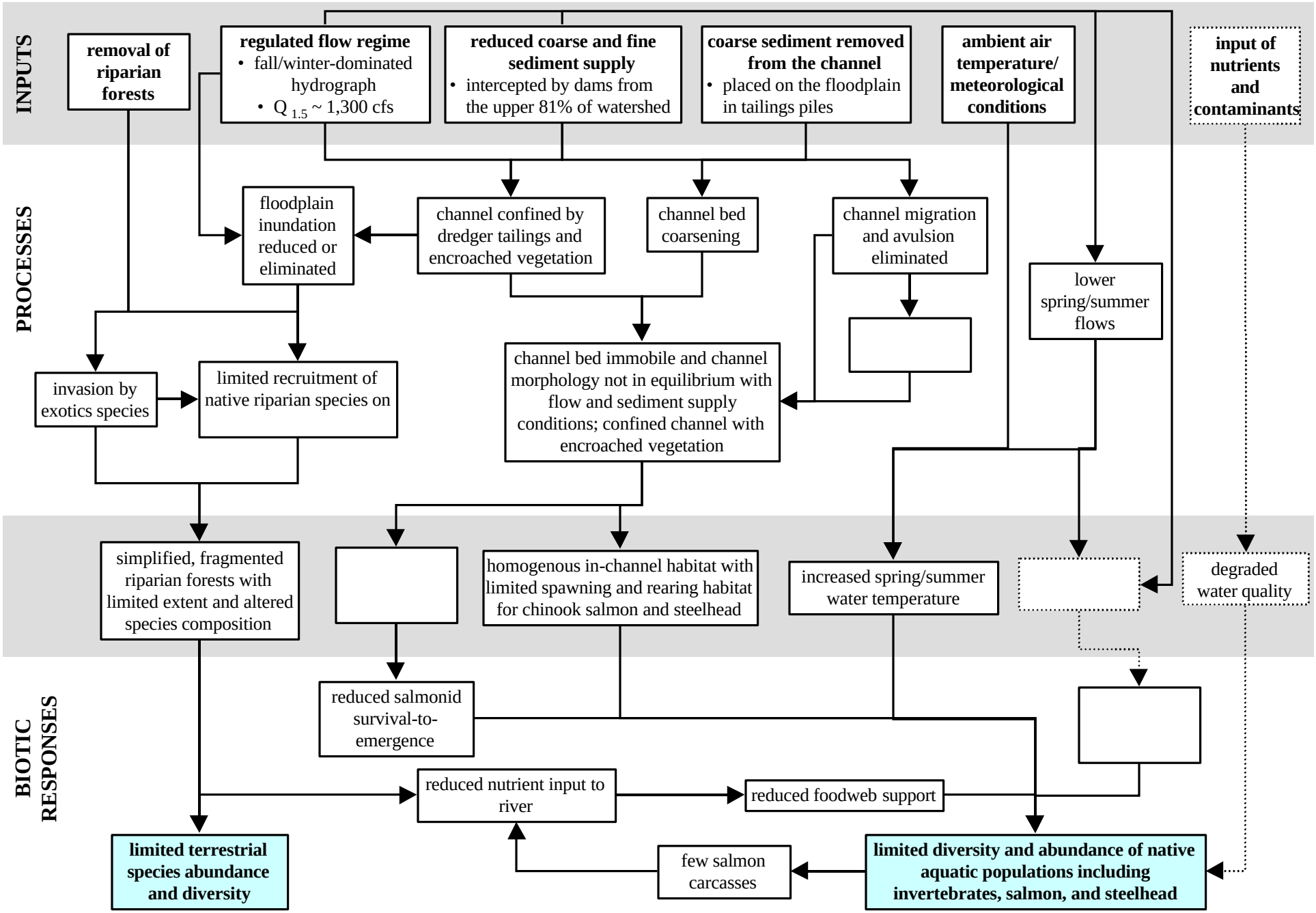


Figure 6. Conceptual model of current state processes and linkages in the Dredger Tailings Reach of the Merced River. indicate areas of high uncertainty based on available data.

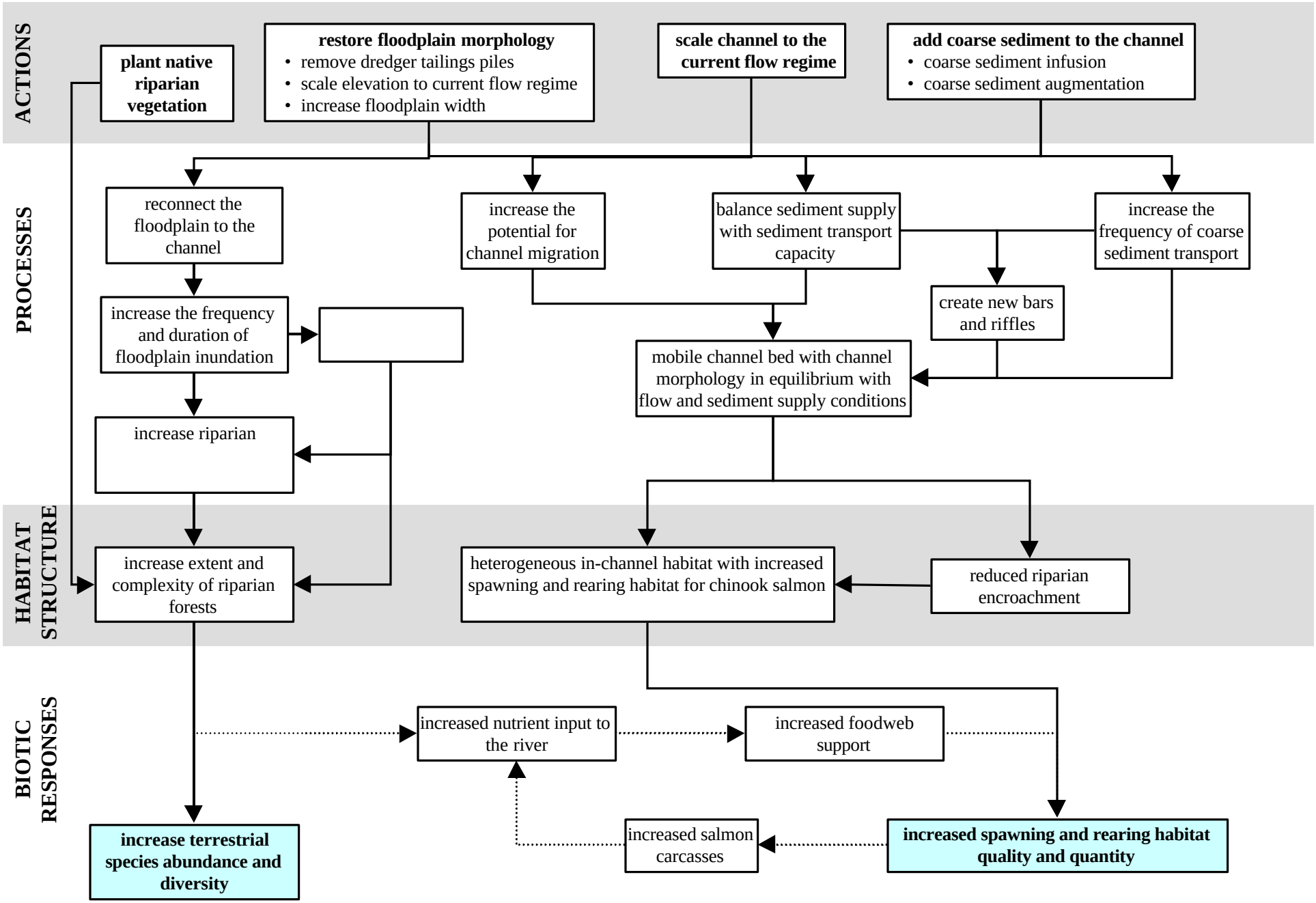


Figure 7. Conceptual model of the proposed restoration actions on the Dredger Tailings Reach of the Merced River.

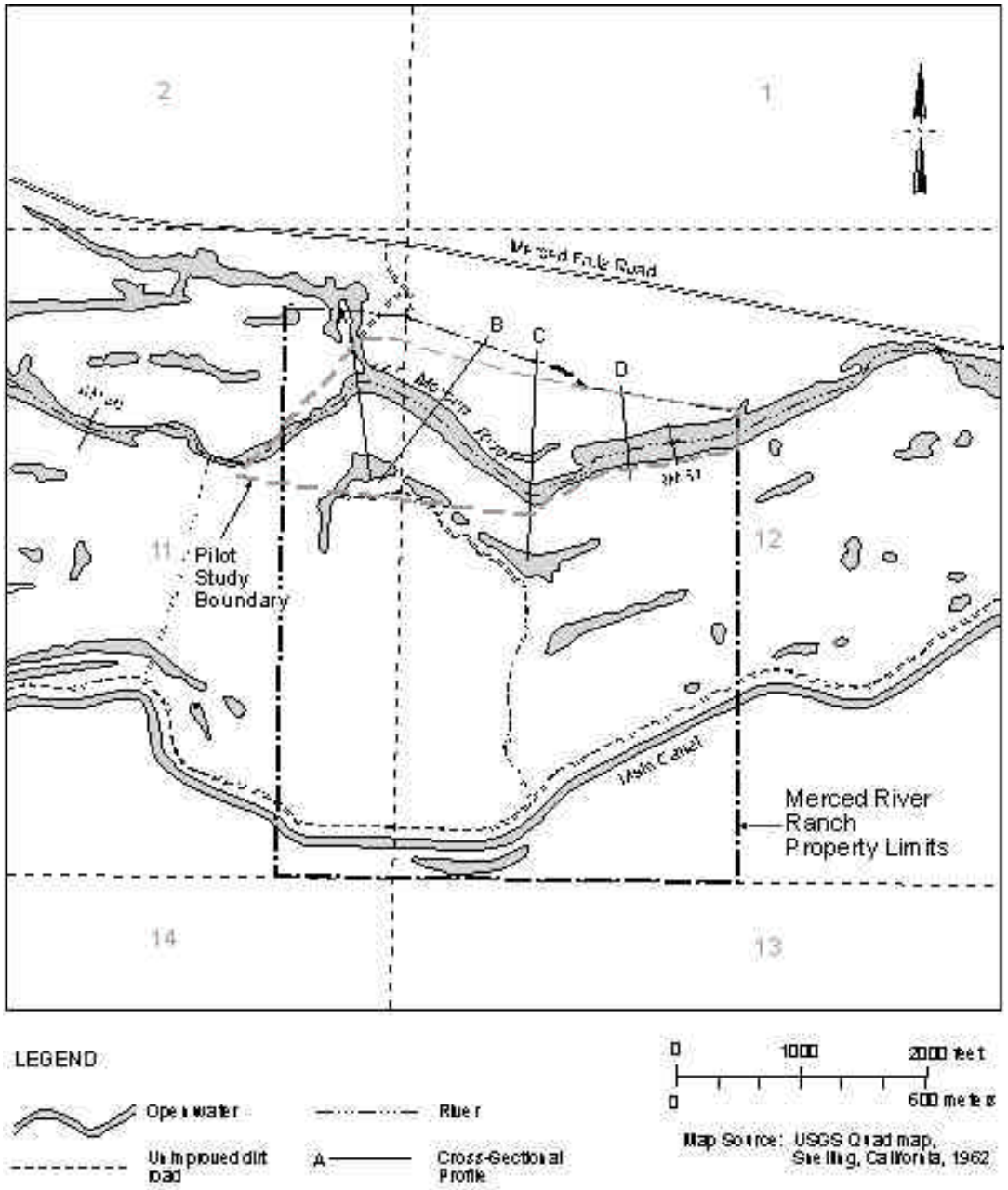
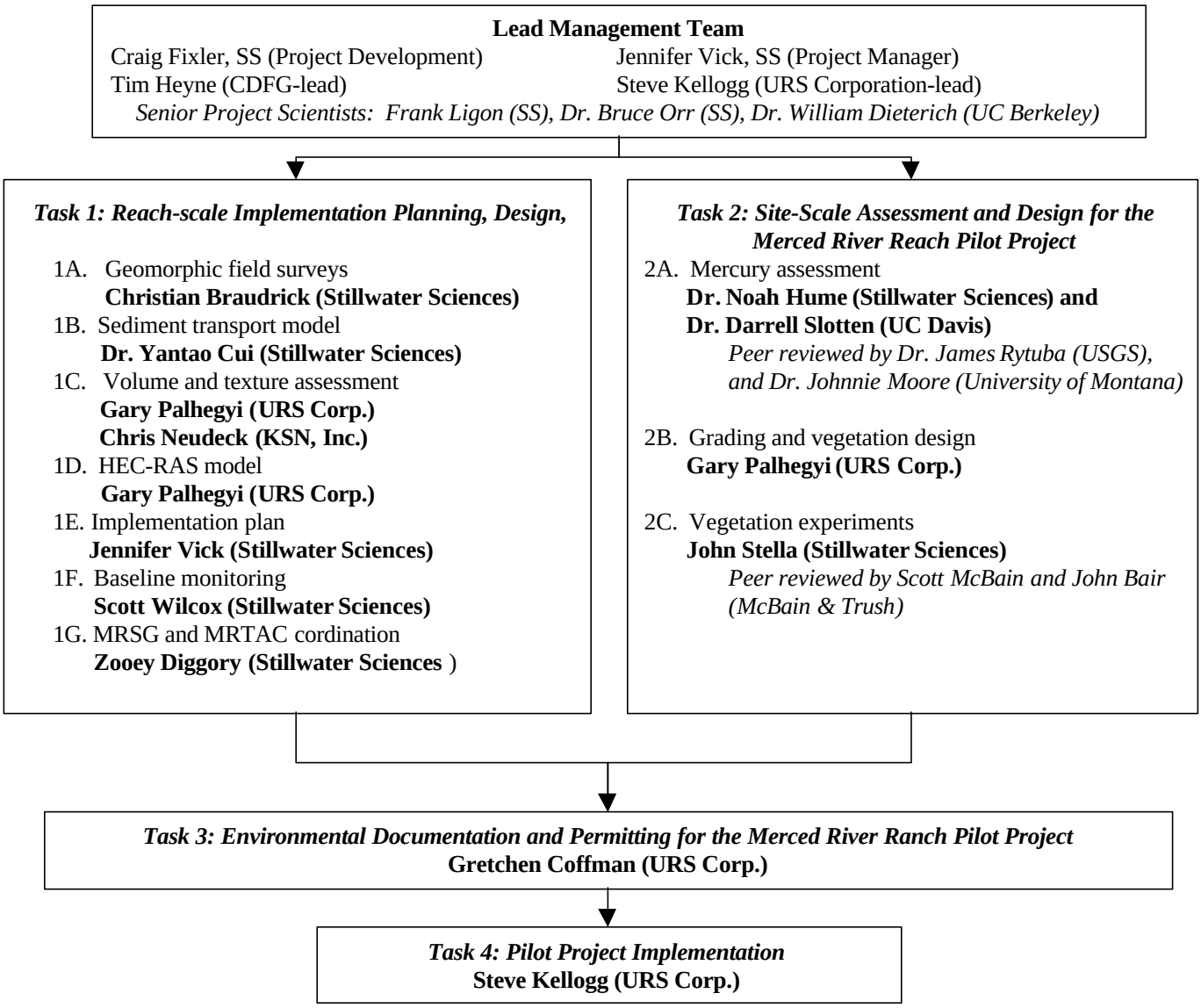


Figure 8. Summary of baseline survey cross sections completed at Merced River Ranch.

	2002			2003												2004												2005								
	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept
1: Reach-scale Implementation Planning, Design, and Baseline Monitoring.																																			
1A. Conduct field surveys and numerical modeling needed for design of large-scale gravel augmentation and floodplain restoration.																																			
1B. Develop and apply a detailed sediment transport model for designing long-term gravel augmentation.													X																						
1C. Determine the volume of material that would be required to be excavated for floodplain restoration and determine the composition of the tailings and its suitability for use in gravel augmentation and other projects with regard to sediment texture.					X																														
1D. Develop and apply a HEC-RAS model to compute current and post-restoration flood conveyance in the reach.													X																						
1E. Complete a draft and final implementation plan for gravel augmentation and floodplain restoration in the reach.																			X																
1F. Implement baseline monitoring.																						X													
1G. Coordinate with the Merced River TAC and Stakeholder Group.																																			
Task 2: Site-scale Assessment and Design at Merced River Ranch.																																			
2A. Merced River Ranch floodplain restoration design: grading and vegetation						X																													
2B. Assess the occurrence of mercury at the Merced																																			
2C. Vegetation experimentation.																	X																		
Task 3: Environmental Documentation And Permitting.																																			
Task 4: Project Implementation and Monitoring.																																			

X = Deliverable

Figure 9. Work schedule.



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Scott Wilcox, M.S., Senior Fisheries Biologist. Project management, environmental impact analysis for fish, wildlife, and water quality.
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Figure 10. Organization chart

Attachment A. Construction Cost Estimate for Merced River Ranch Restoration Pilot Project

No.	Item	Units	Qty.	Months	Re'qd CY/day	Equip. Capacity	No. Equip.	$/month	Unit Cost	Total Costs
1	**Mobilization/Demobilization**									$75,000
2	**Site Layout**									
	survey floodplain/channel, staging areas, stockpile location	day	5						$1,200	$7,500
3	**Clearing (trees, woody debris)**									
	area for staging, stockpile, grading operation, floodplain	LS								$37,500
4	**Material Sieving Operation**									
	screen material	CY	450,000						$1.0	$512,500
5	**Construct Access Road (south side)**									
	grade route, place base rock	LF	3,000						$10	$37,500
6	**Earthwork**									
	Excavation (Remove Tailings)									
	Two loaders@ 5CY capacity, 1500 CY/day	CY	450,000	10.2	2,000	1,500	2	$24,000	$1.36	$612,000
	Hauling (On-site stockpiles)									
	1 mile round trip (5, 20 CY off road trucks @ 3 loads/hr)	CY	450,000	9	2,500	480	5	$15,000	$1.88	$843,750
	Grading floodplains									
	Two cats, coarse grade, finish grade, assume 3 months	AC	60	3			2	$20,000	$2,500	$150,000
	Laborers	-		9			4	$4,800		$216,000
7	**In-Stream Modification/Gravel Infusion**									
	Manipulate on-site material	CY	55,000	3	917	1,500	1	$24,000	$4.91	$270,000
	Place gravel, shape, inc. pools, riffles, runs.	SY	48,000	3	800	1,000	1	$18,000	$4.22	$202,500
8	**Inspection Surveys**									
	channel geometry, floodplains (once per week)	WK		12					$1,200	$14,400
9	**Re-Vegetation**									
	Plant procurement	LS								$246,250
	Plant growth	LS								$212,500
	Hydroseeding for temporary erosion control	LS								$155,000
	Plant protection	LS								$41,000
	Plant installation	LS								$230,400
	Irrigation	LS								$593,750
10	**Install Monitoring Equipment**	LS								$18,750
									Total Construction Costs	**$4,476,300** (1)
									Construction Management (7%)	$313,341 (2)
									Total Construction Costs (1+2)	**$4,789,641**