Project Information

2005 Proposal Number: 0061

Proposal Title: **Biotechnical Streambank Stabilization, Assessment and Demonstration on the Lower Merced River**

Applicant Organization Name: **Resource Conservation District, East Merced**

Total Amount Requested: $**1,035,430**

ERP Region: San Joaquin Region

Short Description

Project seeks to investigate the feasibility of a biotechnical erosion control as an alternative to bank management. Specifically, the project will install and provide landowner education on erosion control, riparian and floodplain restoration in agricultural landscapes, and vegetated filter strips, hedgerows and other wildlife buffers.

Executive Summary

THE PROBLEM – Agricultural lands dominate the landscape of the lower Merced River and in an effort to control stream bank erosion and related property loss, landowners in the lower Merced River have focused on hard bank revetments. This form of revetment is detrimental to native aquatic and terrestrial resources and may simply re–focus bank erosion in neighboring locations. In the lower Merced River, 32 percent of the river bank is covered with revetment. These efforts have simplified instream habitat and reduced the already small riparian habitat in the lower Merced River where almost all of the native riparian vegetation is located within the agricultural levees and for much of the reach vegetation width is one tree wide. The ongoing bank erosion, due to inadequate bank stabilization and lack of appropriate vegetation, deposits sediments into the Merced River. MSCS covered species are adversely affected by loss of instream habitat and increased sedimentation. SUMMARY DESCRIPTION AND PROJECT TYPE – This

proposal investigates the feasibility of biotechnical erosion control as an alternative bank management method. A reach−scale survey of bank stability will be conducted. Three different bank types will be extensively monitored. One demonstration project will be implemented to evaluate the performance of biotechnical stream bank stabilization methods of the Merced River. An extensive outreach component is included to educate agricultural landowners in stream bank stabilization methods that incorporate measures to benefit native species. Permitting will be handled through an ongoing permit coordination effort of the East Merced Resource Conservation District.

GEOGRAPHIC LOCATION − We will select sites in the lower 26.8 river miles of the Merced River, in Merced County, from Santa Fe Boulevard to the confluence with the San Joaquin River.

PROJECT OBJECTIVE − Goals of the proposed project are to protect streamside property, improve terrestrial and aquatic habitat and reduce the input of fine sediment to the lower Merced River.

APPROACH TO IMPLEMENT THE PROPOSAL − Identify locations where erosion control is necessary and feasible using scientific assessment; Establish and evaluate the performance of biotechnical demonstration control project/s; Provide technical advice to landowners on the usefulness and implementation of biotechnical methods; Identify locations where there are opportunities to promote natural channel migration; Monitor, learn, and publicize the experiences to ensure a wide dissemination of the learning experience.

EXPECTED OUTCOMES – Though monitoring we expect to gain an understanding of how well biorevetment will do in the lower Merced River. We expect that it will perform better than hard revetments. We also expect to generate interest in, and pursuit of, additional biorevetment projects with other riparian landowners via our outreach to that community.

ADAPTIVE MANAGEMENT APPROACH − This pilot project will have extensive assessment and monitoring. Project management,

including landowners, agencies, subcontractors and staff will meet regularly to discuss results in order to adapt to new information as necessary.

RELATIONSHIP TO ERP GOALS – The project will assist in recovery of endangered and other at–risk species and native biotic communities, specifically, the Central Valley Fall Run Chinook Salmon, Steelhead and Valley Elderberry Longhorn Beetle. The project will assist in rehabilitation ecological processes though better understanding of, and education about appropriate practices. The project will protect and restore habitat in the riparian and riverine system of the lower Merced River. The project will improve water quality by reducing sediment deposition. Additionally, the ERP PSP identifies the Merced River as a priority area and we will be installing three of nine priority management practices. EMRCD's ongoing Permit Coordination program will facilitate permitting or regulatory assurance that supports agricultural activities benefiting MSCS species. The MRS prioritized biotechnical erosion control demonstration project as one of the top 10 priority restoration actions for the Merced River.

A Project Description

A.1 Problem

Agricultural lands dominate the landscape of the lower Merced River and, in an effort to control river bank erosion and related property loss, many landowners have implemented hard bank revetments. Bank erosion poses two major problems for riparian farmers and landowners. First, they suffer economic losses when productive farmland or access roads are lost to bank erosion. Second, eroding banks are a conduit for fine sediment supply to the river, including for agricultural chemicals that are bound to the fine sediments, and so regulations imposed to control impaired water surface quality (e.g., by the Central Valley Regional Water Quality Control Board) are in part related to river bank erosion. Bank stabilization has become widespread as channel migration processes have come into conflict with agricultural practices and infrastructure located on or near river banks, and as flow regulation has led to channel incision which further de-stabilized the river banks. Bank revetment now covers approximately 32 percent of the Merced River's bank extent downstream of Santa Fe Boulevard to the confluence with the San Joaquin River (26.8 river miles, see Figure 1) (Stillwater Sciences 2002).

River bank stabilization methods on the lower Merced River have focused on hard bank revetments, usually in the form of rock riprap, concrete rubble, or gabions. These methods, especially the use of concrete rubble, are seen by landowners as cheaper, faster and more technologically feasible to implement than more highly engineered solutions. However, such methods are often not effective for long-term bank stability without landowners continually adding material to the bank as the river erodes the underlying bank material. Further, such hard revetment methods may simply re-focus bank erosion to neighboring locations and so exacerbate land loss problems to neighboring landowners.

Hard bank revetment also has numerous direct and indirect impacts on habitat quality for native flora and fauna. Direct impacts include changes in the physical characteristics of the bank following the stabilization. Bank modifications and revetments have, for instance, been implicated in habitat simplification (Li et. al. 1984, Jungwirth et al. 1993) through the loss of erosional and depositional features (Bravard et al. 1986). Bank revetments also eliminate many of the structural features, such as boulders, large woody debris, and overhanging vegetation, that provide fish with velocity refuge and visual isolation from potential predators. In the Sacramento River, these changes have a demonstrated effect on juvenile Chinook salmon where abundance along riprapped banks is considerably lower than along natural banks (USFWS 2000, Ecos, Inc. 1991, CDFG 1983, Michny and Hampton 1984, Michny and Deibel 1986, Michny 1989). In western Washington, Peters et al. (1998) consistently found that seasonal fish densities were significantly higher along natural banks than banks stabilized with riprap. Further, extensive bank erosion normally involves large volumes of fine sediment input that can be detrimental to the habitat quality of channel bed gravels (e.g. to void space for invertebrate colonization), in addition to reductions in water quality caused by increased turbidity and the import of chemicals bound to the fine sediments.

Indirect impacts involve changes in channel and riparian processes required to create and maintain riverine habitats. A number of studies have shown that armoring banks with riprap increases near bank velocities and depths (Binns and Eiserman 1979, Nunally and Sotir 1994, Shields and Hoover 1991). Under high flow conditions, stabilized banks may have velocities that are fatiguing to fish so increasing the distance between hydraulic refuges for upstream migrating fish. Juvenile life stages of salmon, steelhead and other native fish species may be exposed to increased susceptibility to predation along

riprapped banks by native and introduced fish (Peters et al. 1998, USFWS 2001). For example, riprap habitat in the Delta appears to be dominated by introduced centrarchids such as bluegill and largemouth bass that can prey on juvenile salmon and steelhead (Chotkowski 1999).

Traditional bank revetment hinders the establishment of native riparian vegetation and encourages the establishment of non-native, invasive vegetation species, which can thrive in highly disturbed environments. This degrades the quality of habitat available to native terrestrial species that depend on the diversity and structure of native riparian vegetation, as well as those dependent upon particular plants species, such as the federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). Aquatic species are also affected by the lack of trees and overhanging vegetation, as many fish species respond to shade to avoid predation and warm temperatures (Cavallo et al. 2003) and stream bank trees are a critical source of large woody debris, which is an important component of instream habitat.

Biotechnical methods of bank stabilization are an alternative approach to hard revetments that can be considered effective at reducing river bank erosion while also providing some benefit to aquatic species and native vegetation. Biotechnical methods derive from the discipline of ecological engineering whereby bank stabilization is achieved primarily through the natural energy of living vegetation. Biotechnical methods incorporate native tree and understory plantings and rootwads so that, in addition to direct improvements in the abundance of native flora, the matured vegetation can also provide shade and lower bank complexity that benefits both birds and aquatic species. "Hybrid" biotechnical methods may also incorporate some rock or boulder protection to provide immediate bank strength while the vegetation develops. Bank revetments that have incorporated large structural elements such as large wood (Beamer and Henderson 1998), boulder clusters (Boelman et al. 1997), and large riprap (Lister et al. 1995) has been shown to improve habitat suitability for salmonids and other fish. Biotechnical erosion control methods have not been implemented or tested in the Merced River corridor.

Landowners involved in the Merced River Stakeholders (MRS) group have expressed interest in using biotechnical erosion control methods as an alternative to traditional revetment practices, but do not have the technical expertise to implement such methods on their own and do not know where to obtain assistance. Implementing a biotechnical erosion control demonstration project and providing landowners with technical assistance to use biotechnical erosion control methods has been identified as a priority restoration action in the Merced River Corridor Restoration Plan (Stillwater Sciences 2002). As such, it has previously been supported by the Merced River Stakeholder group and Technical Advisory Committee.

A.2 Goals and Objectives

The overall goal of the project is implement a demonstration biotechnical bank stabilization project in the lower Merced River using scientific principles and regular outreach to illustrate the benefits of the approach to landowners and the scientific community. In so doing, the approach will be consistent with ERP goals of providing cutting-edge, scientifically-justified, river management solutions that benefit both stakeholders and the environment. Intensive monitoring will follow implementation.

The overarching objectives of the proposed project are to:

1. evaluate the physical condition and erosion risk for river banks in the 26.8 miles of the lower Merced River;

2. evaluate the impacts of bank revetment on bank erosion and instream and terrestrial streambank habitats at three test sites (one hard revetted, one unrevetted, one biotechnical);
3. implement a demonstration biotechnical river bank stabilization project and provide education opportunities to stakeholders through regular workshops;
4. monitor and evaluate the ability of biotechnical erosion control methods to protect floodplain property and improve habitat conditions; and
5. assist riparian farmers and landowners in adopting biotechnical approaches to future bank stabilization activities.

A.3 Conceptual Model

Under historical conditions, the lower Merced River eroded channel banks and the floodplain on the outside of meander bends and deposited sediment as a bar on the inside of meander bends. This process of erosion and deposition maintained the channel width and diverse in-channel and riparian habitats, including: wetland habitat in oxbow lakes; riparian habitats in freshly deposited sediment; low-velocity deep-water pool habitats for native fish species; and instream cover habitat by overhanging vegetation and trees that had fallen into the river following outer bank erosion. These aquatic habitats provided rearing, foraging, and refugia habitat for different life stages of native fish, including salmon and steelhead. Streambank vegetation shaded the river, regulating stream temperatures, and provided habitat to terrestrial wildlife species.

As natural migration processes came into conflict with agricultural practices and infrastructure in the floodplain and on stream banks, efforts were made to control bank erosion. Channel incision following flow regulation caused widespread bank erosion and the proliferation of bank stabilization projects. Fine sediment inputs to rivers increased. "Hard" revetment methods, including riprap, gabions, and concrete rubble, simplify bank structure and reduce instream habitat complexity, and result in the loss of streambank vegetation which contributes to higher water temperatures and reduces terrestrial habitat and organic inputs to the channel ecosystem. Piecemeal bank revetment can cause the accentuation of bank erosion nearby, often on the opposite bank downstream.

Biotechnical methods that rely on live native vegetation for much of their strength, aided by the strategic placement cobble/boulders and rootwads, are a viable alternative to hard revetment. Live vegetation increases bank resistance to erosion through (i) protecting the bank toe against hydraulic forces through root development, (ii) providing mechanical reinforcement of the banks, and (iii) reducing soil moisture through canopy interception and evapotranspiration. We surmise that biotechnical methods will: 1) provide bank protection that is essential to land managers; 2) reduce fine sediment delivery to the channel; 3) increase instream habitat complexity relative to riprapped banks; 4) reduce the relative percent cover of non-native, invasive plant species; and 5) promote native vegetation that provides multiple ecosystem benefits.

A.4 Approach and Scope of Work

To achieve the goals and objectives described in Section 2, the proposed project combines state-of-the-science reach-scale bank stability assessment, site-scale monitoring of physical conditions and habitat value at an unrevetted, traditionally revetted, and biotechnically revetted stream bank, implementation of a biotechnical stream bank stabilization demonstration project, intensive, quantitative performance monitoring of the demonstration project with riparian buffer treatment, and extensive local landowner outreach. The reach-scale bank survey will identify patterns in bank erosion and revetment as a function

of trends in the geomorphology of the lower Merced River, locations where erosion control is necessary and feasible, and opportunities to promote natural channel migration. The site-scale physical conditions and habitat monitoring at three different bank sites will allow for comparisons between the different bank types in order to constrain the later assessment of the biotechnical demonstration project, and by extrapolation from the reach-scale survey, an assessment of bank habitat conditions and impacts to native species in the lower Merced River. The demonstration project and subsequent monitoring and maintenance will evaluate the utility of biotechnical methods on the lower Merced River to stabilize banks for the benefit of landowners and provide habitat benefits to native species. Landowner outreach will promote the use of stabilization methods that incorporate benefits for native species and give landowners the tools necessary to implement these methods on their own. The project team expertise includes landowner outreach and coordination by the East Merced Resource Conservation District (EMRCD), biological and physical process assessment by Stillwater Sciences (SWS), bank stability assessment and monitoring by the USDA Agricultural Research Service's National Sedimentation Laboratory (NSL), biotechnical streambank stabilization by engineers Domenichelli & Associates (D&A) and surveying by Kjeldsen, Sinnock and Neudeck, Inc (KSN). The project also involves partnerships with Sustainable Conservation and Natural Resource Conservation Service.

The project will focus on the lower 26.8 river miles of the Merced River, from Santa Fe Boulevard to the confluence with the San Joaquin River (Figure 1). The proposed project will be completed through the following tasks, which have been structured to have an integral concern with adaptive management through the comparison of physical and biological performance of the biotechnical stabilization methods with those at a hard revetted bank and one without revetment. The task timeline assumes a project start date of February 1, 2007. Specific task deliverables are listed in the Tasks and Deliverables form.

Task 1: Project Administration. This task includes the oversight of all phases of the project for the project's duration. Activities and costs associated with this task include: subcontracting, invoicing, budgeting, scheduling, and general project communications. This task will involve all of the project team members and be lead by EMRCD.

Task 2: Permitting. A variety of permits will be required to implement the demonstration project and landowner access permission will be required to access the bank monitoring sites. A list of required permits and a permit strategy is included in this proposal's Environmental Compliance Checklist. The EMRCD is currently developing a permit coordination program to expedite the permitting process for restoration and conservation projects on private lands. To qualify for the program, projects must be of small scale and environmentally beneficial. A programmatic negative declaration is under development and will likely be completed prior to the scheduled implementation of the demonstration project. If this occurs and the demonstration project meets all the criteria specified in the programmatic mitigated negative declaration, CEQA and all other permitting needs will be addressed through the permit coordination program and will be in place when construction begins. This is the anticipated avenue for environmental permitting for this project. This task will be led by the EMRCD, with assistance from Sustainable Conservation, SWS, and D&A. The task of acquiring landowner access permission will begin as soon as funding is secured.

Task 3: Reach-scale Survey of Channel Banks. Critical to the success of the project both in terms of proper site selection for comparative monitoring and providing a database of sites most appropriate for future biorevetment projects, is a reach-scale survey of channel banks. Biotechnical erosion control

methods are not suitable for all bank erosion problems and a thorough assessment of bank conditions will identify where erosion control is necessary and where biotechnical methods are feasible. The reach-scale survey will be conducted along the lower 26.8 miles of the Merced River using a USDA bank assessment record sheet, building from floodplain surveys conducted by Stillwater Sciences (2002). The survey will assess the extent and causes of bank erosion, bank morphology, and geotechnical properties. The reach-scale survey will form the basis for: developing decision-making guidance for 'appropriate bank management' (e.g., Thorne et al., 1996); for identifying priority locations for comparison monitoring sites and potential future projects (the proposed demonstration project site has already been selected to facilitate project completion within the current funding schedule); and for defining specific and measurable success criteria as the basis for post-project evaluation (see Task 7). A map of the reach and technical memorandum summarizing the survey results will be the deliverable for the task. To generate interest in the goals of the project, the results of the reach-scale survey will be communicated to riparian landowners, interested community groups, such as the Merced River Stakeholders, and the general public through deliverables in Task 8. The reach-scale survey will occur during the first year of the project and be performed by SWS and NSL.

Task 4: Site-scale Bank Analyses and Habitat Assessment of Channel Banks. Detailed analyses of physical conditions and habitat value will be conducted at three sites in the study reach. The demonstration project (see Task 5) will serve as a biotechnical study site. One unrevetted and one hard bank revetment study site will be selected during the reach-scale survey (see Task 3). Once all three site are selected and landowner access agreements are acquired, detailed bank analyses will focus on the annual hydrological signal, geotechnical properties, root reinforcement provided by native and non-native plant species, and resistance to hydraulic forces of the sample banks. The site-scale bank analyses will demonstrate in detail how flow processes interact with the bank in terms of its material, vegetation, and morphology. Habitat assessment at each of the monitoring sites will compliment the bank analyses and potentially include: terrestrial and aquatic habitat surveys; vegetation cover surveys; wildlife and fish species monitoring; and water quality (particularly turbidity and temperature) sampling. Other assessment criteria will be determined as appropriate to the project. These analyses are essential for maximizing the prospect of project success and also for the notion of "learning by surprise" that is central to adaptive management. The site-scale monitoring will allow for a comparison of the physical conditions and habitat quality of different bank types and serve as the basis for the demonstration project's effectiveness monitoring (see Task 8). A technical memorandum will summarize the results of the site-scale physical and habitat monitoring. This task will be conducted during the first two years of the project by SWS and NSL.

Task 5: Demonstration Project Design. Biotechnical erosion control methods stem from the concept of ecological engineering in which project solutions are focused on retaining or restoring ecological integrity, in this case, by using the strength provided by growing vegetation. Detailed design criteria must be matched to the severity and extent of the bank instability. The quantitative tests of the selected demonstration project site (Task 4) are intended to provide the data required to ensure this match. The demonstration site is a privately owned parcel adjacent to the river in the vicinity of Livingston on the west side of a channel meander bend (Figure 2). The eroding bank is approximately 400 feet long. The bank is currently unprotected and erosion threatens several acres of organically grown crops. Giant reed (*Arundo donax*) and tree tobacco (*Nicotiana glauca*), both invasive, non-native species, have established on the eroding banks. The property is located opposite and adjacent to McConnell State Park which represents one of the largest areas of intact riparian forest habitat along the Merced River (Stillwater

Sciences 2002), meaning the improvements to bank habitat may provide continuity with McConnell State Park and upstream habitats and benefit wildlife migration and movement. The demonstration project design will incorporate biotechnical methods, and will probably involve a hybrid solution combining native plantings with structural elements of rock and large wood. Design details will be derived following the results of the detailed physical assessments in Task 4. The project design will include plans for revegetation on all disturbed areas, including the newly formed streambank, staging area and the top of the slope. At the top of the slope, a native plant hedgerow and vegetative filter strip will be designed in accordance with NRCS standard practices. These revegetation practices will increase connectivity of existing native habitat and remove sediment, organic matter and other pollutants from runoff and wastewater of the agricultural operations. Deliverables for this task are the draft and final design drawings and construction specifications. The demonstration project design will be led by D&A with input from NSL, SWS, EMRCD, NRCS and the landowner. Design planning will commence in early 2008 and be completed by summer 2008 to meet the implementation schedule.

Task 6: Demonstration Project Implementation. Once environmental compliance permits have been secured, implementation of the demonstration project will commence. Where necessary, non-native plants will be eradicated prior to implementation using chemical treatments in combination with mechanical removal. Best management practices will be followed, including the use of one central staging area to minimize site disturbance and erosion, banktop excavator operation where possible, and pumped channel dewatering using a coffer dam to divert water to the opposite bank. With the use of the coordinated permitting program, a NRCS biologist will be present at the site during construction to ensure compliance with environmental permits and to inspect the site regularly for the presence of wildlife species; any individuals found will be moved to a downstream location. Engineering oversight will ensure compliance with the intent of the project design. Following construction, the channel will be rewatered and the site will be revegetated. Once all excess materials and vehicles have been removed, the staging area will be seeded and mulched to reduce the potential for rill erosion and the vegetated filter strip will be planted. A native plant hedgerow and vegetative filter strip will be installed at the top of the bank, using community volunteers as appropriate. D&A will lead the implementation of the demonstration project, with assistance from SWS, EMRCD and NRCS. Implementation will occur between June and October 2008 to coincide with low flows and to limit the amount of sediment contributed from the construction site by rainfall runoff. The implementation task deliverable will be the as-built surveys of the demonstration project.

Task 7: Monitoring and Maintenance. Monitoring will be directed at assessing the ability of the biotechnical erosion control demonstration project to accomplish the goals of protecting streamside infrastructure, ensuring bank stability, providing terrestrial and aquatic habitat, reducing fine sediment impacts on water quality and channel substrate, and increasing the presence of native riparian vegetation. Ecological conditions will be monitored monthly for one year following implementation. Periodic surveys thereafter will likely be beyond the 3-year project period and will be subject to successfully obtaining further funding. Criteria to be tracked and periodically compared to baseline conditions (see Task 4) include: availability of instream habitat and its use by aquatic species of concern (to be determined through habitat and fish surveys); decreased presence of non-native vegetation and increased presence of native riparian vegetation (to be determined by vegetation surveys); improved water quality and channel substrate material (to be determined by turbidity monitoring and instream channel condition surveys); and the ability of the project to protect important streamside infrastructure (to be determined through photo monitoring). The success of giant reed and tree tobacco eradication efforts will also be

monitored, with regrowth being observed and noted along with the other monitoring activities described above. Geomorphic monitoring of bank stability and bank vegetation-hydrology interactions will be achieved using continuous recording instruments and periodic site surveys conducted annually or following high flow events. The monitoring program will be devised by SWS in conjunction with the NSL bank stability experts. Demonstration project monitoring will begin immediately following project implementation and continue until the end of the project term. A technical memorandum will summarize the results of the post-project monitoring.

Regular contact with the demonstration project site landowner will ensure that any project maintenance needs are identified and corrected in a timely manner. Maintenance requirements could potentially include: revegetation of plants/seeds that did not establish themselves; removal/treatment of new growth of giant reed; reapplication of biotechnical erosion control measures to control site rill erosion; or replacement of native revetment materials in response to changing channel conditions (some adjustment of the placed native revetment should be expected). SWS, D&A, and EMRCD will be responsible for responding to maintenance needs.

Task 8: Public Involvement and Community Outreach. Public involvement and outreach will be fundamental to this project. One of the goals of the project is to generate interest in biotechnical erosion control methods so that other, similar projects can be implemented. This can only be accomplished by conducting outreach in order to educate, answer individual landowners' concerns and receive input from those who may be involved on future implementations. Task 8 will occur throughout the project term and involve EMRCD, SWS, and NSL. Task deliverables will include copies of outreach materials and attendance records.

In order to accomplish this outreach, the project team will:

- Conduct four community workshops;
- Provide landowner assistance through expert site visits;
- Facilitate bi-monthly Merced River Stakeholders meetings and provide updates and solicit input from MRS and other community groups interested in the project; and
- Communicate progress to the general public through press releases and invitations to the media, articles in the EMRCD newsletter and updates to relevant websites (EMRCD, Merced River Alliance and Merced River Stakeholders).

<u>Workshops</u>

The four community workshops will be held in Merced County and will include indoor meetings and field days. Invitees will include riparian landowners, community groups and agency representatives. Input from participants will be sought at every workshop through question and answer periods and workshop evaluation forms. Workshop presenters will be drawn from EMRCD, Stillwater Sciences, NRCS, USDA NSL, CDFG, USFWS, RWQCB, landowners with existing bank stabilization projects and others. It is anticipated that the presenting panel will also gain valuable information from attendees.

The first workshop will provide an introduction to biotechnical erosion control, covering such topics as riverbank stability, interactions between river flows, properties of the bank materials, the impacts of bank vegetation and an overview of regulatory compliance.

The second workshop will focus on introducing landowners to the fundamentals of installing biotechnical erosion control, specific methods, associated costs, avenues of cost assistance and methods employed to ensure regulatory compliance.

The third workshop will be held at the biotechnical erosion control demonstration project site/s. This workshop will focus on the implementation of biotechnical erosion control methods. In addition to reviewing the various biotechnical methods being implemented at the demonstration project site/s (e.g. seeding and mulching of uplands areas, native material revetment, vegetated riprap, non-native, invasive plant eradication, and native plant revegetation), the workshop will also highlight actions that have been taken in order to comply with environmental regulations

The fourth workshop will also be held at the demonstration project site/s one year after project implementation. This workshop will focus on critiquing the effectiveness of the applied methods and long term maintenance. The expert panel will lead the group through the various applied methods and discuss how they did or did not achieve the project objectives in the time since implementation. Requirements for effective maintenance of the project/s and ongoing regulatory compliance will be discussed.

Landowner visits

Landowners who express serious interest in installing similar projects on their property and are willing to have an expert team visit the site, will receive at least one such visit. EMRCD will arrange the visit and organize a team which will be most effective in assisting the landowner. The team will drawn from EMRCD, Stillwater Sciences, NRCS, Bank Stabilization experts, CDFG, USFWS, RWQCB, landowners with existing bank stabilization projects and others. These landowners will be encouraged to visit the project site with project staff to inform themselves of the different stages and processes in the project. We will provide this technical assistance to as many as four landowners.

Community groups

The EMRCD will facilitate bi-monthly meeting of the MRS and other project team members will attend community meetings in order to provide information on the project and solicit input from the community. Participation in the project will be solicited where appropriate, such as assistance in revegetation. Various project team members will attend:

- Bi-monthly meetings of the Merced River Stakeholders group
- East San Joaquin Valley Water Quality Coalition meetings
- Merced County Farm Bureau meetings
- Merced River Alliance meetings
- Meetings of other watershed groups, such as Tuolumne and Stanislaus Rivers

Communication

To ensure the greatest dissemination of information related to the project, EMRCD and SWS will collaborate to provide information to the general public. This will be accomplished through:

- Press releases, articles and field day invitations to the media,
- Mailed workshop notifications to potential attendees,
- Articles in the EMRCD newsletter,
- Updates to relevant websites (EMRCD, Merced River Alliance, Merced River Stakeholders, Stillwater Sciences).

A.5 Performance Evaluation

A performance evaluation and monitoring plan (PEMP) will be develop for the entire proposed project to evaluate the success of the project in achieving its stated goals and objectives, and contributing to the goals of the CALFED Bay-Delta Program and Ecosystem Restoration Program. Potential project performance measures include:

- Measures of project completeness, such as 26.8 miles of channel banks surveyed; completed physical assessments and habitat evaluations of three channel bank study sites; final demonstration project design drawings and specifications incorporating biotechnical methods; and completion of demonstration project monitoring reports.
- Measures of improved bank stability at the demonstration project, such as reduction in floodplain area loss, and reduction of the time per year during which the bank is conditionally unstable.
- Measures of aquatic habitat improvement at the demonstration project, such as increase in stream bank habitat area and increase in stream bank habitat complexity.
- Measures of terrestrial habitat improvement at the demonstration project, such as decreased cover of non-native, invasive plant species, and increased cover of native plant species.
- Measures of landowner outreach success, such as number of attendees and return attendees at workshops.

Some performance measures will be contingent on later phases of the project. For example, we cannot identify specific performance measures for the demonstration project until a final design for the project has been completed. Performance measures will be revised, and updated in the PEMP, once project details are sufficient to allow for more specificity. The PEMP will be developed by EMRCD with the input of SWS and CBDA staff to ensure that appropriate measures have been identified. Accomplishment of the PEMP will be tracked with annual project reports presenting findings and addressing project progress.

From the conceptual model, one series of project hypotheses apply primarily to the demonstration project, and are that where bank stabilization is necessary and feasible, biotechnical methods that incorporate cobble/boulders and native vegetation will: 1) provide bank protection that is essential to land managers; 2) reduce fine sediment delivery to the channel; 3) increase instream habitat complexity relative to riprapped banks; 4) reduce the relative percent cover of non-native, invasive plant species; and 5) promote native vegetation that provides multiple ecosystem benefits. Another series of hypotheses would be that the workshops, stakeholder group meetings, and outreach to landowners are effective ways to inform landowners on alternative bank stabilization methods and improve the quality of bank stabilization projects that get implemented on the Merced River. The performance measures of listed above, in combination with the assessment and monitoring tasks will allow the project team to test these hypotheses and contribute to the adaptive management of the project.

A.6 Feasibility

The proposed project has been designed to be feasible within the context of the Merced River watershed and the funding schedule. Landowner involvement and permission to access monitoring sites is facilitated by the EMRCD, which is in regular contact with and has good working relationships with many riparian landowners. To make landowners more comfortable with the idea of monitoring on their property, the project team will keep all landowner information confidential. Results will be reported only in reference to the bank type being monitored. Over 25 landowners attended a biotechnical erosion control workshop hosted by the Community Alliance with Family Farmers in 2003 and members of the

Merced River Stakeholders group have expressed interest in learning about and implementing stabilization methods that benefit native species. This indicates that locating monitoring sites for Task 4 and ensuring good attendance at the workshops (Task 8) will be feasible.

Implementation of the demonstration project is facilitated by the permit coordination work already underway by the EMRCD (see Task 2) and the fact that the site landowner has already agreed to host the project. The demonstration project is expected to fall under the conditions of the EMRCD's coordinated mitigated negative declaration for CEQA compliance for small-scale restoration projects, so acquiring permits for the demonstration project should be straight-forward and timely. This will ensure that subsequent project tasks stay on schedule. Project team members, who have previously visited the demonstration site, have determined that the site is appropriate for the general types of biotechnical methods being considered. The landowner of the demonstration project site is eager to implement the project, committed to its monitoring and success, and supportive of hosting workshops on the property. The broad range of expertise represented by the project team facilitates all aspects of the project.

The broad range of expertise represented by the project team members ensures that the proposed project is effective and feasible within the budget and schedule proposed. The EMRCD is a special district of the State of California created to develop and further ongoing programs to conserve natural resources in Eastern Merced County. They currently coordinate/facilitate the MRS, operate a variety of programs that aide the landowners and ecological resources of the Merced River, and conduct educational workshops for landowners on land management practices. SWS has been interacting with riparian stakeholders, conducting biological and physical process studies, and planning restoration actions on the Merced River for over five years. SWS is keenly aware of the biological and geomorphic conditions of the river as well as the efforts of others investigators and is uniquely qualified to plan, implement, and report the reach-scale survey and site-scale and post-project monitoring. The researchers at the USDA-ARS National Sedimentation Laboratory are recognized world leaders in the affects of vegetation on river bank stability and have recently developed a physically-based model for assessing stream bank stability. As a division of the Agricultural Research Service, NSL researchers have significant experience working in agricultural landscapes, and understand the concerns of agricultural and riparian landowners. Domenichelli and Associates is an engineering firm specializing in water resources and stream restoration projects that has worked extensively on restoration projects on the Tuolumne River. D&A are experienced in restoration design, implementation, and monitoring such as that proposed.

A.7 Data Handling and Storage

Stillwater Sciences completes a QA/QC Plan for all its projects to ensure the quality of data collection efforts, data entry, data management, and analyses. Collection and development of data and information will cover the entire project period and will build on previously obtained data. All data collected for reach-scale survey, site-scale monitoring, and demonstration project monitoring will undergo standard QA/QC procedures before the originals are archived. This process includes review of field notes and data by field crew personnel, a check for accuracy of data entry, and creation of working and back-up copies of original data sheets to eliminate possible loss of or tampering with original data. The Merced NRCS office will archive the NRCS conservation plan for the demonstration site landowner, which will include project designs. All data will be archived at SWS and EMRCD facilities including off-site back-up copies of electronic data. Data generated by the project will be made available upon request. Requested data generated by the project will be prepared and submitted for input into CALFED's data system, once data formats and report guidance are provided.

A.8 Information Value

Research regarding the factors limiting salmon and steelhead populations has focused on the extent and quality of spawning habitat. To-date, very little study has been done to evaluate the impacts to salmon and other native fish species presented in the lower reaches of the Merced River. Since the bed of the river in the lower reaches is primarily sand (Stillwater Sciences 2002), stream banks are potentially a large part of the total habitat available to aquatic species in those reaches. The proposed project will look specifically at the habitat conditions associated with stream banks and will provide valuable information regarding factors potentially limiting salmon, steelhead, and other native species populations in the lower reaches of the river.

The detailed site-scale assessments of different bank types, coupled with the reach-scale survey will allow for comparisons between the different bank types, and provide a reach-scale estimate of bank habitat conditions and impacts to native species.

Through the use of in-the-field demonstration projects, delivery of research results, site visits to interested landowners and delivery of contact lists, the project will provide sufficient information that riparian landowners and land managers can make informed decisions about stream bank management on their property.

The proposal is integrally concerned with developing assessment protocols and defining the relationship between watershed processes and CALFED goals and objectives. It is the intention that the scientific investigation undertaken as part of the bank assessment and demonstration project will provide both a standard protocol and transferable information regarding bank conditions which can be used in defining the threshold at which bank erosion is severe enough to warrant remedial action. Thus, the project outcomes could provide the trigger mechanism for action under a river-wide permit for bank protection while also providing understanding of long-term benefit to scientists and river managers in the CALFED area. This data will increase the scientific evidence available upon which to develop, refine, and strengthen CALFED Program goals and objectives.

The proposal centers on developing a regional understanding of bank stability and a specific, quantitative understanding of bank hydrology (including the effect of bank vegetation) and geotechnical properties using cutting-edge science approaches recently developed by scientists at the USDA NSL. The implementation of a demonstration project developed through scientific study provides the opportunity for including project assessment directly into the project design. The assessment and monitoring protocols used for the project will provide a method for determining need for bank protection and present the basis for a standard approach that could be applied beyond the Merced River, from which regional datasets of bank condition can be developed, facilitating comparison between Central Valley rivers. Project design will be underpinned by an adaptive management approach of learning through experimentation which will allow the project monitoring to contribute effectively to overall adaptive management of the Merced River and thus capitalize on the recommendations made recently by the CALFED Science Board and the Merced River Adaptive Management Forum, which was convened by USFWS and CALFED (AMFSTP 2002). The proposed project is also a direct development of a CALFED ERP-funded project, the Merced River Corridor Restoration Plan.

A.9 Public Involvement and Outreach

Task 8 outlines the significant work that will be done in outreaching to the community. Workshops, farm visits and use of the demonstration sites will target riparian landowners in order to further the use of biorevettment practices. Outreach to the general public through the use of local media, Merced River Alliance newsletter and websites will increase awareness of the Merced River and solicit involvement via participation in the Merced River Stakeholders, project workshops and appropriate restoration activities. Targeted outreach will also be done to community groups that have shared interests in the goals of the project, such as the Merced River Alliance, East San Joaquin Water Quality Coalition and others. This level of public involvement and outreach will provide agricultural landowners with the information, access to technical support, and partnerships necessary to begin implementing stream bank stabilization methods on their property that effectively protect their property and infrastructure and provide benefits to native species. The tools provided by the outreach component of this property will greatly increase the capacity of agricultural landowners to plan, implement, and fund projects on their own or with support of local partnerships, rather than through the CALFED ERP funding mechanism.

B Applicability to CALFED Bay-Delta Program and ERP Goals

B.1 ERP Priorities

The proposed project represents a science-based approach to river management suitable to the philosophy of the CALFED Bay-Delta Authority (and potentially of transferable value to neighboring watersheds), a practical demonstration and evaluation of bank stabilization techniques, and a significant opportunity for developing the effectiveness of community-based watershed management. The proposed project addresses local watershed management objectives by developing recommended actions from the Merced River Corridor Restoration Plan (Stillwater Sciences 2002). Following completion of the Plan, biotechnical erosion control demonstration projects were determined by stakeholders to be one of the five highest priority action items in the lower Merced River.

The proposed project directly supports two of the objectives of the CalFed Bay Delta program:
Improving Ecosystem Quality. The project will improve and increase aquatic and terrestrial habitat on a limited scale but assumes that the practices will be implemented on a larger scale as a result of information gained and disseminated by project implementation.
Improving Water Quality. The project will decrease the sediment load from eroding streambanks and agricultural runoff into the Bay-Delta system on a limited scale but assumes that the practices will be implemented on a larger scale as a result of information gained and disseminated by project implementation.

The proposed project contributes to all of the CALFED ERP goals. Biotechnical bank measures have been demonstrated in other locations to be a cost-effective and environmentally-suitable approach to erosion control, without many of the negative consequences of hard bank protection, such as damage and disruption to instream and terrestrial habitats. The proposed project is intended to provide bank management performance improvements over that achieved with hard revetment, at a lower long-term cost than associated with hard revetment, and to achieve environmental improvements in parallel. These range from promoting the recovery of at-risk species, improving terrestrial habitat by removing non-native invasive plant species, and promoting the establishment of a native plant species to reduce fine sediment input to the channel progressively over time as the vegetation develops. Evaluation of habitat conditions associated with different stream bank types and evaluation of potential limiting factors to

salmon and steelhead in the Merced River is an effort to inform the recovery of endangered and other at-risk species and native biotic communities. The use of biotechnical stabilization methods at the demonstration project and workshops to assist landowners in incorporating habitat features to bank stabilization projects will help rehabilitate ecological process and restore habitats in the lower reaches of the river. By removing non-native invasive plant species and planting native vegetation, the demonstration project will help reduce impacts from non-native invasive species. If the methods employed by the demonstration project function as expected and are implemented at other sites on the river, water quality could be improved by the reduction in fine sediment.

The project directly addresses the following ERP PSP priorities:
Assist farmers in integrating agricultural activities with ecosystem restoration. The project accomplishes this by providing a wide array of information on biotechnical bank stabilization to the agricultural community and others. This information includes relative effectiveness of various techniques for bank stabilization and sediment control, associated costs, regulatory compliance, avenues for implementation and, resources to contact bank stabilization professionals and obtain technical assistance.

Contribute to understanding the relative effectiveness of different conservation-based farming practices and systems, and their contribution to restoration efforts. Extensive project monitoring and site comparisons will provide valuable information on the relative effectiveness of various bank stabilization practices.

Develop and implement agricultural activities that benefit MSCS covered species. The project promotes the recovery of three MSCS-covered species, the valley elderberry longhorn beetle, steelhead and Central Valley fall-run Chinook salmon by improving terrestrial habitat (revegetation with native species, including valley elderberry bushes), and improving aquatic habitat by reducing fine sediment and associated agricultural chemical input to the channel.

Facilitate permitting or regulatory assurances that support agricultural activities benefiting MSCS-covered species. The complexity and expense of the permitting processes pose significant barriers to landowners. The EMRCD permit coordination program will provide an avenue for regulatory compliance by landowners that drastically reduces these barriers while supporting the mandates of all regulatory agencies. This will benefit not only the demonstration project, but similar projects that landowners in the lower Merced River choose to implement.

Matching Funds. The project will leverage existing EMRCD funds for outreach (MRS Facilitation, Alliance newsletter and website). Additionally, the landowner will contribute significant in-kind services and the project will seek cost-share assistance from NRCS EQIP program.

Durable projects. The project will endure through the local partnership of the Natural Resource Conservation Service and use of their standard practices. NRCS personnel will be directly involved with project design and implementation and will gain a greater understanding of biorevettment techniques. Coupled with the outreach efforts of this project to local landowners, this will increase the likelihood of additional biorevettmetn projects in the lower Merced River. Additionally, information gained through the project will be adequately archived and available to landowners, agencies and other interested parties.

Appropriate scale. In order to have an appreciable impact on the identified at-risk species, implementation of biorevettment practices must be installed on more than one location of the Merced River. However, this can not be accomplished without the information and outreach that will be generated by this project. Therefore, the scale that is delineated in the proposal, one demonstration site and three monitoring sites is appropriate at this time.

Priority management practices. The project will install and provide landowner education on three of the identified priority management practices identified in the PSP:

- Erosion Control;
- Riparian and floodplain restoration in agricultural landscapes and;
- Vegetated filter strips, hedgerows and other wildlife buffers.

Geographical Priority. The proposed project occurs in an identified ERP PSP priority area, the Merced River.

Adaptive Management. The project will be accomplished using adaptive management by way of having a conceptual model that specifies assumptions and objectives and evaluating project impacts on these through ongoing monitoring and assessment. Additionally, the proposed project is a science-based approach to river management, and presents a significant opportunity for developing the effectiveness of community-based watershed management, reflecting the philosophy of the CALFED Bay-Delta Authority

The proposed project also supports the ERP PSP priority of promoting **locally based partnerships that benefit private landowners** through the outreach workshops. The series of workshops proposed as an integral component of this project are a direct response to the desires and suggestions of the local community, and are designed to provide education, outreach, and technical assistance to local landowners interested in biotechnical streambank stabilization techniques. The workshops have been designed to educate landowners on the variety of bank stabilization techniques available, associated costs, permitting issues, and provide landowners with the resources to contact bank stabilization professionals and obtain technical assistance. As such, there will be not only direct benefit to the local community both through environmental improvement, but the education, assessment and design information will be made available to all stakeholders in an accessible means. Biotechnical methods are considered especially appropriate for environmentally sensitive areas such as parks, woodlands, riparian areas, and scenic corridors where aesthetics, wildlife habitat, or native planting may be critical. As a result, it is often easier to obtain environmental clearance and necessary permits for erosion control projects that incorporate biotechnical and habitat enhancing elements in their design. Several landowners have already expressed an interest in having a demonstration project implemented on their property or have requested technical assistance to incorporate biotechnical erosion control methods (over 25 people recently attended a CAFF-sponsored field-based workshop on bank stabilization), indicating there is a real need for the development and dissemination of best practice information to stakeholders.

B.2 Relationship to Other Ecosystem Restoration Actions or Program Investments

The proposed project will complement the studies and restoration actions being implemented by Merced Irrigation District and California Department of Fish and Game to benefit aquatic species, including salmon and steelhead. Merced ID and CDFG jointly developed and agreed upon a formal 10-year study program to determine the potential factors that may limit salmon production in the Merced River. This

program is designed to evaluate the habitats necessary for increased salmon production by assessing the needs of each freshwater salmon life stage (i.e., upstream migration, spawning, egg incubation, fry and juvenile rearing, and outmigration).

The proposed project will also complement the extensive Merced River Salmon Habitat Enhancement Project that is being implemented by CDFG working with CDWR. This project will reconstruct the river channel and floodplain through 4.3 miles of the Merced River that have been excavated for aggregate mining. The objectives of the project are to: (1) reduce predation on young salmon by non-native fish by isolating habitat in river-captured mining pits that serve as predator habitat, (2) restore or enhance salmon spawning habitat, (3) enhance passage of adult and juvenile salmon, (4) resize the channel and floodplain to restore some natural river processes, and (5) reestablish riparian vegetation.

The project complements Merced River Corridor Restoration Plan, published by Stillwater Sciences with support from Merced County Planning Department and funding from CALFED ERP. The restoration plan provides a technically sound, publicly supported, and implementable plan to improve geomorphic and ecological functions in the Merced River corridor from Crocker-Huffman Dam to the confluence with the San Joaquin River. The project was funded by Central Valley Project Improvement Act-Anadromous Fish Restoration Program and CalFed. The proposed project implements an action recommended in the Merced River Corridor Restoration Plan (Stillwater Sciences 2002).

The proposed project will complement and enhance the EMRCD Merced River Alliance project, funded by CalFed. Complementary activities include outreach to the agricultural and general communities through a semi-annual newsletter, updates to the Alliance website and participation with the Merced River Stakeholders.

The proposed project will complement and enhance the EMRCD Watershed Coordinator program, funded through Department of Conservation. Complementary activities include; permit coordination; educational outreach to landowners on; facilitation of the Merced River Stakeholders (MRS) as well as providing an opportunity for building citizen participation through the MRS.

The project will build upon the Watershed Stewardship Project and Biologically Integrated Orchard Systems projects conducted in Merced County by Community Alliance with Family Farmers. These projects provided significant outreach to farmers and other landowners in environmentally-friendly farming practices, such as wildlife habitat on farms, erosion control and pesticide reduction. One field-based project workshop on stream bank stabilization drew over 25 people, indicating the real need for the development and dissemination of best practice information to on this topic to stakeholders.

B.3 Additional Information for Proposals Involving Land or Easement Acquisition

The proposed project does not involve land or easement acquisition.

C Qualifications and Organization

The proposed project is sponsored by the East Merced Resource Conservation District (EMRCD) in collaboration with Stillwater Sciences (SWS), USDA Agricultural Research Service's National Sedimentation Laboratory (NSL) and Dominichelli & Associates (D&A). The project team organization is presented in Figure 3 along with general project responsibilities. General descriptions of the project

team member are below. Detailed information on the experience and qualifications of all proposed project personnel is included in the required Personnel form.

East Merced Resource Conservation District is a special district of the State of California created to develop and further ongoing programs to conserve natural resources in Eastern Merced County.
Goals/Mission: Preserve and enhance the river and floodplain environment along the lower Merced River; preserve agricultural lands; develop positive relationships with local, state, and federal legislators; promote awareness of natural resources issues unique to Merced County; and develop/ distribute technical information on wetland resources and wildlife habitat. (This is not a complete list.)
Experience and Qualifications: Operate Watershed Coordinator Program, East Merced Vernal Pool Program, Mustang Creek Flood Control Project, and Farm Equipment Rental Program; coordinate/facilitate MRS; obtain range/farmland conservation easements; participate in Merced Area Groundwater Pool Interests Program; manage the Merced River Alliance Project, including MRA newsletter; conduct educational workshops for landowners on land management practices; developed comprehensive report on the Soils, Habitats, and Rare Species Associated with the Vernal Pools Grasslands of East Merced County, California.

Stillwater Sciences is a privately owned consulting company founded in 1996 to promote rigorous science and a collaborative decision making approach to environmental problem-solving.
Goals/Mission: Promote responsible and reasonable environmental practices through application of objective, interdisciplinary, and high quality scientific investigations for the betterment of our clients and the environment; work closely with agencies, industry, and non-governmental organizations to provide the technical information needed to make scientifically sound resource management decisions.
Experience and Qualifications: Established the MRS and a technical review and oversight team representing the lower Merced River; conducted baseline geomorphic and ecological surveys on the lower Merced River; conducted sediment and hydraulic modeling of the lower Merced River; designed guidelines for channel and floodplain restoration in the Dredger Tailings Reach of the Merced River; developed and completed the Merced River Corridor Restoration Plan; currently funded through CALFED ERP for restoration planning in the Dredger Tailings Reach.

United States Department of Agriculture Agricultural Research Service: National Sedimentation Laboratory is part of the national program of the ARS in natural resources, and it is dedicated to studying and finding solutions to problems associated with soil erosion and sediment delivery from upland areas, erosion and sedimentation in stream channels, the impact of sediment and other agricultural contaminants on the biological well being of streams, and the loss of nutrients and agricultural chemicals from agricultural activities on the landscape.

Goals/Mission: Emphasizes interdisciplinary research dealing with the processes of soil erosion; transport and deposition of sediment; in-stream structures, and bank protection on these processes; water quality; and the ecological well-being of streams.

Experience and Qualifications: The Channel Watershed Processes unit of the NSL is focused on developing improved methods to measure, predict, and control sediment yield and soil loss in agricultural watersheds using an integrated laboratory, field-based, and numerical approach, including the effect of channel stabilization measures on sediment yield from agricultural watersheds. Dr. Andrew Simon is an acknowledged world-leader in bank erosion processes and has spent the last seven years developing bank stability models that account for the role of hydrology, geotechnical properties and bank vegetation.

Domenichelli & Associates is an engineering firm specializing in water resources and stream restoration projects.
Goals/Mission: Provide a variety of services from large scale restoration designs to the design and construction management of municipal improvement facilities such as pipelines, pump stations and levee restorations.
Experience and Qualifications: Recent experience in stream restoration projects, fish ladder design and hydraulic structure design; extensive experience in hydrologic and hydraulic studies. Designed and provided construction support for a 2.6 mile restoration project on the Tuolumne River. The new meander, channel in-fill material and bench elevations were designed according to the characteristics of the regulated releases. Final design included restoring several mining pits and creating a new meandering channel and over-bank benches to maintain a 500-foot vegetated riparian corridor.

D Cost

D.1 Budget

The tasks of the proposed project have been structured to progressively inform the following task. For example, reach-scale surveys (Task 3) inform our understanding of reach conditions and which banks are appropriate for further monitoring; site-scale monitoring (Task 4) informs the demonstration project design (Task 5); the design is then implemented (Task 6) and the performance of the demonstration project is evaluated through the monitoring program (Task 7), and the results of all tasks are communicated to a wide audience (Task 8). The tasks have been designed to be streamlined precursors to the next task and are essential to the project as a whole. Elimination of any task would severally constrain the project team's ability to implement the following task.

D.2 Cost share and matching funds

The following cost shares have been arranged for the proposed project:

- **Coordinated permit assistance.** As discussed under Task 2, the project will be working under a regional permitting program coordinated by the EMRCD and Sustainable Conservation. This will significantly reduce the amount of effort required by the project team to develop and acquire the necessary environmental compliance documents and permits for the implementation of the demonstration project. Regional coordinated permit assistance represents a cost-savings of approximately $12,000 in labor and permit fee costs. It is expected that the regional coordinated permit will be in place far in advance of the demonstration project implementation.
- **Merced River Alliance aerial video footage.** Initially, this proposal included a task to collect aerial photographs of the lower reach for use in the reach-scale surveys and for selecting site-scale monitoring locations. In 2005, however, the Merced River Alliance project produced aerial video footage of the lower Merced River. This footage will be used to complement and update the most recent aerial photography set available for the lower river (1998). Using the Merced River Alliance project video footage in concert with the 1998 aerial photographs, rather than gathering new aerial photographs represents a cost-share of approximately $20,000. The video footage is already available for use by the proposed project.
- **Landowner funding for implementation of the demonstration project.** The landowner of the proposed demonstration project site will be applying for funding through the NRCS to assist in the implementation of the demonstration project. The NRCS will pay up to $60 per linear foot of bank stabilization, representing a potential cost-share of $30,000. This will also guarantee the involvement

of the NRCS in the planning, designing, and implementation of the demonstration project. The NRCS has developed standard practices for bank stabilization, but also recognize that the demonstration project represents an innovative approach that can be used to inform their standard practices. This cost-share is tentative, as it is dependent on NRCS approval. That said, the potential for cost-sharing with this funding mechanism (CALFED ERP) will improve the standing of the project to all cost-share providers and increase the likelihood of the landowner successfully acquiring funding from NRCS.

- **Landowner funding for implementation of a native plant hedgerow and filter strip.** The landowner will be applying for NRCS funding to implement a native plant hedgerow and filter strip along the reach of property that includes the demonstration project site. The NRCS will pay up to half of the cost while the landowner pays the other half, representing a total potential cost-share of approximately $10,700. Additionally, the landowner will be supplying irrigation and other maintenance equipment and labor as needed. The hedgerow and filter strip will allow the proposed project to further address ERP funding priorities for erosion control and assist the project in achieving its goals of improving reach-scale riparian habitat conditions. NRCS designs for hedgerows and filter strips will be used to facilitate Task 5 designs. This cost-share is tentative, as it is dependent on NRCS approval.
- **Volunteer assistance to implement the demonstration project.** The EMRCD will be arranging for local volunteer labor to implement portions of the demonstration project, such as assisting with geotextile installation and planting of native vegetation. This volunteer labor will provide first-hand experience to those individuals interested in learning about the techniques and represents a cost-share of approximately $3,000. This cost-share is contingent upon volunteer participation, but is expected to be easily arranged.

D.3 Long-term funding strategy

The project team will apply for additional funding to continue the monitoring of the demonstration project for up to five years. The project team will also continue to apply for funding that will fund citizen participation in resource conservation. Further, the proposed project is designed to encourage other landowners to implement these practices. These landowners will seek their own funding. It is expected that they will apply to NRCS cost share programs, such as EQIP.

E Compliance with Standard Terms and Conditions

We have carefully reviewed and understand the standard grant agreement terms. The East Merced Resource Conservation District is willing and able to comply with the terms of the sample ERP grant agreement template with some minor changes. We would prefer to see adjustments in the budget flexibility and task retention clauses. The suggested alternative language for the budget flexibility clause will help the EMRCD manage the project budget effectively and streamline both the EMRCD and Grant Manager time and budget needed to balance task budgets. The suggested alternative language for the task retention clause will ensure that performance retention is paid to the EMRCD and subsequently to subcontractors in a timely manner.

4. Budget Line Item Flexibility:

A. Line Item Adjustment(s). Subject to the prior review and approval of the Grant Manager, adjustments between existing budget/task line items(s) may be used to defray allowable direct costs up to

up to fifteen percent (15%) of the Agreement total including any amendment(s) thereto. Line item adjustments in excess of fifteen percent (15%) shall require formal agreement amendment.

B. Procedure to Request an Adjustment. The Contractor may submit a request for an adjustment in writing to the Grant Manager. Such adjustment may not increase or decrease the total contract amount. The Contractor shall submit a copy of the original Agreement Budget sheet reflecting the requested change(s) in **Bold** and Underlined. Budget adjustment(s) deleting a budget line item or adding a new budget line item requires a formal amendment and are not permissible under this provision. The Grant Manager may also propose adjustment(s) to the budget.

6. Performance Retention:

In accordance with the requirements set forth in the State Contracting Manual, Section 7.33.B, the State shall withhold, from the invoiced payment amount to the Contractor, an amount equal to ten percent (10%) of that payment. Disbursements shall be made on the basis of costs incurred to date, less ten percent of the total invoice amount. Disbursement of the ten percent retention shall be made either (1) upon Contractor's satisfactory completion of a discrete project task (ten percent retention for task disbursed); or (2) upon completion the project and the Grantee's compliance with project closure requirements specified by GCAP (ten percent retention for project disbursed).

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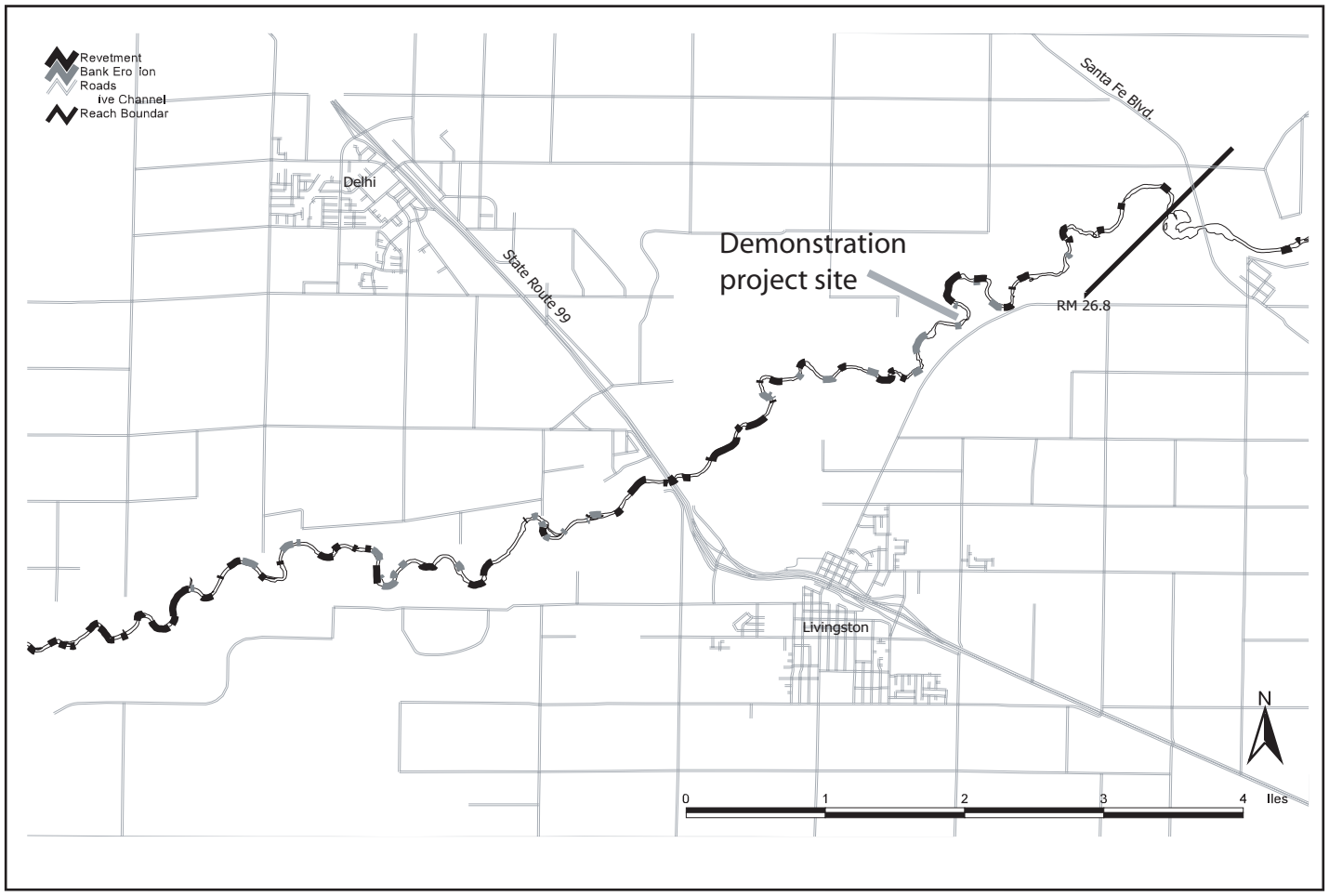
G Nonprofit Verification

East Merced Resource Conservation District is a local agency and qualified to receive funding from this funding source.



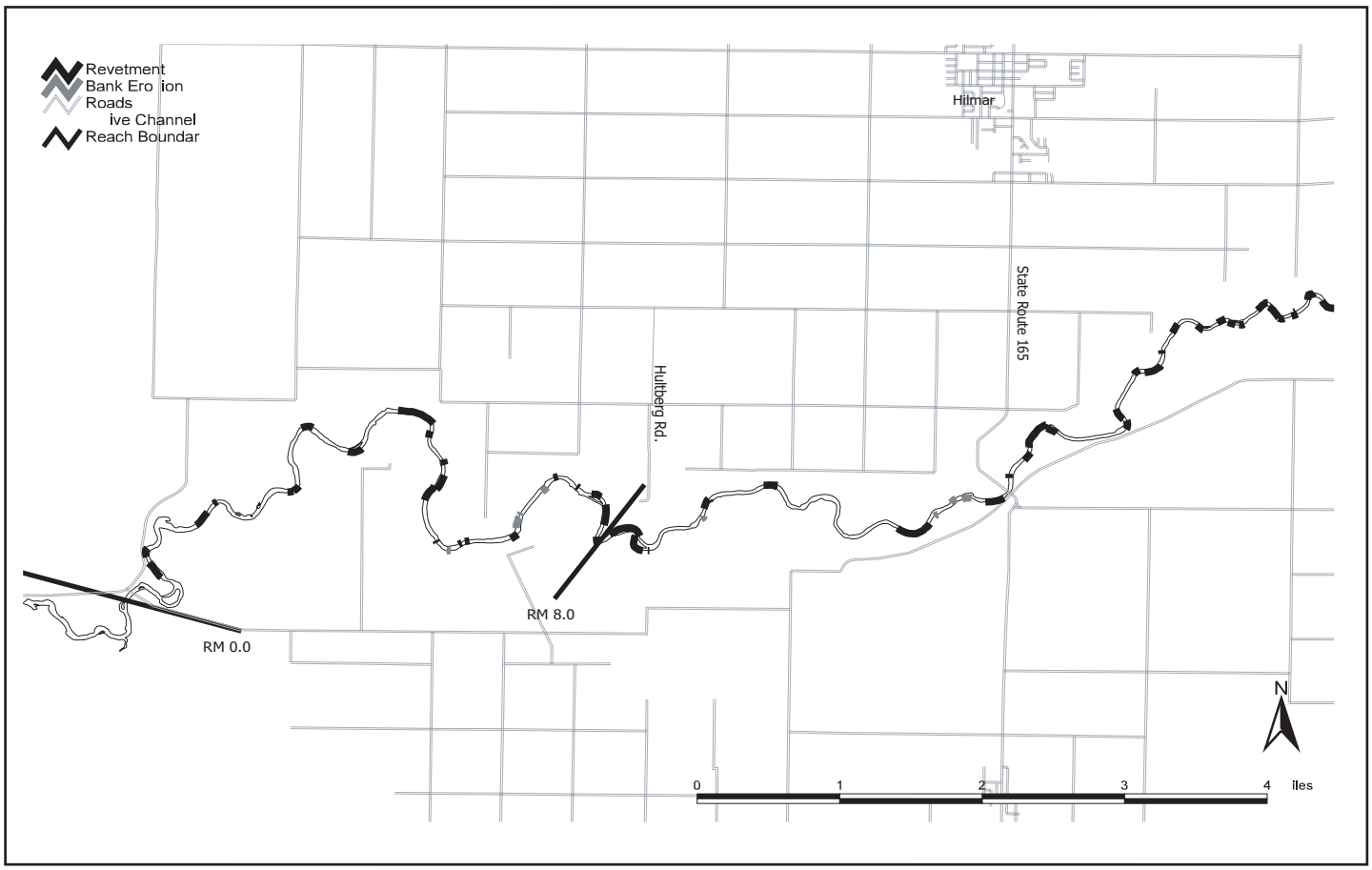


Figure 1. Bank erosion and revetment in the lower Merced River (~RM 26.8-0.0).

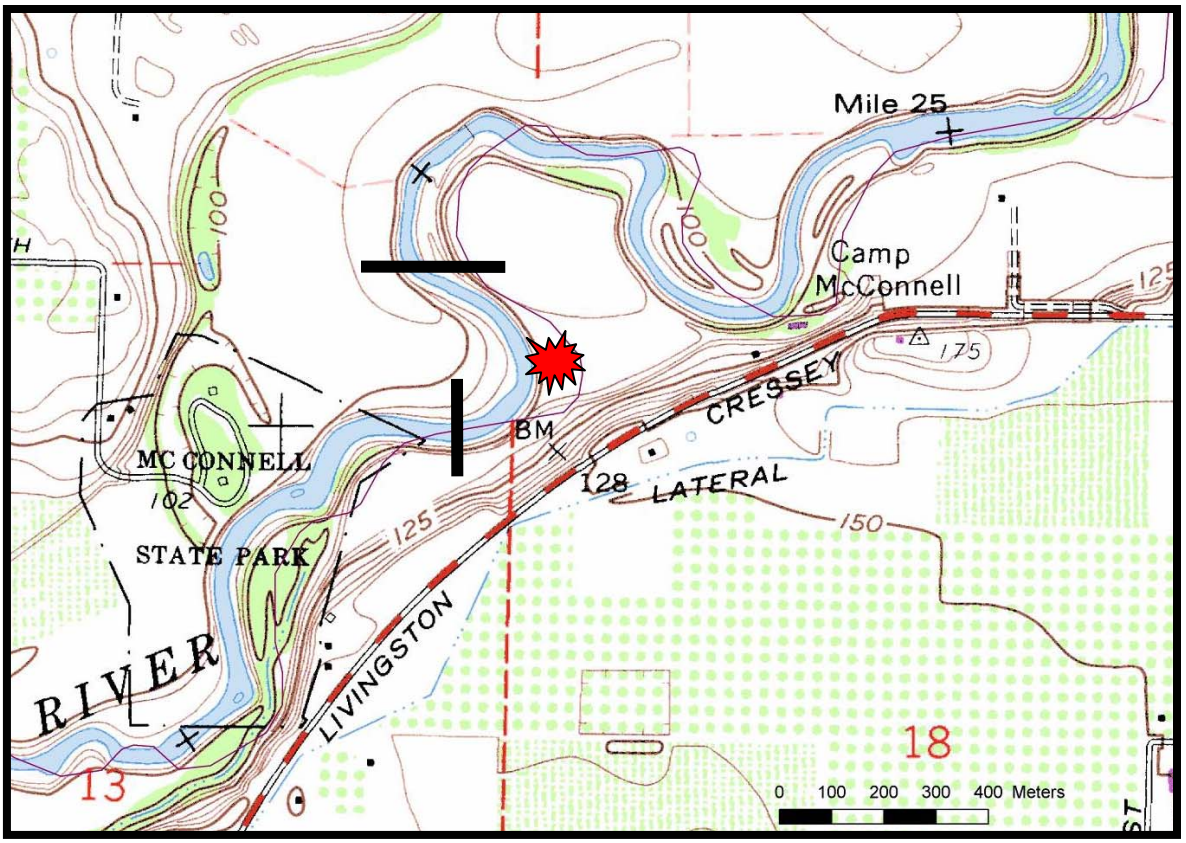


Figure 2A. Location of the demonstration project. Black lines indicate the approximate extent of the demonstration project reach; red dot indicates location of photo below.

Figure 2B. The demonstration project site (looking upstream). The vegetation covering the eroding bank is predominantly giant reed and tree tobacco, both non-native, invasive plant species.

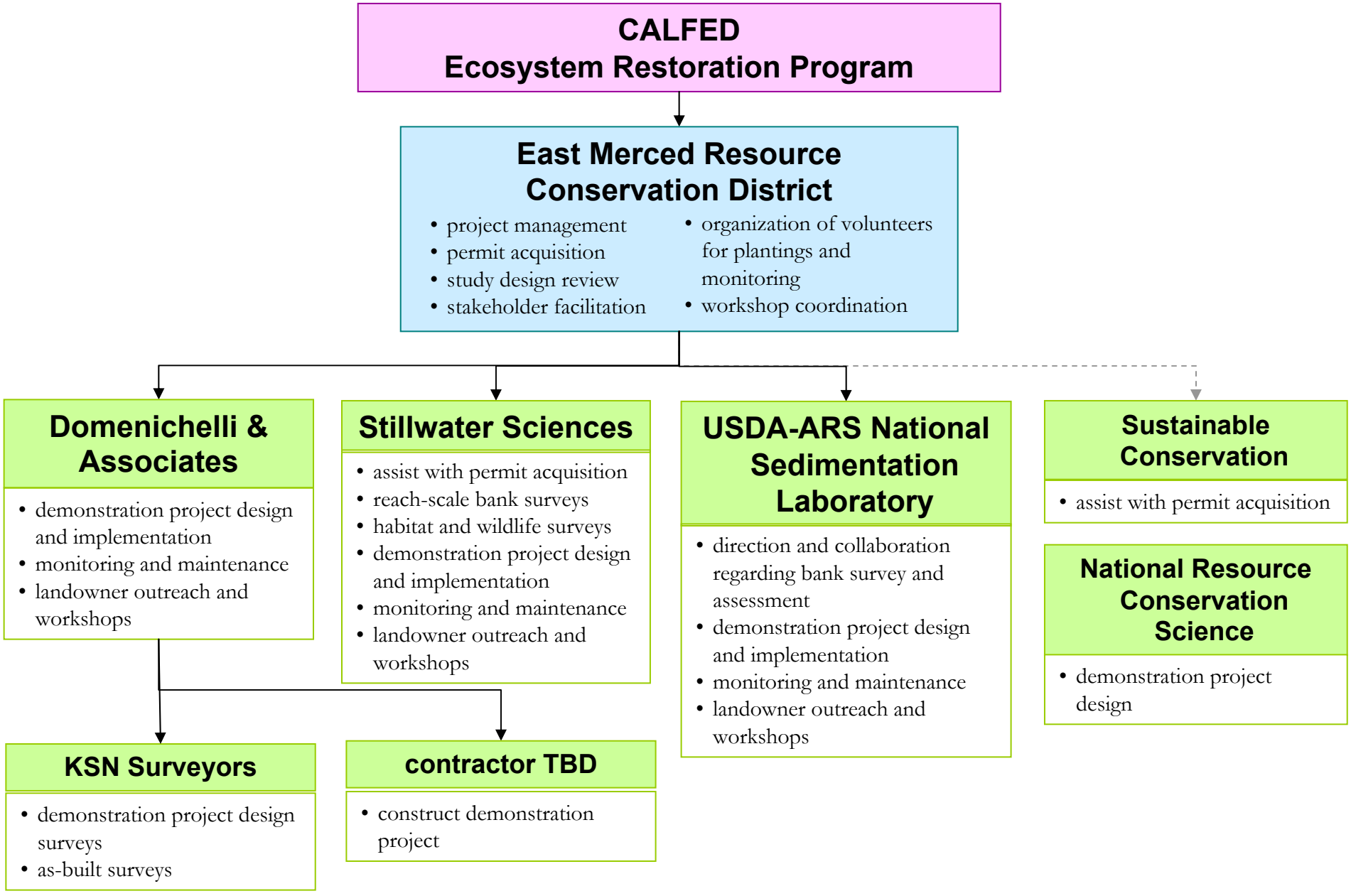


Figure 3. Project organization.

Peter W. Downs, Ph.D.
Senior Fluvial Geomorphologist

Dr. Downs is a fluvial geomorphologist with 17 years expertise in the field of watershed-scale effects on sediment transport processes, channel morphological response and river restoration. He has expertise in geomorphic assessments at various levels of detail, river restoration design and planning within an adaptive management framework, post-project monitoring and evaluation, and integrated watershed planning. Dr. Downs has led geomorphic analyses in a variety of river habitats in the US, UK and New Zealand and with differing management objectives including river channel conservation, fisheries improvement, riparian habitat restoration, flood control and channel stability. Much of his work has been multi-disciplinary in nature involving links to hydrologic and hydraulic modeling, biological and habitat surveys and to stakeholder involvement in management solutions. 2004 saw the publication of his co-authored book *River Channel Management: towards sustainable catchment hydrosystems*, the first textbook devoted specifically to the history and recent developments in management and restoration of river channels.

Education

Ph.D., *Applied Fluvial Geomorphology*; University of Southampton, UK; 1992
B.Sc. Hons, *Geography (emphasis in geomorphology)*; Univ. of Leicester, UK; 1988

Training

"Risk management strategies through project management", 2002.
"Applied Fluvial Geomorphology" short course, (D. Rosgen & L. Leopold) 1995.
Public Inquiry training, UK, 1994.
Time management workshop, UK, 1993.
Courses in the "Postgraduate Certificate in Academic Practice" (UK, 1993-9).

Professional Experience

Project Management

Dr. Downs has managed large watershed-scale and smaller river reach projects, as well as being responsible for corporate technical development and leading geomorphology staff teams. In his former academic career, he managed research grants and consultancy projects, provided supervision of undergraduate and graduate students (to PhD.) and held various administrative posts at a Department-level, including Exams Officer. His focus has generally involved watershed-scale projects that link river restoration to flood management, fisheries improvement and other management concerns, requiring an integrated understanding of the challenges faced by modern river channel management. He has extensive experience of public speaking to a variety of audiences including students, academic researchers, agency personnel and stakeholders. He has received training in project management, presentation skills and giving evidence.

Fluvial Geomorphology & Channel Dynamics

Dr. Downs was recently invited to perform as Lead Scientist to the CBDA Environmental Water Program, aiming to acquire additional flows for priority creeks to provide environmental benefit. The role of Lead Scientist involves the co-ordination of staff and the management of studies designed to assist in preparing testable scientific hypotheses and experiment-based monitoring programs which result in planned flow acquisitions that provide proven restoration benefits (with a focus on fisheries), to pass academic and agency peer-review and to adhere to an

ecosystem focused approach to adaptive management.

Previously, Dr. Downs managed the development of geomorphic guidance documentation designed to assist in the prescription of high flows for river restoration. The project, one part in the development of the CBDA Environmental Water Program involved the development of a novel classification of high flow types according to specific environmental objectives, the linkage of the high flows to appropriate simulation analyses for planning high flow releases, state-of-the-science summaries of the various simulation analyses and a framework for high flow prescription according to adaptive management principles. The documentation is being used to guide flow application experiments and to allow water planners, fisheries scientists and the public to understand the probable sediment transport processes and channel dynamics resulting from high flow releases.

Dr. Downs was the task lead for the geomorphic process assessment component of the Santa Clara River Parkway Floodplain Restoration Feasibility Study, funded by the California Coastal Commission. The assessment consisted of a through review of all available literature appertaining to geomorphic process in the 4,200 km^2 watershed of the semi-arid Santa Clara River, in Ventura and Los Angeles Counties, California, and development of hillslope, fluvial and estuarine conceptual models for geomorphic processes throughout the watershed. The conceptual models are designed to guide planning for as part of a scheme to acquire and manage in excess of 32 km of the lower mainstem river both for restoration and flood control purposes.

Dr. Downs was also tasked recently with deciphering the dynamics of geomorphic processes and morphological change in the middle reaches of the San Joaquin River, as part of a study for the Natural Resources Defense Council and Friant Dam Water Users aimed at improving salmon spawning habitat in the reach. The reach, immediately below Friant Dam, is limited for sediment supply, is partly constrained by bedrock and has been previously mined for gravel in-stream while floodplain mining activities continue at present. The study made use of long-term geologic investigations of the changing sediment supply to the reach, analyses of contemporary sediment transport processes, channel cross-section and long profile surveys, topographic interpretation, estimated rates of sediment extraction and facies mapping of bed sediment size distributions confirmed by pebble counts.

In the UK, Dr. Downs was part of a five-person academic team tasked with the preparation of national guidance documentation for 'Geomorphological Approaches to River Management' for the Environment Agency of England and Wales in 1996. Several documents were produced to assist Environment Agency personnel and riparian stakeholders understand the capability and utility of geomorphic analysis in relation river management issues and problems, including sustainable approaches to river restoration.

Dr. Downs has also been integrally involved in the development of procedures for evaluating river restoration projects. These procedures center on the envisaging project evaluation as a combination of compliance, performance, and sustainability assessments. He has also developed indices for assessing project performance based on spatial comparisons of improvements in physical habitat diversity provided by river restoration schemes, and time-relative measure of scheme

performance based on sediment transport potential as described by magnitude-frequency analysis.

Sediment Transport & Budgeting

Dr. Downs' expertise in fluvial geomorphology includes studies in sediment transport and budgeting. He led a detailed sediment budget assessment of Redwood Creek, Marin County for the National Parks Service and GGNPA, providing estimates for four historic time periods, including assessment of rates of sediment production and transport, identification of sediment storage locations and reservoir transfer rates. These issues were investigated using watershed modeling, field reconnaissance of sediment sources, mainstem channel surveys and dendrochronology, applicable rate estimates from neighboring catchments, and sediment transport modeling. The assessment is being undertaken as the physical basis for planning restoration of Big Lagoon at the mouth of the watershed and included the corroboration of several estimates in ascertaining rates and caliber of sediment delivery to the Lagoon now, and in the future. The work was undertaken in conjunction with the Department of Earth and Planetary Sciences at UC Berkeley, enabling integration of research-grade technologies to the appraisal.

Dr. Downs also led a comprehensive study of sediment transport processes across the 250 square mile watershed of the Laguna de Santa Rosa, Sonoma County. This study for the U.S. Army Corps of Engineers and the Sonoma County Water Agency involved historic, hydrologic, and geomorphic analyses, including watershed reconnaissance, analysis of cross-sectional channel change, bed material sediment sampling by grab and core, suspended sediment and bedload sampling during high flow events, sediment yield and sediment transport estimates. The study aimed to integrate flood control concerns with preservation of the Laguna.

For the U.S. Army Corps of Engineers and Santa Clara Valley Water District, Dr. Downs performed a sediment budget feasibility study for Upper Penitencia Creek. He performed reconnaissance level geomorphic assessment, identified sediment sources and sinks and long-term trends of sediment transport. Dr. Downs used a Geographic Information System to superimpose key data types to subdivide the watershed, derive geomorphic process domains, and thus prioritize field sites to guide the fieldwork. The tasks also involved reviewing previous studies, performing fieldwork, estimating sediment yields using predictive equations, constructing sediment budget and analyzing bridge scour.

River Restoration Planning & Design

Dr. Downs is currently leading a large CBDA-ERP-funded project, jointly with the California Department of Fish and Game and URS Corporation intended to restore a severely disturbed reach of the lower Merced River in the San Joaquin valley. The reach is both highly regulated and was previously subject to dredging for gold. As a result, the channel is now incised into a floodplain surface composed entirely of dredge tailings. Using a philosophy of best scientific information to guide restoration planning, the project involves intensive physical and biological surveys of the 7-mile reach including analysis for the potential occurrence of mercury in the dredge tailings, hydraulic and sediment transport modeling, and a pilot experiment in floodplain re-vegetation under controlled conditions. These studies will form the basis for channel and floodplain restoration of a section of the reach that will balance sediment transport and supply to result in sustainable improvements to spawning habitats. The project specifically targets issues raised by the Merced River Adaptive Management Forum and includes on-going outreach with the Merced River Stakeholder group to ensure local involvement

and understanding of the planned project.

Dr. Downs was the project manager for a CALFED-funded restoration project in the San Joaquin National Wildlife Refuge. This study investigated opportunities for a non-structural flood control initiative in the refuge that will serve to restore periodic floodplain fisheries habitat across a 3,100 acre site. The project involved use of a one-dimensional, looped network hydrodynamic model to simulate floodplain flows according to different configurations of levee breaches in conjunction with geomorphic assessment of levee breach implications and consultation with fisheries experts on the most suitable floodplain micro-topography to benefit native fishes and prevent fish stranding.

Previously, in the UK, Dr. Downs managed the development and implementation of a rehabilitation scheme to improve in-stream habitat diversity and fisheries quality for a lowland, sand-bedded flood control river channel in rural Nottinghamshire, England. Following watershed-scale geomorphic assessments of sediment pathways, plans were produced to improve channel diversity based on initiatives taken in-stream, in the riparian zone and across the river basin and based on a 'prompted recovery' approach. In-stream measures were tested for geomorphic and hydraulic sustainability and installed in 1996 over a 3km reach. Post-project monitoring and evaluation has continued since, along with planning for further rehabilitation measures downstream.

At the other physical extreme, Dr. Downs developed plans for suitable approaches to rehabilitation in a steep, boulder-bedded watershed in South Island, New Zealand. The watershed is urbanized in its lower extent and with pristine headwaters. The planning involved network-wide geomorphic characterization of sediment transport processes and the use of stream power to determine the probable sediment budget tendencies as the river entered the constrained floodplain of the urban area. A variety of potentially sustainable in-channel, corridor and watershed measures for rehabilitation were proposed based on the character of native fish species and the existing channel constraints and structures.

Dr. Downs has conducted numerous other geomorphic evaluations and restoration plans for the Environment Agency of England and Wales. In one example, he served as a geomorphic advisor to a team planning mitigation measures to restore channel sinuosity as part of a long-term plan for re-introducing trout to the river; in another, he undertook a geomorphic 'fluvial audit' (qualitative sediment budget) as the background for planning river rehabilitation for a low-gradient, incised river channel on the England-Wales border. For this project he designed a newly sinuous course for the channel to retain the integrity of its energetic processes and to reduce dependency on bank revetment measures.

Environmental Impact Assessments

Dr. Downs was the geomorphology lead in identifying physical constraints regarding alternative site locations for a retention basin on Pleasant Grove Creek for the City of Roseville. Analysis included a historic assessment of changing geomorphic conditions the Pleasant Grove Creek watershed and field and air reconnaissance in order to interpret the evolutionary trends of the mainstem channels and therefore predict likely future conditions.

Dr. Downs was the project manager for hydrology and geomorphology studies for a 27-lot subdivision located at the confluence of two creeks in Contra Costa

County. Key issues included the assessment of project impacts on stream stability and identification of appropriate mitigation and developer setback. Analysis included re-computing and sensitivity analysis of flow calculations, regional geomorphic analysis and application of new USDA bank stability model incorporating material, hydrologic and vegetation effects.

He has also conducted a review of cumulative impacts assessment used to assess the downstream effects of timber harvesting practices on the water quality of Jordan and Freshwater Creeks. The reviewed method consisted of combining the sediment production impact of three factors: hydrologic change, logging-related landsliding, and road-related gullying.

Academic Experience

Prior to joining Stillwater Sciences, Dr. Downs was for 8 years an Assistant Professor in the Faculty of the School of Geography at the University of Nottingham, UK. He taught classes in river restoration, river corridor and integrated basin management, river channel dynamics, hydrological modeling, and concepts in geomorphology. During this time, in addition to research and teaching activity, he undertook and managed numerous consultancy projects relating his fluvial geomorphology expertise to river channel management. Dr. Downs has published numerous articles in international scientific journals and has recently finished co-authoring a book encompassing the state of the art in River Channel Management (publication May 2004). Since arriving in the US, Dr. Downs has continued to provide guest lectures and co-instruction to UC Berkeley classes 'Restoration of Rivers and Streams' and 'Hydrology for Planners'.

Teaching Experience

1993-2000: Lecturer (i.e., Assistant Professor), School of Geography, University of Nottingham, Nottingham, UK
2004-2007: Special Professor, honorary position at the School of Geography, University of Nottingham, Nottingham, UK
2000-2004: Special Lecturer, honorary position at the School of Geography, University of Nottingham, Nottingham, UK

1999: Visiting Scholar, Department of Geography, University of California at Berkeley, CA

1992-1993: Teaching Fellow (i.e., junior Faculty), Department of Geography, University of Southampton, Southampton, UK

Professional Affiliations

American Geophysical Union: co-convener of 2002 Fall Meeting special session
British Geomorphological Research Group: convener of 2001 Annual Conference
Fellow of the Royal Geographical Society (FRGS)

Selected Publications

Book:
Downs, P.W. and Gregory, K.J. 2004. River Channel Management: Towards Sustainable Catchment Hydrosystems, London, Arnold, 395pp.

Technical Papers and Book Chapters:
Gregory, K.J. and Downs, P.W. *in press.* The sustainability of restored rivers: catchment-scale perspectives on long-term response, in Darby, S.E. and Sear, D.A. (eds.) River Restoration: Managing the Uncertainty in Restoring Physical Habitat, Chichester, J.Wiley & Sons.

Downs, P.W. 2005. Restoration Planning in a Severely Disturbed Catchment: the Lower Merced River, California, Eos Transactions AGU 86(52), Fall Meeting Supplement, Abstract H11F-04.

Downs, P.W. and Stallman, J. 2005. Sequential Sediment Budgets in an Ungauged Watershed: Redwood Creek, Marin County, California, Eos Transactions AGU 86(52), Fall Meeting Supplement, Abstract H54A-0617.

Downs, P.W. and Priestnall, G. 2003. Modeling catchment processes, in Kondolf, G.M. and Piegay, H. (eds.) Methods in Fluvial Geomorphology, Chichester, J.Wiley & Sons, pp205-230.

Downs, P.W., Sklar, L. and Braudrick, C.A. 2002. Addressing the uncertainty in prescribing high flows for river restoration, Eos Transactions AGU 83 (47), Fall Meeting Supplement, abstract H71F-08.

Downs, P.W., Kondolf, G.M. and Skinner, K.S. 2002. Rivers and streams, in Perrow, M.R. and Davy, A.J. (eds.) Handbook of Ecological Restoration, volume 2: Restoration in Practice, Cambridge, Cambridge University Press, pp.267-296

Downs, P.W. and Kondolf, G.M. 2002. Post-project appraisals in adaptive management of river channel restoration, Environmental Management, 29, 477-496.

Downs, P.W. 2001. Geomorphological evaluation of river restoration schemes: principles, method, monitoring, assessment, evaluation. Progress?, in Nijland, H.J. and Cals, M.J.R. (eds) River Restoration in Europe: practical approaches, Lelystad, The Netherlands, Institute for Inland Water Management and Waste Water Treatment / RIZA, pp.243-249.

Downs, P.W. and Kondolf, G.M. 2001. Post-project appraisals: the key to river restoration success, Hayes, D.F. (ed) 2001 Wetlands Engineering and River Restoration Conference, August 27-31 2001, Reno, ASCE, on CD.

Wood, A.L., Simon, A., Downs, P.W., and Thorne, C.R. 2001. 'Bank-Toe Processes in Incised channels: the contribution of apparent cohesion in impeding removal of failed cohesive blocks', Hydrological Processes, 15, 39-61.

Downs, P.W. and Simon, A. 2001. Fluvial geomorphological analysis of the recruitment of large woody debris in Yalobusha river network, central Mississippi, USA, Geomorphology, 37, 65-91.

Downs, P.W. and Caruso, B.S. 2000. Three Streamscapes Project: fluvial geomorphology context for rehabilitation opportunities in the Water of Leith, Dunedin, New Zealand, in Nolan, T.J. and Thorne, C.R. (eds.) Gravel Bed Rivers 2000 CD-ROM. A Special Publication of the New Zealand Hydrological Society.

Downs, P.W. and Thorne, C.R. 2000. Rehabilitation of a lowland river: reconciling flood defense with habitat diversity and geomorphological sustainability, Journal of Environmental Management, 58, 249-268.

Downs, P.W. and Priestnall, G. 1999. System design for catchment-scale approaches to studying river channel adjustments using a GIS, International

Journal of Geographical Information Systems, 13, 3, 247-266.

Downs, P.W., Wright, N.G., Swindale, N.R. and Skinner, K.S. 1999. Modelling detailed hydraulic and morphological change following installation of flow deflectors in the River Idle, Nottinghamshire, UK., in Proceedings of the Third International Ecohydraulics Conference on CD ROM

Skinner, K.S., Downs, P.W. and Brookes, A. 1998. Geo-hydraulic Diversity Index (GDI): a method for assessing the sustainability of rivers, in Abt, S.R., Young-Pezeshk, J. and Watson, C.C. (eds.) Water Resources Engineering '98, New York, ASCE, pp.666-671.

Brookes, A., Downs, P.W. and Skinner, K.S. 1998. Uncertainty in the engineering of wildlife habitats, Journal of the Institution of Water and Environmental Management, 12, 25-29.

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Kondolf, M. and Downs, P.W. 1996. Catchment approach to channel restoration, in Brookes, A. and Shields, F.D.Jr. (eds.) River Restoration: guiding principles for sustainable projects, Chichester, J.Wiley & Sons, pp.129-148.

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Downs, P.W. and Gregory, K.J. 1995. The sensitivity of river channels to adjustment, The Professional Geographer, 47, 168-175.

Simon, A. and Downs, P.W. 1995. An interdisciplinary approach to evaluation of potential instability in alluvial channels, Geomorphology, 12, 3, 215-232.

Downs, P.W, and Brookes, A. 1994. Developing a standard geomorphological approach for the appraisal of river projects, Kirby, C. and White, W.R. (eds) Integrated River Basin Development, Chichester, J.Wiley & Sons, pp299-310.

Downs, P.W. 1994. Characterization of river channel adjustments in the Thames basin, South-East England, Regulated Rivers: Research and Management, 9, 151-175.

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Gregory, K.J., Davis, R.J. and Downs, P.W. 1992. Identification of River Channel Change due to Urbanization, Applied Geography, 12, 299-318.

Downs, P.W., Gregory, K.J. and Brookes, A. 1991. How Integrated is River Basin Management?, Environmental Management, 15, 299-309.

Tasks And Deliverables

Task ID	Task Name	Start Month	End Month	Personnel Involved	Deliverables
1	Administration and Management	1	36	Huff, Gwen Downs, Peter Diggory, Zooey Cosio, Tamara	Agenda and minutes of staff meetings, progress and financial reports as required, invoices, subcontracts
2	Permitting	1	36	Huff, Gwen Diggory, Zooey Cosio, Tamara	Copies of environmental compliance documents, permits and landowner access agreements
3	Reach-scale Survey of Channel Banks	4	7	Downs, Peter Hume, Noah Fleming-Singer, Maia Diggory, Zooey Liebig, Russell National Sedimentation Laboratory, USDA-ARS	Reach map, technical memorandum
4	Site-scale Bank Analyses and Habitat Assessment of Channel Banks	4	36	Downs, Peter Hume, Noah Fleming-Singer, Maia Diggory, Zooey Liebig, Russell	Technical memorandum

				Cosio, Tamara	
5	Demonstration Project Design	12	19	Downs, Peter Hume, Noah Fleming-Singer, Maia Diggory, Zooey Liebig, Russell Associates, Domeniccelli & National Sedimentation Laboratory, USDA-ARS	Demonstration Project Design
6	Demonstration Project Implementation	19	20	Downs, Peter Hume, Noah Fleming-Singer, Maia Diggory, Zooey Liebig, Russell Associates, Domeniccelli & National Sedimentation Laboratory, USDA-ARS	As-built survey
7	Monitoring and Maintenance	20	34	Downs, Peter Hume, Noah Fleming-Singer, Maia Liebig, Russell Cosio, Tamara Associates, Domeniccelli & National Sedimentation Laboratory, USDA-ARS	Technical memorandum
8					

	Public Involvement and Community Outreach	**1**	**36**	**Huff, Gwen Downs, Peter Fleming-Singer, Maia Diggory, Zooey Cosio, Tamara Lashbrook, Cynthia Whipp, Karen Associates, Domeniccelli & National Sedimentation Laboratory, USDA-ARS**	**Workshops materials and attendance sheets, results of consultation meetings, MRS agenda and minutes, copies of newsletters, websites**

Total Project Budget Summary by Task and by Fiscal Year

Note: This budget summary **automatically links** to the costs and totals on the **"Budget Detail"** worksheet.
DO NOT CHANGE FORMULAS OR ENTER NUMBERS INTO ANY CELLS EXCEPT THE SHADED CELLS for "Cost Share" and "Other Matching Funds"

BUDGET SUMMARY	Total Amount for Year 1	Total Amount for Year 2	Total Amount for Year 3	Total Amount for All Years
Total Costs for Task One	$ 70,488.05	$ 61,661.98	$ 61,661.98	$ 193,812.01
Total Costs for Task Two	$ 22,946.34	$ 14,420.00	$ 4,686.50	$ 42,052.84
Total Costs for Task Three	$ 22,073.00	$ -	$ -	$ 22,073.00
Total Costs for Task Four	$ 34,751.00	$ 101,454.00	$ 46,916.00	$ 183,121.00
Total Costs for Task Five	$ 23,560.00	$ 51,947.00	$ -	$ 75,507.00
Total Costs for Task Six	$ -	$ 218,689.60	$ 4,841.00	$ 223,530.60
Total Costs for Task Seven	$ -	$ -	$ 103,571.00	$ 103,571.00
Total Costs for Task Eight	$ 55,733.30	$ 64,385.30	$ 71,644.74	$ 191,763.34
Total Costs for Task Nine	$ -	$ -	$ -	$ -
Total Costs for Task Ten	$ -	$ -	$ -	$ -
Total Costs for Task Eleven	$ -	$ -	$ -	$ -
Total Costs for Task Twelve	$ -	$ -	$ -	$ -
Total Costs for Task Thirteen	$ -	$ -	$ -	$ -
Total Costs for Task Fourteen	$ -	$ -	$ -	$ -
Total Costs for Task Fifteen	$ -	$ -	$ -	$ -
Total Costs for Project Tasks	$ 229,551.69	$ 512,557.88	$ 293,321.22	$ 1,035,430.79
1/Cost Share		$ 40,700.00	$ -	$ 40,700.00
2/ Other Matching Funds	$ 32,000.00	$ -	$ 3,000.00	$ 35,000.00

1/ *Cost share funds* are specifically dedicated to your project and can include private and other State and Federal grants. Any funds listed in this line must be further described in the text of your proposal (see Chapter 3, Section D, of the PSP document)

2/ *Other matching funds* include other funds invested consistent with your project in your project area for which the ERP grant applicant is not eligible. Any funds listed in this line must be further described in the text of your proposal (see Chapter 3, Section D, of the PSP document)

Proposal Number
Proposal Name

Detailed Budget Breakdown by Task and by Fiscal Year

Applicant Name

BUDGET FOR TASK ONE (Administrative)	TOTAL AMOUNT TASK 1 All Years	Year 1			Year 2			Year 3		
		Amount per hour	Number of Hours	Total Amount for Year 1	Amount per hour	Number of Hours	Total Amount for Year 2	Amount per hour	Number of Hours	Total Amount for Year 3
Personnel										
Gwen Huff	$ 123,660.00	$45	1012	$ 45,540.00	$ 45.00	868	$ 39,060.00	$ 45.00	868	$ 39,060.00
Karen Whipp	$ 9,030.00	$35	86	$ 3,010.00	$ 35.00	86	$ 3,010.00	$ 35.00	86	$ 3,010.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ 132,690.00**			**$ 48,550.00**			**$ 42,070.00**			**$ 42,070.00**
										-
[1/] Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$132,690.00**			**$48,550.00**			**$42,070.00**			**$42,070.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ 5,600.00			$ 3,600.00			$ 1,000.00			$ 1,000.00
2/ Travel and Per Diem	$ 6,000.00			$ 2,000.00			$ 2,000.00			$ 2,000.00
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor: Stillwater Sciences	$ 28,106.00			$ 9,028.00			$ 9,539.00			$ 9,539.00
4/ Sub-Contractor: Dominichelli and Associates	$ 15,771.00			$ 5,257.00			$ 5,257.00			$ 5,257.00
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 55,477.00**			**$ 19,885.00**			**$ 17,796.00**			**$ 17,796.00**
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	3%			$ 2,053.05			$ 1,795.98			$ 1,795.98
Total Costs for Task One	**$ 193,812.01**			**$ 70,488.05**			**$ 61,661.98**			**$ 61,661.98**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

2/ Travel expenses and per diem must be at rates specified by the Department of Personnel Administration. The contractor is required to maintain travel receipts and records for auditing purposes. No travel out of the state of California shall be reimbursed unless prior written authorization is obtained from the State.

3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

Proposal Number
Proposal Name

Detailed Budget Breakdown by Task and by Fiscal Year

Applicant Name

BUDGET FOR TASK TWO	TOTAL AMOUNT TASK 2 All Years	Year 1 Amount per hour	Year 1 Number of Hours	Year 1 Total Amount for Year 1	Year 2 Amount per hour	Year 2 Number of Hours	Year 2 Total Amount for Year 2	Year 3 Amount per hour	Year 3 Number of Hours	Year 3 Total Amount for Year 3
Personnel										
Gwen Huff	$ 27,000.00	$ 45.00	270	$ 12,150.00	$ 45.00	270	$ 12,150.00	$ 45.00	60	$ 2,700.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ 27,000.00**			**$ 12,150.00**			**$ 12,150.00**			**$ 2,700.00**
										-
[1/] Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$27,000.00**			**$12,150.00**			**$12,150.00**			**$2,700.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ 3,000.00			$ 1,000.00			$ 1,000.00			$ 1,000.00
2/ Travel and Per Diem	$ 2,550.00			$ 850.00			$ 850.00			$ 850.00
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor: Stillwater Sciences	$ 5,198.00			$ 5,198.00			$ -			$ -
4/ Sub-Contractor: Dominichlli and Associates	$ 3,080.00			$ 3,080.00			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 13,828.00**			**$ 10,128.00**			**$ 1,850.00**			**$ 1,850.00**
[5/] Overhead Percentage (Applied to Personnel & Other Costs)	3%			$ 668.34			$ 420.00			$ 136.50
Total Costs for Task Two	**$ 42,052.84**			**$ 22,946.34**			**$ 14,420.00**			**$ 4,686.50**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

2/ Travel expenses and per diem must be at rates specified by the Department of Personnel Administration. The contractor is required to maintain travel receipts and records for auditing purposes. No travel out of the state of California shall be reimbursed unless prior written authorization is obtained from the State.

3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

BUDGET FOR TASK THREE	TOTAL AMOUNT TASK 3 All Years	Year 1 Amount per hour	Year 1 Number of Hours	Year 1 Total Amount for Year 1	Year 2 Amount per hour	Year 2 Number of Hours	Year 2 Total Amount for Year 2	Year 3 Amount per hour	Year 3 Number of Hours	Year 3 Total Amount for Year 3
Personnel										
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
										-
										-

	Total All Years	Year 1 Amount per hour	Year 1 Number of Hours	Total Amount for Year 1	Year 2 Amount per hour	Year 2 Number of Hours	Total Amount for Year 2	Year 3 Amount per hour	Year 3 Number of Hours	Total Amount for Year 3
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ -**			**$ -**			**$ -**			**$ -**
1/ Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$0.00**			**$0.00**			**$0.00**			**$0.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -
2/ Travel and Per Diem	$ -			$ -			$ -			$ -
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor: Stillwater Sciences	$ 13,323.00			$ 13,323.00			$ -			$ -
4/ Sub-Contractor: USDA National Sedimentation Laboratory	$ 8,750.00			$ 8,750.00			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 22,073.00**			**$ 22,073.00**			**$ -**			**$ -**
5/ Overhead Percentage (Applied to Personnel & Other Costs)				$ -			$ -			$ -
Total Costs for Task Three	**$ 22,073.00**			**$ 22,073.00**			**$ -**			**$ -**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK FOUR	**TOTAL AMOUNT TASK 4 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -

	$ -	$ -		$ -	$ -		$ -	$ -		$
Personnel Subtotal	**$ -**			**$ -**			**$ -**			**$ -**
										-
1/ Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$0.00**			**$0.00**			**$0.00**			**$0.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -
2/ Travel and Per Diem	$ -			$ -			$ -			$ -
3/ Equipment	$ 30,000.00			$ -			$ 30,000.00			$ -
4/ Sub-Contractor: Stillwater Sciences	$ 101,871.00			$ 15,376.00			$ 52,079.00			$ 34,416.00
4/ Sub-Contractor: USDA National Sedimentation Laboratory	$ 51,250.00			$ 19,375.00			$ 19,375.00			$ 12,500.00
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 183,121.00**			**$ 34,751.00**			**$ 101,454.00**			**$ 46,916.00**
5/ Overhead Percentage (Applied to Personnel & Other Costs)				$ -			$ -			$ -
Total Costs for Task Four	**$ 183,121.00**			**$ 34,751.00**			**$ 101,454.00**			**$ 46,916.00**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

BUDGET FOR TASK FIVE	**TOTAL AMOUNT TASK 5 All Years**	**Year 1** Amount per hour	**Year 1** Number of Hours	**Year 1** Total Amount for Year 1	**Year 2** Amount per hour	**Year 2** Number of Hours	**Year 2** Total Amount for Year 2	**Year 3** Amount per hour	**Year 3** Number of Hours	**Year 3** Total Amount for Year 3
Personnel										
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ -**			**$ -**			**$ -**			**$ - -**
										-
1/ Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$0.00**			**$0.00**			**$0.00**			**$0.00**

Proposal Number
Proposal Name

Detailed Budget Breakdown by Task and by Fiscal Year

Applicant Name

Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -
2/ Travel and Per Diem	$ -			$ -			$ -			$ -
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor: Stillwater Sciences	$ 32,822.00			$ -			$ 32,822.00			$ -
4/ Sub-Contractor: Domenichelli and Associates	$ 42,685.00			$ 23,560.00			$ 19,125.00			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 75,507.00**			**$ 23,560.00**			**$ 51,947.00**			**$ -**
[5/]Overhead Percentage (Applied to Personnel & Other Costs)				$ -			$ -			$ -
Total Costs for Task Five	**$ 75,507.00**			**$ 23,560.00**			**$ 51,947.00**			**$ -**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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3/ Please provide a list and cost of major equipment ($5,000 or more) to be purchased, and complete "Equipment Detail" Worksheet

4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			**Year 2**			**Year 3**		
BUDGET FOR TASK SIX	**TOTAL AMOUNT TASK 6 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
Gwen Huff	$ 1,800.00	$ -		$ -	$ -		$ -	$ 45.00	40	$ 1,800.00
Cindy Lashbrook	$ 1,800.00	$ -		$ -	$ -		$ -	$ 45.00	40	$
	$ -	$ -		$ -	$ -		$ -	$ -		$ 1,800.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ 3,600.00**			**$ -**			**$ -**			**$ 3,600.00**
										-
[1/] Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$3,600.00**			**$0.00**			**$0.00**			**$3,600.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ 800.00			$ -			$ -			$ 800.00
2/ Travel and Per Diem	$ 300.00			$ -			$ -			$ 300.00
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor: Stillwater Sciences	$ 17,060.00			$ -			$ 17,060.00			$ -

4/ Sub-Contractor: Domenichelli and Assosiates	$ 195,260.00			$ -			$ 195,260.00			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 213,420.00**			**$ -**			**$ 212,320.00**			**$ 1,100.00**
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	3%			$ -			$ 6,369.60			$ 141.00
Total Costs for Task Six	**$ 223,530.60**			**$ -**			**$ 218,689.60**			**$ 4,841.00**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK SEVEN	**TOTAL AMOUNT TASK 7 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ -**			**$ -**			**$ -**			**$ - -**
										-
[1/] Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$0.00**			**$0.00**			**$0.00**			**$0.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ -			$ -			$ -			$ -
2/ Travel and Per Diem	$ -			$ -			$ -			$ -
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor: Stillwater Sciences	$ 69,621.00			$ -			$ -			$ 69,621.00
4/ Sub-Contractor: USDA National Sedimentation Laboratory	$ 26,250.00			$ -			$ -			$ 26,250.00
4/ Sub-Contractor: Dominichelli and Associates	$ 7,700.00			$ -			$ -			$ 7,700.00
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 103,571.00**			**$ -**			**$ -**			**$ 103,571.00**

[5/]Overhead Percentage (Applied to Personnel & Other Costs)				$ -			$ -			$ -
Total Costs for Task Seven	**$ 103,571.00**			**$ -**			**$ -**			**$ 103,571.00**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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4/ Please list each subcontractor and amounts (if subcontractor not selected yet, use function like "ditch construction subcontractor")

5/ Indicate rate in column immediately to the right of this cell; and provide a description of what expenses are covered by overhead. If overhead is > 15% must provide justification

		Year 1			Year 2			Year 3		
BUDGET FOR TASK EIGHT	**TOTAL AMOUNT TASK 8 All Years**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 1**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 2**	**Amount per hour**	**Number of Hours**	**Total Amount for Year 3**
Personnel										
Gwen Huff	$ 67,500.00	$ 45.00	450	$ 20,250.00	$ 45.00	450	$ 20,250.00	$ 45.00	600	$ 27,000.00
Karen Whipp	$ 25,200.00	$ 35.00	240	$ 8,400.00	$ 35.00	240	$ 8,400.00	$ 35.00	240	$ 8,400.00
Cindy Lashbrook	$ 18,000.00	$ 45.00	100	$ 4,500.00	$ 45.00	200	$ 9,000.00	$ 45.00	100	$ 4,500.00
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
	$ -	$ -		$ -	$ -		$ -	$ -		$ -
Personnel Subtotal	**$ 110,700.00**			**$ 33,150.00**			**$ 37,650.00**			**$ 39,900.00**
										-
[1/] Benefits as percent of salary				$0.00			$0.00			$0.00
Personnel Total (salary + benefits)	**$110,700.00**			**$33,150.00**			**$37,650.00**			**$39,900.00**
Other Costs	**Total All Years**			**Total Year 1**			**Total Year 2**			**Total Year 3**
Operating Expenses: (ex: seed, plant materials, irrigation supplies, software, office supplies, etc)	$ 15,150.00			$ 5,350.00			$ 4,900.00			$ 4,900.00
2/ Travel and Per Diem	$ 3,500.00			$ 1,000.00			$ 1,000.00			$ 1,500.00
3/ Equipment	$ -			$ -			$ -			$ -
4/ Sub-Contractor: Stillwater Sciences	$ 46,828.00			$ 12,110.00			$ 13,960.00			$ 20,758.00
4/ Sub-Contractor: USDA National Sedimentation Laboratory	$ 10,000.00			$ 2,500.00			$ 5,000.00			$ 2,500.00
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
4/ Sub-Contractor	$ -			$ -			$ -			$ -
Other Costs Subtotal	**$ 75,478.00**			**$ 20,960.00**			**$ 24,860.00**			**$ 29,658.00**
[5/]Overhead Percentage (Applied to Personnel & Other Costs)	3%			$ 1,623.30			$ 1,875.30			$ 2,086.74
Total Costs for Task Eight	**$ 191,763.34**			**$ 55,733.30**			**$ 64,385.30**			**$ 71,644.74**

1/ Indicate your rate, and change formula in column immediately to the right of this cell

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Proposal Number
Proposal Name

Detailed Breakdown of Equipment Purchase

Applicant Name

EQUIPMENT DETAIL

Use this worksheet as a sample of how to present project equipment costing more than $5,000. Applicants must complete a spreadsheet as shown below to present project equipment costing more than $5,000.

Task No	List of Equipment	Unit Cost	Task Total
No one piece of equipment will be purchased by the project that costs over $5,000			
		TOTAL	**$ -**

Equipment purchased for a project shall be purchased by (*Name of Contractor*) and shall adhere to State of California Contracting rules and regulations as stated in State Contracting Manual (SCM) 7.29 Equipment Purchases.

For further information please go to: http://www.ols.dgs.ca.gov/Contract+Manual/default.htm

The Contractor shall maintain an inventory record for each piece of non-expendable equipment purchased with the funds provided under the terms of this agreement. The inventory record for each piece of such equipment should include the date acquired, total cost, serial number, model identification, and any other information or description necessary to identify said equipment. Non-expendable equipment are those items of equipment that have a normal life expectancy of one year or more and an approximate cost of $5,000 or more.

Contractor shall provide DFG with a copy of the inventory record at the time an invoice is presented for reimbursement for such equipment purchase.

NOTE: Ownership and reporting requirements for equipment purchased depends upon the Contractor's type of organization (state agency, local entity, private, etc.). Specific provisions for equipment purchases shall be provided at the time contract documents are prepared.

Environmental Compliance

CEQA Compliance

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

If you are using a categorical exemption, choose all of the applicable classes below.

− Class 1. Operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination. The types of "existing facilities" itemized above are not intended to be all−inclusive of the types of projects which might fall within Class 1. The key consideration is whether the project involves negligible or no expansion of an existing use.

− Class 2. Replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced.

− Class 3. Construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure. The numbers of structures described in this section are the maximum allowable on any legal parcel, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

− Class 4. Minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

– Class 6. Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies. These may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded.

– Class 11. Construction, or placement of minor structures accessory to (appurtenant to) existing commercial, industrial, or institutional facilities, except where the project may impact on an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies.

Identify the lead agency.
East Merced Resource Conservation District
Please write out all words in the agency title other than United States (Use the abbreviation "US".) and California (Use the abbreviation "CA".).

Is the CEQA environmental impact assessment complete?
No.

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

Document Name

State Clearinghouse Number

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

The work will be carried out under a mitigated negative declaration. The EMRCD, which will serve as the lead agency, has two options available for fulfilling CEQA obligations. Option 1: The EMRCD is currently developing a permit coordination program to expedite the permitting process for restoration and conservation project on private lands. To qualify for the program, project must be of small scale and environmentally beneficially. A programmatic negative declaration is under development and will likely be completed prior to construction of activities identified in this

proposal. If this occurs AND the project identified in this proposal meet all the criteria specified in the programmatic mitigated negative declaration, CEQA and all other permitting needs will be addressed through the permit coordination program. (Programmatic mitigated negative declarations have been prepared for permit coordination in Marin, Navarro, San Luis Obispo, Santa Cruz, and San Diego counties; samples are available upon request). Option 2: If the project does not qualify for the permit coordination program, the EMRCD will prepare a mitigated negative declaration for the specific project to be covered with ERP funds. In either case, the EMRCD has agreed to act as CEQA lead for this project.

NEPA Compliance

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

Identify the lead agency or agencies.

Natural Resources Conservation Service

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

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

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

The NRCS utilizes a rigorous planning process before offering recommendations to cooperators. As a federal agency, the NRCS must ensure project works are compliant with the National Environmental Policy Act (NEPA). NRCS is required to conduct an Environmental Evaluation for assistance it provides

according to the NRCS−NEPA rules (7CFR 650), which became effective in 1979 and as updated by California Amendment CA4 in 2000. This rule prescribes the assessment procedures under which NRCS−assisted actions are to be implemented. The procedures are designed to insure that environmental consequences are considered in decisionmaking, and to allow NRCS to assist individuals and non−federal public entities to take actions that protect, enhance, and restore environmental quality. The NRCS nine step conservation planning process is used to customize a management plan unique to the conditions of a local property and its manager. A conservation plan describing the selected management system is prepared for the customer and a NEPA compliant Environmental Assessment Worksheet (EAW) is completed as part of each conservation plan. The landowner of the proposed demonstration site has already completed a conservation plan with NRCS, including EAW.

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

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

Local Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
conditional Use Permit	–	–	
variance	–	–	
Subdivision Map Act	–	–	
grading Permit	–	–	
general Plan Amendment	–	–	
specific Plan Approval	–	–	
rezone	–	–	
Williamson Act Contract Cancellation	–	–	

other	–	–	

State Permits And Approvals	Required?	Obtained?	Permit Number (If Applicable)
scientific Collecting Permit	–	–	
CESA Compliance: 2081	–	–	
CESA Complance: NCCP	–	–	
Lake Or Streambed Alteration Agreement	X	–	
CWA 401 Certification	X	–	
Bay Conservation And Development Commission Permit	–	–	
reclamation Board Approval	X	–	
Delta Protection Commission Notification	–	–	
state Lands Commission Lease Or Permit	X	–	
action Specific Implementation Plan	–	–	
SWRCB Water Transfer Approval	–	–	
other	–	–	

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

Permission To Access Property	Required?	Obtained?	Permit Number (If Applicable)
permission To Access City, County Or Other Local Agency Land Agency Name	–	–	

permission To Access State Land Agency Name	**–**	**–**	
permission To Access Federal Land Agency Name	**–**	**–**	
permission To Access Private Land Landowner Name **Cynthia Lashbrook**	**X**	**–**	

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

NRCS assistance will be used in the implementation and planning of this project. Specifically, we will be following NRCS guidelines for streambank stabilization, hedgerows and vegetated buffer strips.

Land Use

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

How many acres will be acquired by fee?

How many acres will be acquired by easement?

Describe the entity or organization that will manage the property and project activities, including operation and maintenance.

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

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

Describe briefly the provisions made to secure this access.

An agreement has been made with one property owner to access and perform work on her property. EMRCD and Stillwater Sciences accept responsibility to gain such an agreement with up to two additional landowners if funding will allow for the inclusion of more than one demonstration site. Both organizations have strong ties to the landowner communities of the Lower Merced River and do not anticipate difficulty in securing agreements with additional landowners.

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

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

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

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

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

Land Designation	Acres	Currently In Production?
Prime Farmland	**52.2 AC**	**X**
Farmland Of Statewide Importance	**5 AC**	**X**
Unique Farmland		**–**
Farmland Of Local Importance		**–**

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

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

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

The land is not under a Williamson Act contract.

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

The property listed above as Prime Farmland and Farmland of Statewide Importance is the entire farm of the landowner who has agreed to participate in the project. However, the project would only impact approximately 500 feet of property adjacent to the Merced River. Cropland would only be minimally impacted as a result of grading back the streambank.