

## EXECUTIVE SUMMARY

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**PROJECT TITLE:** A MECHANISTIC APPROACH TO RIPARIAN RESTORATION IN THE SAN JOAQUIN BASIN  
**APPLICANT:** Stillwater Sciences

**PROJECT DESCRIPTION, SIZE AND LOCATION:** The proposed project will identify the physical and biological mechanisms affecting establishment of riparian vegetation, in particular Fremont cottonwood and willow communities in the San Joaquin Basin, in order to identify the most cost-effective strategies and sites for riparian protection and restoration. The project addresses a need for *ecologically-based hydrologic models and water management strategies for habitat restoration*, identified as a Focused Action in the 1999 CALFED Proposal Solicitation Package (p. 19). In a phased project, the Stillwater Sciences Project Team proposes to develop a conceptual framework of physical influences on riparian plant establishment (Phase I); develop and validate a *recruitment box* hydrologic and biological model for study sites on the Tuolumne and Merced rivers (Phase II); and apply the model to a 52-mile reach of the Merced River corridor in coordination with an ongoing, CALFED-funded corridor restoration plan (Phase III). Study sites for Phase II will be established in Stanislaus County along the Tuolumne River from La Grange Dam (RM 52) to the San Joaquin confluence (RM 0) and in Merced County along the Merced River from Crocker-Huffman Dam (RM 52) to the San Joaquin River confluence (RM 0) (Figure 1). This proposal seeks funding for Phases I and II only.

**PRIMARY BIOLOGICAL/ECOLOGICAL OBJECTIVES:** The objective of this project is to develop a scientifically tested, mechanistic model of riparian vegetation establishment that can be used at the site and river corridor scales to evaluate long-term restoration potential of riparian ecosystem processes in the San Joaquin Basin. The model will be specifically calibrated to the San Joaquin Basin, and is intended to be used as an implementation tool by resource agencies. Using the model to prioritize large-scale restoration efforts will directly benefit riparian and riverine habitat, instream aquatic habitat, and seasonally inundated floodplain habitat as well as enhance physical and biological interactions between these habitats. Restoration projects guided by this model will also benefit San Joaquin fall-run chinook salmon and steelhead (CALFED priority species), migratory birds, including Swainson's hawk (a CALFED second priority species), and numerous other native species, including several endangered or sensitive species. Riparian zones provide multiple benefits to instream and terrestrial ecosystems and are widely recognized as centers of biodiversity and corridors for dispersal of plants and animals in the landscape (Gregory et al. 1991, Johannson et al. 1996). Because the model considers the physical processes structuring riparian habitats, large-scale restoration of those processes can be expected to provide sustainable ecosystem benefits far into the future.

**COSTS:** The estimated total cost of Phases I and II of the project is \$223,666. Stillwater Sciences will apply to the U.S. Fish and Wildlife Service's Anadromous Fisheries Restoration Program (AFRP) for FY 2000 to fund Phase I of the project (\$43,894). Phase I is included in this CALFED proposal in the event that the AFRP does not provide funding. If Phase I is funded by the AFRP, this proposal will seek funding for Phase II only (\$179,772). Significant cost savings are incorporated into this proposal because it builds directly upon past and ongoing projects conducted by Project Team members on the Tuolumne and Merced rivers, including the Merced River Corridor Restoration Plan, portions of which were funded by CALFED and AFRP in 1998.

**ADVERSE AND THIRD PARTY IMPACTS:** The Project Team will collaborate the Tuolumne River Technical Advisory Committee, which includes representatives from USFWS, CDFG, Tuolumne and Modesto Irrigation Districts, Tuolumne River Preservation Trust, Friends of the Tuolumne, and the City

and County of San Francisco, as well as the Merced River Technical Advisory Committee, the AFRP, landowners, and other interested parties to ensure that all potential third party impacts are identified and avoided.

**APPLICANT QUALIFICATIONS:** The Project Team is composed of Stillwater Sciences and a Scientific Advisory Team. This team has extensive experience in ecological, geomorphic, and environmental research and management issues in the San Joaquin Basin and in public coordination. Projects completed or underway by team members include long-term evaluations of chinook salmon population dynamics and factors limiting production in the Tuolumne River, geomorphic assessments of the Tuolumne and Merced rivers, mapping of riparian vegetation along 55 miles of the Merced River, and design and implementation of river-wide and site-specific monitoring in the Tuolumne River. The scientific advisory team consists of internationally recognized experts in the fields of riparian ecology, plant physiology, hydrology, geomorphology, aquatic ecology, and statistics. Scientific advisors have conducted riparian research projects similar to this proposal on the Truckee River and Dry Creek, CA, the Snake River, ID, and the Oldman and St. Mary's rivers, Alberta.

**MONITORING AND DATA EVALUATION:** The Project Team will conduct all data collection, evaluation, and management in accordance with CALFED's Comprehensive Monitoring, Assessment and Research Program (CMARP). Phase II of the project includes hypothesis-driven, project-specific data collection and monitoring, for the purpose of developing a mechanistic model to evaluate riparian restoration methods. In addition, the Project Team will coordinate sampling designs, data collection and analyses with the Cosumnes Science Consortium to test the wider applicability of the model to unregulated systems.

**LOCAL SUPPORT/COORDINATION WITH OTHER PROGRAMS:** The Project Team will collaborate with the Tuolumne River Technical Advisory Committee, described above, as well as the Merced River Technical Advisory Committee, AFRP, and local landowners. All phases of this project will be coordinated with the ongoing Merced River Corridor Restoration Plan (MRCRP) project, jointly conducted by Stillwater Sciences and Merced County, and partially funded in 1998 by CALFED and the AFRP. For example, this proposal will build on, and complement, the riparian vegetation GIS mapping (for 55 miles of the Merced River corridor) and field assessment of geomorphic factors and riparian vegetation composition and stand viability that are currently funded (\$58,000) and scheduled for 1999 as part of the MRCRP project. The proposed Phase II riparian recruitment model validation effort will also be coordinated with the Cosumnes Science Consortium's ongoing riparian research on the Cosumnes River.

**COMPATIBILITY WITH CALFED OBJECTIVES:** The ERPP vision for the East San Joaquin Basin Management Zone includes "restoring and protecting a self-sustaining stream meander corridor and an associated diverse riparian community that provides shade, nutrients, and woody debris to the rivers, as well as habitat for plants and wildlife communities" (ERPP vol. II, p. 417). Additionally, the vision for each of the Stanislaus, Tuolumne, and Merced Ecological Management Units is "to improve habitat for fall-run chinook salmon, late-fall-run chinook salmon, steelhead, riparian vegetation, and wildlife resources" and "restoring important ecological functions and processes that will improve habitat for fall-run chinook salmon, late-fall run chinook salmon, steelhead, native amphibians and reptiles, riparian vegetation and wildlife resources" (ERPP vol. II, p. 418-422). Important measures identified by the ERPP to achieve this vision include restoring Central Valley streamflows and natural floodplain and flood processes (ERPP vol. II, p. 423-424). The proposed project is expected to be compatible with all other CALFED objectives including water quality, water supply reliability, levee system integrity, and other CALFED Programs including Water Use Efficiency, Water Transfers and Watershed Management.