





# BEAR CREEK WATERSHED ASSESSMENT

Western Shasta Resource Conservation District



*Confluence of Bear Creek and the Sacramento River.*

## PURPOSE

Conduct a watershed assessment for Bear Creek and Ash Creek watersheds

## PROJECT GOALS

- ✦ Gather existing data including water, geology and soils, erosion, hydrology, vegetation, fisheries, wildlife, human uses, and fire and fuels
- ✦ Identify data gaps where additional information is needed
- ✦ Determine if watershed conditions may be limiting beneficial water uses and/or anadromous and resident fish populations
- ✦ Document findings in a watershed assessment document to be used as the basis for a comprehensive watershed management plan

### AWARD AMOUNT

\$140,806

### WATERSHED

Bear Creek and Ash Creek Watersheds

### COUNTY

Shasta County

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 4

## *Benefits to the Bay-Delta System*

The value of streams such as Bear Creek can be integral and valuable in restoring ecological health to the Bay-Delta system, particularly for steelhead trout and fall-run Chinook salmon. Implementation of this project is an important step toward this restoration. A cooperative program with water users for a mutually acceptable flow schedule, that not only provides protection for downstream migrating salmon and steelhead, but also recognizes the needs of agriculture, will provide multiple benefits locally and downstream. By documenting existing conditions in the Bear Creek watershed, decision-makers and managers can make better-informed decisions regarding the use of water and natural resources in the watershed and provide the needed data to work toward a cooperative agreement that would benefit both fish and agricultural water users.

## PROJECT OVERVIEW

Bear Creek is a small eastside tributary that enters the Sacramento River 5 miles below the town of Anderson. The watershed historically supported anadromous fish species such as salmon and steelhead. However, the limited runoff in this small stream makes it difficult to meet the instream flow needs of both anadromous fish and agricultural water demands simultaneously, especially in below-normal water years.

The Bear Creek watershed community began meeting in late 2001 to address instream flow needs and degraded water quality conditions. Residents of the community soon formed the Bear Creek Coordinated Resource Management Plan (CRMP) and agreed on the need for a watershed assessment. Ash Creek, a small tributary between the Bear Creek and Battle Creek watersheds that enters the Sacramento River just south of Bear Creek, is included in the assessment. The watershed assessment will focus on land use, hydrology, water quality, stream channel morphology, fisheries and aquatic habitat, sediment sources, and recreation. The watershed assessment will provide basic information for a comprehensive watershed management plan and will support future implementation projects.

Public meetings, quarterly newsletters to property owners and interested residents, and articles and public service announcements to the local media will supplement the watershed assessment and improve communication throughout the watershed.



*The headwaters of Bear Creek: Thatcher Meadow and Latour Butte.*

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# CLEAR LAKE WATERSHED MERCURY AND NUTRIENT ASSESSMENT

Lake County Watershed Protection District



*Sediment sampling in Eight Mile Glade.*

## PURPOSE

Determine mercury and nutrient inputs to Clear Lake to support the development and implementation of water quality protection measures

## PROJECT GOALS

- ✦ Estimate average annual mercury and nutrient input (loads) to Clear Lake
- ✦ Develop an adaptive water quality monitoring program
- ✦ Identify sources of mercury within the watershed
- ✦ Provide data for use in implementation of Clear Lake Mercury Total Maximum Daily Load (TMDL) and support the implementation of the Clear Lake Nutrient TMDL
- ✦ Coordinate the monitoring and assessment program with local property owner groups, local organizations, Native American tribes, the USDA Natural Resources Conservation Service, and the Central Valley Regional Water Quality Control Board (CVRWQCB)

## AWARD AMOUNT

\$147,182

## WATERSHED

Cache Creek Watershed

## COUNTY

Lake County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 1, State Assembly: 1, State Senate: 2

## *Benefits to the Bay-Delta System*

Clear Lake is the headwaters of Cache Creek, a tributary to the Sacramento River and the Bay-Delta. This project provides direct benefits to wildlife and human health by identifying watershed mercury sources to Clear Lake and determining solutions to reduce mercury in the lake and the Bay-Delta. The project also provides benefits to local residential, recreational, and commercial interests by facilitating programs to reduce nutrient loads and eliminate seasonal algal blooms, which affect tourism and sport fishing. Implementation of this project will benefit five Native American tribes who use resources of the lake and watershed, local business owners, tourists, sport fishermen, and the East Lake and West Lake Resource Conservation Districts by improving the water quality of Clear Lake. The general public benefits from this project through the implementation of Total Maximum Daily Loads (TMDLs) in cooperation with the CVRWQCB and the U.S. Environmental Protection Agency.

## PROJECT OVERVIEW

Clear Lake is located in the central Coastal Range of Northern California and is the headwater of Cache Creek, which is a tributary to the Sacramento River and the Bay-Delta. Historical mercury mining activities in the watershed have increased mercury loads entering the lake. Nutrient loads to the lake, particularly phosphorus, have caused seasonal algal blooms despite improved erosion control management. The mercury and nutrient loads have impaired the beneficial uses of Clear Lake, including fishing, recreation, and fish and wildlife habitat. In an effort to restore these beneficial uses, the CVRWQCB has adopted a Clear Lake Mercury TMDL and is developing a Clear Lake Nutrient TMDL to reduce the mercury and nutrient loading to Clear Lake.

The Lake County Watershed Protection District is determining mercury and nutrient loads to Clear Lake to support TMDL development and implementation. The District works in coordination with the CVRWQCB with input from local property owner groups, local resource conservation districts, Yolo County, the Cache Creek Conservancy, five Native American tribes, the Delta Tributary Mercury Council, and the USDA Natural Resources Conservation Service. The project quantifies mercury and nutrient loading from major tributaries to the lake by collecting water quality samples at multiple times during the year and at varying flow regimes. The project also collects additional water quality samples throughout the watershed to identify mercury hotspots. The monitoring program will be evaluated at the end of each sampling period and revised, if necessary, in cooperation with the CVRWQCB. Public meetings encourage volunteer participation and provide opportunities for public input.



*Stream sampling in the upper watershed.*

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*Foresthill shaded fuel break demonstration site before treatment.*

**PURPOSE**

Protect urban areas within the Bear and American River watersheds from fire dangers while recognizing the natural fire ecology of the Sierra Nevada

**PROJECT GOALS**

- ✦ Implement a network of shaded fuel breaks at the urban-wildland interface
- ✦ Protect urban areas and residents from fire dangers
- ✦ Determine the impact of fuel reduction measures on water quality
- ✦ Implement a region-wide approach to accommodating the natural fire cycle
- ✦ Educate the public about fire management strategies

**AWARD AMOUNT**

\$99,700

**WATERSHED**

Upper Bear River and North Fork American River Watersheds

**COUNTY**

Placer County

**CALFED REGION**

Sacramento Valley Region

**LEGISLATIVE DISTRICTS**

US Congress: 4, State Assembly: 4, State Senate: 1

*Benefits to the Bay-Delta System*

The American River and the Bear River originate in the Sierra Nevada and provide a significant amount of flow to the Sacramento River and the Bay-Delta. Excess fuel loads (vegetation) within these watersheds, because of historical fire suppression policies, have created conditions that can lead to very hot, catastrophic fires, rather than to a natural cycle of frequent, moderate fires. These fires have severe impacts on urban development and the soil, air, and water resources in these watersheds. This project will provide direct benefits to urban and suburban developments and will promote improved soil, air, and water resources within these watersheds by developing a regional approach to the natural fire cycle. Improved fire management will also benefit water quality in the Bay-Delta by reducing sediment and pollutant loading from severely burned areas. Recreation, water supply, wildlife, and plant communities of these watersheds also benefit in the long term with reduced fuel load, more frequent, moderate fires, and a more natural fire ecology.

## PROJECT OVERVIEW

The American River and the Bear River originate in the Sierra Nevada and flow into the Sacramento River and ultimately into the Bay-Delta. Historical fire suppression has affected the quantity of vegetation (or fuel loading) within the American River and Bear River watersheds and the watershed ecosystems that are dependent on a natural cycle of frequent, moderate fires. Catastrophic fires are more likely to damage urban areas and the extensive development along the urban-wildland interface. Because the American River is a major tributary to the Sacramento River, impacts on water quality in these watersheds substantially affect the water quality of the Sacramento River and the Bay-Delta.

The City of Colfax is collaborating with the Ponderosa Fire Safe Council, the American River Watershed Group, the American River Watershed Institute, and established stakeholder forums to develop a fire management plan to protect urban communities from catastrophic fires and reduce potential water quality impacts resulting from these fires. Vegetation assessment and fire modeling in the Ponderosa Fire Safe Council project area will provide a basis for the fire management plan. The assessment and modeling will determine current fuel load and inform the project team of optimal areas to implement shaded fuel breaks. This project develops a GIS database of the ecological and geological features of the watersheds. A network of shaded fuel breaks constructed by individual private landowners will further separate urban development from wildland areas and accommodate the natural fire cycle. Citizen monitoring conducted prior to and following implementation of each shaded fuel break will evaluate the potential short-term impacts on water quality. This project includes a media tour of the completed shaded fuel breaks at which information about fire management strategies will be disseminated to the general public.



*Foresthill shaded fuel break demonstration site after treatment.*

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# COTTONWOOD CREEK WATERSHED STRATEGY

Cottonwood Creek Watershed Group



*An example of erosion that occurs each year during storm events on Cottonwood Creek. Such erosion will be addressed in the lower 12 to 15 miles of the channel.*

## PURPOSE

Develop a watershed management strategy based on the watershed assessment and stakeholder participation

## PROJECT GOALS

- ✦ Identify watershed management objectives
- ✦ Recommend specific management or restoration actions
- ✦ Build capacity of the Cottonwood Creek Watershed Group to coordinate management, restoration, and monitoring activities

## AWARD AMOUNT

\$200,000

## WATERSHED

Cottonwood Creek Watershed

## COUNTY

Shasta County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2 and 3, State Assembly: 2, State Senate: 4

## *Benefits to the Bay-Delta System*

The Cottonwood Creek watershed is a tributary to the Sacramento River, which is a significant water supplier to the Bay-Delta and an integral component of the Bay-Delta system. Ecosystem health and water quality within the Bay-Delta are dependent on the quality of water from upstream areas. This project will develop a comprehensive management strategy for the Cottonwood Creek watershed. Restoration projects that stem from the management plan will result in improved habitat, water quality, and water supply reliability. These improvements will directly benefit fish and wildlife as well as the local community. Implementation of this project will also provide benefits to the Bay-Delta, predominantly through salmonid habitat and water quality improvements. Although Cottonwood Creek is located many miles from the Delta, its status and health are ultimately reflected in the health of the Delta.

## PROJECT OVERVIEW

Cottonwood Creek is the largest undammed tributary on the west side of the Sacramento Valley. It drains an area of 930 square miles and enters the Sacramento River just downstream of the Redding/Anderson area. Cottonwood Creek watershed supports a number of sensitive species, including Chinook salmon, steelhead trout, northern spotted owls, and foothill yellow-legged frogs. Many studies have been conducted in the past on the creek's hydrology and sediment transport process. Additionally, the Cottonwood Creek Watershed Group (CCWG) recently completed an assessment of the entire watershed. CCWG is a nonprofit organization composed of landowners, business owners, agency representatives, and other local stakeholders. Building on this assessment, the CCWG is now working on a comprehensive management strategy for the watershed.

The watershed management strategy describes the desired condition of the watershed and outlines watershed management activities aimed at achieving that condition. The plan also provides direction for future watershed management activities, including those conducted by public agencies and private interests. The plan is being developed through an active public outreach/stakeholder involvement process and focuses on the following issue areas: erosion and sedimentation, flooding, rangelands, timber, green belts/riparian corridors, aquatic habitats, terrestrial habitats, groundwater, and water quality.



*A pond left behind from the days of placer mining. Property owners are removing the piles of rock and plan to restore the area.*

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*Crossing before: Failing 25-year-old log stringer bridge at Swamp Creek, an intermittent tributary to Deer Creek (photo courtesy of Collins Pine Company and USFS).*

## PURPOSE

Reduce sediment discharge into Deer Creek by implementing nine restoration projects

## PROJECT GOALS

- ✦ Maintain the high quality of Deer Creek water by managing roads and watercourse crossings to reduce excess erosion and sedimentation
- ✦ Maintain viable anadromous fish spawning and rearing habitat

## AWARD AMOUNT

\$493,175

## WATERSHED

Deer Creek Watershed

## COUNTY

Tehama County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 3, State Assembly: 2, State Senate: 4

### *Benefits to the Bay-Delta System*

Watershed planning through the locally driven Deer Creek Watershed Conservancy will help to preserve and restore spring-run Chinook salmon and steelhead trout and other important attributes of the watershed. In addition to providing direct benefits to the creek's fish populations, the improved water quality resulting from this project will also benefit Deer Creek's water users, and ultimately contribute to a healthier Bay-Delta.

## PROJECT OVERVIEW

Deer Creek is a secondary tributary to the Sacramento River. The watershed drains 200 square miles and is 60 miles long. Deer Creek is home to highly valued populations of spring-run Chinook salmon and steelhead, as well as populations of other Chinook salmon and resident native fish. It contributes valuable surface water for agriculture, recreation, and fish and wildlife habitat. The watershed also provides timber resources for both private companies and the U.S. Forest Service.

The Conservancy participated in a comprehensive, systematic road and sediment source survey of Deer Creek in 1996. The survey identified the major sediment-producing sites in the upper watershed. This study found sediment yields were highest from sources related to roads, and were tied closely to geology. The greatest yields were from areas underlain with rhyolite and dacitic pyroclastic rocks. As a result of the survey, 44 significant sites were identified and prioritized.

This project implements restoration projects in nine of the 44 identified sites within a 3-year timeframe. Work includes upgrading culverts to meet 100-year flows, installing structures at stream-crossings to improve fish passage and reduce the potential for crossing failure, and narrowing roads and improving drainage on roads to reduce sedimentation and erosion. This implementation project is carried out by the Deer Creek Watershed Conservancy, a nonprofit organization composed of many different stakeholders. The project stems from the organization's comprehensive watershed management plan, which was completed in 1998.



*Crossing after: Log stringer bridge has been replaced with an 8-foot-high, 12-foot-wide squashed culvert (photo courtesy of Collins Pine Company and USFS).*

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# GLENN COUNTY SURFACE WATER STEWARDSHIP

Glenn County Department of Agriculture



*A guest speaker from the USGS discusses federal programs during a field day at one of the project's research/demonstration sites.*

## AWARD AMOUNT

\$275,000

## WATERSHED

Lower Sacramento River Watershed

## COUNTY

Glenn County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 3, State Assembly: 2, State Senate: 4

## PURPOSE

Continue a pesticide and water quality management education program to enable and empower growers to effectively reduce water quality problems associated with orchard runoff

## PROJECT GOALS

- ✦ Provide education to growers about orchard management practices that reduce pesticide use and pesticide runoff
- ✦ Maintain demonstration buffer strip sites as working nonpoint-source pollution reduction models for growers
- ✦ Establish a demonstration site to examine feasibility of rice straw compost as a water quality management strategy
- ✦ Conduct a study to measure and quantify the amount of pesticide that drifts off site after typical orchard application (referred to as regional atmospheric deposition)

### *Benefits to the Bay-Delta System*

Water quality tests of the surface waters in the Central Valley and Bay-Delta system repeatedly have found pesticide levels toxic to aquatic life. The highest concentrations of pesticides in surface water are attributed to orchard runoff. The Glenn County Surface Water Stewardship program develops a pesticide/water management education program to promote awareness among local growers about cost-effective best management practices to reduce pesticide runoff and other nonpoint-source pollution from their orchards. This project benefits local surface waters and the Bay-Delta system by teaching growers how to keep downstream waters safe for aquatic life and beneficial uses, and by performing research to fill in data gaps related to pesticide dispersal and pesticide remediation techniques. It also benefits the local growers by demonstrating cost-effective management strategies that create sustainable orchards, as well as help meet water quality compliance regulations.

## PROJECT OVERVIEW

The Glenn County Surface Water Stewardship program addresses nonpoint-source pollution associated with pesticide, sediment, and nutrient runoff from orchards. It expands existing outreach, education, research, and water quality management programs. The project develops pesticide and water management education with field days, farm tours, newsletters, and the media. It provides environmental education and promotes local grower awareness of cost-effective best management practices to reduce nonpoint-source pollution.

This project establishes two demonstration orchards to provide essential information to landowners on best management practices that reduce nonpoint-source pollution associated with runoff after winter storm events. The demonstration orchards (almond) will use and compare different types of vegetative buffer filter strips. Each site includes land preparation, herbicide use, fertilization, seed sowing, and irrigation practices. Each will have a control area that will be studied for a minimum of three years to assess management-measure effectiveness. Another demonstration will examine the feasibility of using rice straw compost as a management strategy to remediate soil that has been exposed to pesticides.

The project involves additional research to measure and quantify the amount of pesticide that drifts off site after typical orchard application. This reconnaissance study assesses the deposition of pesticides on soil and water surfaces relative to local pesticide application and to ambient regional sources. When complete, the project will help fill research data gaps and demonstrate practical, cost-effective means for farmers to control or mitigate off-site pollution.



*At this research/demonstration site, planted native grasses act as a buffer strip and control area with an auto sampler to catch water runoff.*

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# INVENTORY, ERADICATION, AND MONITORING OF INVASIVE SPECIES

Lake County Watershed Protection District



One of the 108 locations of *Arundo donax* along the shores of Clear Lake.

## PURPOSE

To educate the public about *Arundo donax* and *Tamarix* spp., two invasive plant species of concern; to inventory and eradicate the plants; and to monitor the effectiveness of eradication

## PROJECT GOALS

- ✦ Eradicate *Arundo donax* in the project area
- ✦ Inventory *Tamarix* spp. for future eradication efforts
- ✦ Restore riparian habitat
- ✦ Work with local watershed groups to increase public awareness of invasive species and how they affect riparian function

### AWARD AMOUNT

\$181,262

### WATERSHED

Cache Creek and Putah Creek Watersheds

### COUNTY

Lake County

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 1, State Assembly: 1, State Senate: 2

## *Benefits to the Bay-Delta System*

Nonnative species removal is critical to the health of the state's water systems. The health of the upper Cache and Putah Creek watersheds can be improved by reducing wildfire fuels and minimizing sediment input to the stream by implementing practices to protect streamflows, stream channels, and riparian habitat. Efforts to control or eradicate *Tamarix* spp. and *Arundo donax* infestations in these watersheds will allow natural vegetation succession by native plant species. Direct benefits include decreased wildfire threat, enhanced riparian corridors and habitat, and overall improved watershed health. Each of these benefits contributes to improved water quality, reduced water use by water-sucking nonnative plants, and improved discharge to the Bay-Delta system.

## PROJECT OVERVIEW

Lake County contains the headwaters of Cache Creek and Putah Creek. Both watersheds are plagued by two invasive plant species - *Arundo donax* and *Tamarix* spp., which are listed among 100 of the “world’s worst invaders” in the Global Invasive Species Database. Once established, these species displace native riparian vegetation and provide poor habitat for terrestrial insects and wildlife. *Arundo donax* and *Tamarix* spp. trap sediments and narrow flood channels, leading to accelerated erosion and overbank flooding. *Arundo donax* is prone to wildfire and debris blockages that often lead to public and private infrastructure damage. Additionally, because *Tamarix* spp. develops a very dense root system that can reach 30 feet in depth, it lowers the water table, causing native vegetation disappearance and the soil salt chemistry to change.

This project builds on previous eradication efforts undertaken by the County over the past three years, including identifying, mapping, and eradicating primary sources of *Arundo donax*. Volunteers using a variety of cutting methods continue eradication efforts. *Tamarix* spp. site information is collected concurrently with site information for *Arundo donax*. The information is put into a Geographic Information System (GIS) database for future eradication. Surveying and monitoring protocols have been developed and used for collecting site information and monitoring success of eradication projects. This project also includes the development of a revegetation plan and an invasive species management plan, including a public outreach and education strategy.



*Active watershed groups making a difference in Scotts Valley.*

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# LOWER CLEAR CREEK SPAWNING GRAVEL INJECTIONS

*Western Shasta Resource Conservation District*



*Lower Clear Creek gravel injections site at Placer Bridge.*

## PURPOSE

Increase the amount of in-channel gravel substrate available in Lower Clear Creek to address a limiting factor for anadromous salmonid production

## PROJECT GOALS

- ✦ Increase instream spawning and rearing habitat for anadromous fish (Chinook salmon and steelhead trout)
- ✦ Monitor gravel movement
- ✦ Improve channel and floodplain ecological functions

## AWARD AMOUNT

\$335,489

## WATERSHED

Clear Creek Watershed

## COUNTY

Shasta County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 4

## *Benefits to the Bay-Delta System*

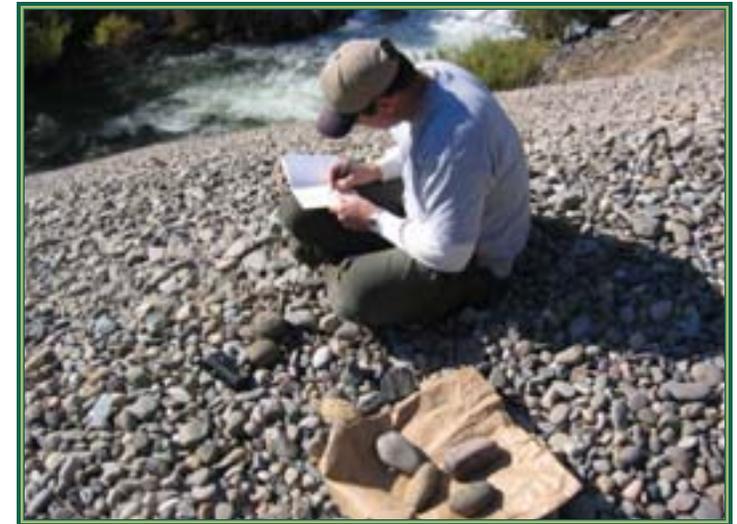
This project increases the instream spawning gravel substrate to improve salmonid production and provides improvements to the channel floodplain and ecological functions of the Lower Clear Creek watershed. Clear Creek, located in Shasta County, is an important tributary to the Sacramento River. Gravel enhancements in Clear Creek will provide spawning habitat from Whiskeytown Dam to the Sacramento River. This project fosters local efforts in watershed management. The restoration work has involved the cooperative efforts of numerous federal, state, and local agencies, local landowners, and Native American tribes, who will benefit from the restoration of anadromous salmonid habitat in the watershed. Restoration efforts can lead to significant increases in fall-run Chinook salmon spawning populations. The local economy will benefit from this project, as it has been estimated by the U.S. Department of Agriculture that each salmon caught in the Sacramento River generates \$1,000 in local revenues.

## PROJECT OVERVIEW

Lower Clear Creek has been identified as an important stream for anadromous fish in the Sacramento Valley. A significant portion of the Clear Creek channel is in substantial sediment deficit as a result of past gravel extraction activities and blockage of upstream gravel sources by Whiskeytown Reservoir. This project is part of a larger comprehensive watershed restoration program that has been actively implementing restoration actions since 1995 to address all factors limiting production of anadromous salmonids in lower Clear Creek.

The Lower Clear Creek Spawning Injection project augments gravel resources in the Clear Creek stream channel to restore anadromous salmonid spawning and rearing habitat. The project uses an injection method that stockpiles clean, appropriately sized gravel on the stream bank. High winter flows move the gravel into the channel. This method is beneficial for its low cost and minimal environmental disturbance.

This project monitors gravel movement by photo monitoring during low-to-normal flow regimes and by radio telemetry during high flow regimes when visual observation is difficult. Six transmitters are installed in gravel rocks of various sizes at each gravel injection site to track gravel movement by telemetry. As the rocks move downstream, they are located using the signals broadcasted by the transmitters.



*Western Shasta RCD Projects Manager Michael Harris records gravel monitoring data at Placer Bridge gravel injections site.*

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# NORTH YUBA RIVER WATERSHED IMPROVEMENT: ABANDONED MINE RECLAMATION AND RESTORATION

Sierra County Board of Supervisors



*The North Yuba River.*

## PURPOSE

Restore watershed functions in the North Yuba River and its tributaries

## PROJECT GOALS

- ✦ Reduce sedimentation
- ✦ Provide geomorphic stabilization in disturbed areas
- ✦ Improve water quality, including drinking water quality
- ✦ Foster a collaborative work group within the Watershed Council
- ✦ Increase interest in and understanding of the watershed and its resources
- ✦ Contribute to the local economy

### AWARD AMOUNT

\$217,000

### WATERSHED

Yuba River Watershed

### COUNTY

Sierra County

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 3, State Senate: 1

### *Benefits to the Bay-Delta System*

The North Fork Yuba River is a major tributary to the Yuba River, which, in turn, is an important tributary to the Sacramento River. This project delivers both local benefits and broader public benefits of improved habitat for fish and wildlife downstream. Restoration of the mining sites in the North Fork Yuba River watershed improves water quality by reducing sediment loads, benefiting local fish and the Chinook salmon and steelhead downstream in the Yuba River. Replacing nonnative vegetation with native vegetation improves habitat for local wildlife species. The improved conditions provide greater opportunity for sport fishing and other recreational pursuits. Improved stream stability provides additional benefits by reducing maintenance costs for streamside landowners.

## PROJECT OVERVIEW

The North Yuba River flows through Sierra County on the west slope of the Sierra Nevada. New Bullards Bar Reservoir is the only impoundment on the North Yuba River; above it, the river is free-flowing with no water diversions. Just downstream of New Bullards Bar Reservoir, the North Yuba River flows into the Yuba River, a major tributary to the Sacramento River and the Bay-Delta. The quality of water from the North Yuba River is an important influence on the quality of water in the mainstem of the Yuba River, which supports steelhead and fall- and spring-run Chinook salmon.

Historical mining and more recent activities have altered flows, threatened water quality, and degraded fish and wildlife habitat at abandoned mine sites in the North Yuba River watershed. Abandoned mines and roads have been shown to contribute a majority of the sediment to watercourses in the North Yuba watershed. Erosion from these sites is affecting soil productivity, hydrologic conditions, vegetation, and aquatic and riparian resources.

The Sierra County Fire Safe and Watershed Council, working as advisors to the Sierra County Board of Supervisors and composed of local residents and private property owners, has formed partnerships with industry and government representatives to lead an effort to reclaim and restore up to five inactive mine sites in the North Yuba River watershed. These sites were selected based on a number of criteria, including: availability of recent site-specific information from existing surveys, a high probability of successful outcomes, good access and visibility, and the existence of multiple resources that would benefit from the restoration. All sites involve neglected access roads, which cause undue sedimentation to nearby streams, and have been identified as having opportunities for wildlife habitat improvements.

Work at these sites includes reestablishment of natural hydrology, removal of non-eligible historic structures, stabilization of soils around abandoned roads, removal of abandoned equipment, removal and remediation of hazardous materials on site, and removal of nonnative vegetation. Restoration includes planting native vegetation, restoring meadows, enhancing hardwood and aspens, and increasing bird nesting through the installation of bird boxes. Work is being undertaken by contractors and through a volunteer partnership with the Nevada Union High School Adopt-A-Stream program.



*Lower Brush Creek Mine Road project.*

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# PUTAH CREEK—YOLO HOUSING AUTHORITY PROJECT

Solano County Water Agency



*This California black sedge estuary is a unique feature of Yolo Housing on Lower Putah Creek.*

## PURPOSE

Restore riparian vegetation, instream wetland, and fish spawning habitat at the Yolo Housing Authority property along lower Putah Creek

## PROJECT GOALS

- ✦ Restore and enhance riparian vegetation, instream wetland, and fish spawning habitat with the combined involvement of landowners, tenants, and local agencies
- ✦ Monitor restoration efforts to assess performance
- ✦ Educate landowners and support watershed stewardship

### AWARD AMOUNT

\$279,655

### WATERSHED

Putah Creek Watershed

### COUNTY

Solano and Yolo Counties

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 3, State Assembly: 8, State Senate: 4

### *Benefits to the Bay-Delta System*

The Yolo Housing Authority (YHA) property is located along lower Putah Creek. This project restores riparian vegetation, instream wetland, and fish spawning habitat at the YHA property. Because the property's habitat is degraded relative to upstream and downstream areas, restoration of the site will improve the riparian corridor, which is part of a wildlife migration pathway from the north coast to the Bay-Delta. Benefits of these actions include improved habitat for fall-run Chinook salmon, steelhead, Pacific lamprey, and resident fish populations as well as migratory birds, raptors, northwestern pond turtle, valley elderberry longhorn beetle, and numerous other sensitive and common species dependent on the rare strips of riparian habitat along Central Valley waterways. Other benefits include erosion control and trash cleanup, resulting in improved water quality and community involvement, improved neighborhood relations, and educational opportunities. This project is an important step forward for a priority restoration site.

## PROJECT OVERVIEW

Putah Creek's riparian corridor links the Yolo Bypass wildlife area with contiguous natural areas that extend from Lake Berryessa to Clear Lake and into the Mendocino National Forest, forming a significant wildlife migration pathway from the north coast to the Bay-Delta. The Yolo Housing Authority (YHA) property is a public housing development located along lower Putah Creek,  $\frac{3}{4}$  of a mile east of the Highway 505 overcrossing of the creek. This property is degraded as a result of invasive nonnative vegetation and illegal dumping. There are more submerged tires and other debris per square foot at the YHA property than at any other location along the 23 miles of lower Putah Creek. Because the site is particularly degraded relative to upstream and downstream areas, restoration of the site will improve the riparian corridor.

This project engages local landowners and tenants of the YHA property in dialogues about trespassing and illegal trash dumping in the neighborhood and involves them in the removal of illegally dumped debris; abatement of invasive nonnative vegetation such as eucalyptus, tree-of-heaven, and Himalayan blackberry; and restoration of riparian, wetland, and Valley oak woodland plant communities and fish spawning habitat along lower Putah Creek. Creating fish spawning habitat involves installation of a boulder bar and placement of spawning gravels. The YHA project also includes monitoring aquatic invertebrates, birds, and fish. Through the physical restoration of the site, this project builds community among residents and engages them as stewards of their environment.



*Legacy solid wastes will be cleaned up as part of the restoration project.*

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*Algal bloom on Lower Deer Creek. Studies are underway to determine its causes and to plan remediation actions.*

**PURPOSE**

Improve watershed health and address the degradation of Deer Creek resulting from historical gold mining practices

**PROJECT GOALS**

- ✦ Describe the hydrology and geomorphology of Deer Creek
- ✦ Conduct a sediment study
- ✦ Develop a restoration plan
- ✦ Conduct water quality monitoring
- ✦ Implement erosion control projects
- ✦ Build local capacity to effectively manage the watershed

**AWARD AMOUNT**

\$360,000

**WATERSHED**

Deer Creek Watershed

**COUNTY**

Nevada County

**CALFED REGION**

Sacramento Valley Region

**LEGISLATIVE DISTRICTS**

US Congress: 2, State Assembly: 3, State Senate: 1

*Benefits to the Bay-Delta System*

Deer Creek is a major tributary to the Yuba River and one of the few remaining wild steelhead fisheries in the Central Valley. Implementation of this project will help benefit downstream and local communities by limiting the amount of sediment and mercury entering the Bay-Delta system and by improving water quality. These improvements will directly benefit the highly valued population of steelhead trout, Chinook salmon, and other anadromous and resident fish, as well as downstream urban water users. Improved water quality, restored streambanks, and improved ecological health of the creek will also benefit the local community and encourage its citizens to take pride in their watershed and to safely use the local watershed for recreational activities.

## PROJECT OVERVIEW

Deer Creek is a main tributary to the Lower Yuba River below Englebright Dam. Rich deposits of gold were discovered in Deer Creek and the surrounding watershed in the late 1800s. As a result, Deer Creek was severely degraded and altered by gold mining activities. Following the cessation of hydraulic mining, the river incised and left behind gold mining debris and mercury deposits. Today, this material is mixed with the sediment of Upper Deer Creek, resulting in high sediment loads. The high sediment loads not only affect the instream ecology of the creek, but also contribute to heavy sediment loads in the lower Yuba River that threaten salmon and steelhead populations.

The Deer Creek watershed is now under the stewardship of a rural coalition composed of city and county governments, state and federal agencies, local nonprofit organizations, local landowners, and educational and youth groups. The intent of this coalition is to develop a restoration model for a river that flows through the center of a small Gold Country town. Restoring Deer Creek builds on work previously conducted, including the preparation of watershed assessments and identification of priority actions. This project will achieve a better understanding of the watershed by assessing the hydrology and geomorphology of the creek, analyzing the flow regime, and conducting a sediment study. This information will be added to the previous data to develop a restoration plan to improve habitat value and water quality. The restoration component of one of the project elements includes relocation of a footbridge, streambank revegetation and stabilization, and trash removal.



*The Friends of Deer Creek lab, which is used for research, training, and public outreach.*

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*Pitcher plant bog threatened by sediment from eroded logging road.*

## **PURPOSE**

Improve water quality of the South Yuba watershed, strengthen local stewardship education programs, and foster education and sustainable forest management practices

## **PROJECT GOALS**

- ✧ Reduce erosion and sedimentation within the South Yuba River watershed
- ✧ Build community capacity to implement forest restoration and fuel reduction projects
- ✧ Educate the public about forest ecosystems, sustainable forest management and restoration, and fire ecology
- ✧ Educate the public and schoolchildren about water quality and watershed health

### **AWARD AMOUNT**

\$300,536

### **WATERSHED**

Yuba River Watershed

### **COUNTY**

Nevada County

### **CALFED REGION**

Sacramento Valley Region

### **LEGISLATIVE DISTRICTS**

US Congress: 2, State Assembly: 3, State Senate: 2

### *Benefits to the Bay-Delta System*

The South Yuba River watershed drains into the mainstem of the Yuba River at Englebright Dam and ultimately into the Sacramento River. Improved conditions in the South Yuba provide downstream benefits to public and private users of water from the system. The extensive public outreach and education efforts of the South Yuba Watershed Project contribute to the improvement of source water quality of the Bay-Delta and reduction of sediments into Englebright Lake. Timber supply interests also benefit from improvements in the sustainability of timberlands. The South Yuba watershed community benefits from this project's financial and technical assistance for private land improvements and added protection against fire damage. This project benefits the general public by promoting watershed stewardship and sustainable forest management practices, and by reducing long-term water quality problems and fire danger.

## PROJECT OVERVIEW

Flows in the South Yuba River enter the mainstem of the Yuba River at Englebright Dam and are then transported to the Feather River, the Sacramento River, and ultimately the Bay-Delta. The South Yuba River's watershed has excess fuel buildup in its forests, altered hydrology in some locations, and numerous water quality issues. Excess fuel buildup has become a major concern for forest health, water quality, human safety, and overall watershed management. Altered hydrology has increased sediment loads to the Pat Yore Flat fen system, which are detrimental to the moss and plant species living in the fen. Water quality issues include the release of mine tailings containing heavy metals, and sediment erosion from trails. Soil-borne pollutants released into local surface waters also affect the water quality of Lake Englebright.

To promote greater watershed health, the Nevada County Land Trust is implementing this project with the support of the Yuba/Bear Watershed Council, California State Parks, Tahoe National Forest, Nevada County Public Schools, Sequoia Challenge, Yuba Watershed Institute, the local resource conservation district, Bureau of Land Management, Nevada County Irrigation District, South Yuba River Citizens League, Nevada County Department of Transportation, and Sierra Pacific Industries. This project supports healthy, sustainable forests in the South Yuba River watershed through sharing the cost of an expanded fuel reduction education program with private landowners, subsidizing consulting services for private landowners, and supporting a sustainable forestry program that makes it economically feasible for landowners to practice sustainable forestry.

The community capacity for watershed and forest management is greatly enhanced by this project's multiple workshops on mature forest management, demonstrations by the Yuba Watershed Institute on natural history and forest practices, an expanded watershed education program at the Bridgeport Natural Science Center, and fire ecology workshops and demonstrations. The water quality of the South Yuba River watershed and the Bay-Delta is improved by erosion reduction in the watershed via the project's Excelsior/South Yuba Mining Canal restoration, restoration of the natural hydrology in Pat Yore Flat fen, and restoration of the abandoned Ancho Erie gold mine. In addition, the project improves watershed stewardship through extensive outreach efforts to all South Yuba watershed residents and stakeholders.



*Surveying areas of erosion potential on the Independence Trail near Nevada City.*

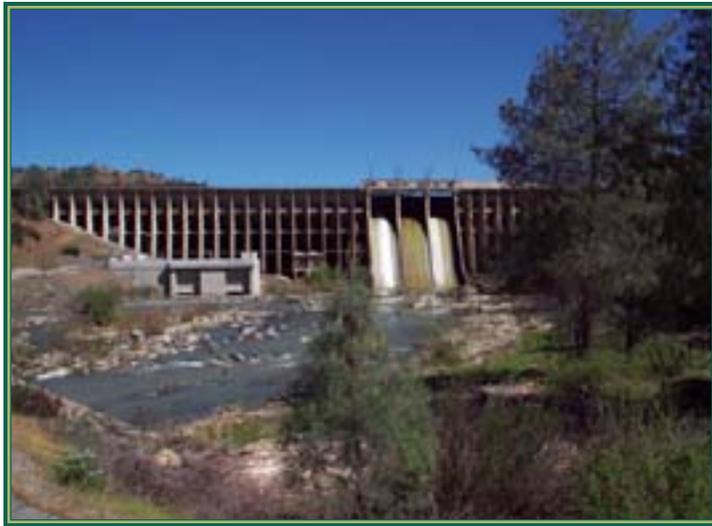
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# STONY CREEK WATERSHED MANAGEMENT PLAN

Glenn County Resource Conservation District



*Stony Gorge Dam near Elk Creek (Photo courtesy of Cindy Horney).*

## PURPOSE

Hire a watershed coordinator to bring together individuals from various backgrounds to outline a watershed management strategy that will establish protocols for conducting baseline assessments for the watershed, identify potential projects, and conduct and coordinate watershed activities.

## PROJECT GOALS

- ✦ Improve public outreach and increase environmental education opportunities
- ✦ Compile and analyze existing watershed information and identify information gaps
- ✦ Identify a list of projects and methods to improve watershed conditions
- ✦ Establish a watershed monitoring program

### AWARD AMOUNT

\$200,000

### WATERSHED

Stony Creek Watershed

### COUNTY

Glenn County

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 1

## *Benefits to the Bay-Delta System*

The Stony Creek watershed is a tributary to the Sacramento River, which is a significant water supply source to the Bay-Delta and an integral component of the Bay-Delta system. Ecosystem and water quality in the Bay-Delta is dependent on the quality of water from upstream areas. Improving the quality of discharge from Stony Creek will provide benefits to the lower Sacramento River and the Delta, including recreation, water supply, and wildlife. Improvements made within the watershed will provide recreational, water supply, and wildlife benefits to local citizens as well.

## PROJECT OVERVIEW

The Stony Creek watershed includes an area of 700 square miles. It is the second largest Sacramento River tributary on the west side of the Sacramento Valley. Principal issues of concern in the watershed include altered flow regime attributable to dam operations; loss of quality stream and riparian habitat; accelerated erosion and sediment deposition; property damage from flooding and channel bank erosion; decline in wildlife, fish, and birds; and invasion of exotic plant species (primarily *Arundo donax* and *Tamarisk*). This project provides funding for a watershed coordinator to organize efforts to address these issues. The coordinator will serve as a liaison among resource agencies, landowners, and other stakeholders. Key tasks of the watershed coordinator include conducting public outreach and environmental education activities, facilitating stakeholder meetings, compiling and analyzing existing watershed information, facilitating the identification of methods to improve watershed conditions, establishing a watershed monitoring program, developing a quarterly newsletter regarding the health and opportunities for improvements of the Stony Creek watershed, and managing the existing *Arundo donax* mapping and eradication restoration project.



Picnic area at the East Park Reservoir (Photo courtesy of Cindy Horney).

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# TEHAMA WEST WATERSHED ASSESSMENT

*Tehama County Resource Conservation District*



*Forested lands in western Tehama County.*

## AWARD AMOUNT

\$199,500

## WATERSHED

Thomes Creek and Elder Creek Watersheds

## COUNTY

Tehama County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 4

## PURPOSE

Conduct an assessment of the Tehama West watersheds, which include the westside tributaries of the Sacramento River between Cottonwood Creek and Stony Creek

## PROJECT GOALS

Prepare a document that:

- ✦ provides a package of tools to efficiently guide implementation of watershed improvements
- ✦ helps to develop solutions that protect the resource-based economy of the region
- ✦ leads to a cooperative non-regulatory effort to improve the ecosystem in the watershed
- ✦ educates stakeholders and serves as a repository of information about the watershed

## *Benefits to the Bay-Delta System*

The reach of the Sacramento River within this project's area is a very important spawning and rearing area for anadromous fish. The management support developed through this project will enable restoration of the creeks, providing ecosystem benefits within the watershed, in the mainstem of the Sacramento River, and for the Bay-Delta system as a whole. These could include improvements to habitat for species of special importance to the CALFED Program, including winter-run Chinook salmon and steelhead, and to the species that occupy wetland/vernal pool and riparian habitats. Reductions in the fine sediment load discharged from this watershed to the Sacramento River provide benefits to the ecosystem and to downstream water users. Local benefits include improved ecological conditions, reduced maintenance costs for local landowners, and diminished pressures on land use choices owing to improved conditions for special-status species in the watersheds.

## PROJECT OVERVIEW

The creeks in the Tehama West watershed flow from the east slopes of the coast range to the Sacramento River below Red Bluff Diversion Dam. The area includes 1,440 square miles, and the principal waterways are Thomes Creek and Elder Creek. Smaller streams include Reeds, Red Bank, Coyote, Oat, and McClure Creeks. All are intermittent streams that generally dry up in the summer. The mainstem of the Sacramento River in this area contains important spawning and rearing habitat for many fish species, including the endangered winter-run Chinook salmon and steelhead. Although some of the area is federally owned, 80% of the property, a majority of which are large ranch properties and commercial timberlands, is owned privately.

Thomes Creek and Elder Creek have been identified by the U.S. Fish and Wildlife Service (USFWS) as being restorable for Chinook salmon spawning and rearing habitat. This watershed historically was a major contributor of gravel to the Sacramento River, and Thomes Creek in particular was cited by USFWS and the Department of Water Resources as a critical gravel recruitment source. Impediments to the realization of the potential of these streams as salmon habitat include: loss of riparian vegetation, the existence of nonnative invasive species such as *Arundo donax* and *Tamarix*, physical barriers to migration, and unscreened agricultural diversions. Another valuable natural resource in the watershed is a large concentration of wetland/vernal pool habitat.

The Tehama County Resource Conservation District (TCRCD) is the sponsor of this project that takes a first step toward recovery of the natural benefits of the watershed by completing a watershed assessment. The assessment documents existing conditions in the watershed through research of historical conditions and by compiling existing data on the physical and ecological resources within the watershed using a GIS system. The assessment process also provides a valuable educational tool and platform for building consensus with landowners, agencies, and stakeholders within the watershed. The TCRCD Board of Directors, staff, and a Technical Advisory Committee are reviewing this information to identify critical gaps and to identify and prioritize restoration and management efforts. This process also identifies restoration activities that will benefit other watersheds in the area and the Sacramento Valley as a whole



*Chaparral lands in western Tehama County.*

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*A typical summertime flow on the North Fork Pit River.*

## PURPOSE

Implement restoration projects to improve water quality, reduce bank erosion, restore riparian vegetation, and restore wetlands along selected reaches of the Pit River

## PROJECT GOALS

- ✦ Conduct education and outreach to involve stakeholders, citizens of Alturas, and the county's Native American community in project planning
- ✦ Develop a stormwater management plan for the City of Alturas
- ✦ Reduce erosion along the X-L Ranch reach of the North Fork Pit River
- ✦ Install livestock fencing along 5 miles of the Pit River and its tributaries to protect riparian areas
- ✦ Develop restoration techniques for seasonally inundated riparian and wetland areas

### AWARD AMOUNT

\$585,580

### WATERSHED

Pit River Watershed

### COUNTY

Modoc County

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 3, State Senate: 1

### *Benefits to the Bay-Delta System*

The Pit River watershed is one of the primary headwaters to the Sacramento River. These projects improve water quality by reducing soil erosion, thus decreasing sediment loads in the Upper Pit River and in downstream waters. This improvement benefits local fish as well as Chinook salmon and steelhead downstream in the Sacramento River. Local Native American communities and local landowners will benefit from the improvements to their property, and the entire local community benefits from the economic influx of restoration funds. Further benefits accrue to migratory waterfowl, including the greater sandhill crane.

## PROJECT OVERVIEW

The Pit River watershed is one of the primary headwaters to the Sacramento River. Its waters flow through Shasta Lake and down the Sacramento River to the Bay-Delta. The Pit River is currently listed as an impaired water body for nutrients, organic enrichment, low dissolved oxygen, and temperature. Other problems include erosion, channel downcutting, sediment discharge, and excess turbidity. These adverse conditions are felt both locally and throughout the Bay-Delta ecosystem. The Central Modoc Resource Conservation District (CMRCD) has supported stakeholders to select several projects intended to increase landowner participation, demonstrate restoration techniques for other similar portions of the watershed, and complete first steps toward effective community management of the Upper Pit River. The following projects have been funded:

- ✧ The Alturas Storm Water Management Plan. Reduces chronic flooding in Alturas and identifies nonpoint source water pollution.
- ✧ The North Fork Pit/X-L Ranch Riparian Restoration Project. Addresses bank erosion that threatens a tribal cemetery and livestock management.
- ✧ The Pit River Fencing Initiative. Provides landowner incentives to establish and maintain riparian fencing programs, including offstream water development for livestock.
- ✧ The Dry Creek Basin Fence Project. Improves the management of a 6,000-foot-elevation valley that feeds into Parker Creek, a tributary to the North Fork Pit River.
- ✧ The Pit River–John and Sally Clark Riparian and Wetland Enhancement Project. Develops riparian revegetation techniques applicable to those parts of the river subject to moderate seasonal inundation as a result of irrigation impoundment.

The data and documentation generated by these sub-projects are consistent with statewide standards and coordinated with the Regional Water Quality Control Board water quality monitoring program for the Pit River. The resulting data will be made available to local interests and other entities through public meetings, reports, and posting of information and data on local and statewide websites. The CMRCD is also conducting extensive public outreach to build support and participation from citizens, and has formed a close partnership with the X-L Ranch Community of the Pit River Tribe. Community education and outreach efforts focus on the urban watershed issues found in Alturas, as well as on inclusion of the county's Native American community in watershed planning and management.



*Central Modoc RCD Crew installing a brush barb on the Pit River near Alturas.*

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# UPPER SPANISH CREEK WATERSHED ASSESSMENT AND RESTORATION STRATEGY

Plumas Corporation



*Collecting substrate and flow data on Spanish Creek.*

## PURPOSE

Develop a detailed watershed assessment and restoration strategy for Spanish Creek

## PROJECT GOALS

- ✧ Develop a watershed assessment
- ✧ Develop a restoration strategy to stabilize bank erosion
- ✧ Establish riparian habitat
- ✧ Build community capacity for effective watershed management

## AWARD AMOUNT

\$170,000

## WATERSHED

Spanish Creek Watershed

## COUNTY

Plumas County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 3, State Senate: 1

## *Benefits to the Bay-Delta System*

Spanish Creek is a tributary to the Feather River, which is the major water supply basin for the State Water Project and an integral component of the Bay-Delta system. Ecosystem and water quality within the Bay-Delta is dependent on the quality of water from upstream areas. Stabilization of Spanish Creek will:

- ✧ reduce sediment load and the transport of other contaminants, such as nitrogen and phosphorus, from entering the Feather River and Bay-Delta system, thereby providing multiple benefits to water users and the general public;
- ✧ prevent the loss of property for creekside landowners;
- ✧ build community capacity to assess and effectively manage the watershed; and
- ✧ encourage technology transfer and information sharing within the watershed management community.

## PROJECT OVERVIEW

The Spanish Creek watershed is located in the northern Sierra Nevada Mountains and is a tributary to the Upper North Fork Feather River. The Feather River contributes a major portion of runoff flow to the Sacramento River. Over the years, the banks of Spanish Creek have become unstable largely as a result of historical hydraulic mining and channelization projects. The creek was used as a commercial gravel source in the 1960s. Since operations ceased in the mid-1990s, sediment buildup has caused mid-channel sandbars to form, changing the flow of Spanish Creek and resulting in the loss of land for creekside landowners.

To address these issues, landowners along Spanish Creek are working together with the Feather River Coordinated Resource Management Group, an alliance of natural resource management agencies, local landowners, private interests, and the public, to develop a watershed assessment and design long-term effective management practices. Rather than individual landowners attempting to fix their own portions of the streambank, and thus transferring the problem to their neighbors, they have agreed to participate in a coordinated approach and assess the problem as a whole by examining the entire channel. This project calls for a thorough scientific study of the Spanish Creek watershed to quantify river geomorphology, flow, and sediment characteristics. From this study, a comprehensive restoration strategy for Spanish Creek will be developed. The restoration strategy will focus on reducing excess erosion and sedimentation from the watershed. This project also educates the community to help build its capacity to collaborate and participate in effective watershed management and restoration activities.



*Vertical banks such as this one on Spanish Creek are eroding riparian habitat and property and contributing to water quality degradation.*

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# UPPER TRINITY RIVER WATERSHED MANAGEMENT PLANNING PROJECT

*Trinity County Resource Conservation District*



*Alpine lakes store the winter snowmelt that feeds the entire watershed.*

## PURPOSE

Develop a watershed assessment and action plan to address the high levels of sedimentation and turbidity in the Upper Trinity River watershed

## PROJECT GOALS

- ✦ Minimize sedimentation and turbidity
- ✦ Improve water quality and water supply reliability
- ✦ Improve fish habitat

### AWARD AMOUNT

\$200,000

### WATERSHED

Upper Trinity River Watershed

### COUNTY

Trinity County

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 4

### *Benefits to the Bay-Delta System*

Nearly 1 million acre-feet of water per year is diverted from Trinity Lake into the Bay-Delta system, making the Upper Trinity River an important source watershed to the system. This project provides the necessary planning needed to:

- ✦ improve water quality and water supply reliability for downstream urban and agricultural water users by reducing sedimentation and turbidity in the Upper Trinity River watershed,
- ✦ reduce erosion of silts and sands that impair the quality of spawning gravels for anadromous fish, and
- ✦ improve recreation and tourism opportunities for the local community by improving water quality and supply.

## PROJECT OVERVIEW

The Upper Trinity River watershed has a drainage area of 692 square miles that includes Trinity Lake. Water is diverted regularly from Trinity Lake into the Bay-Delta system, which provides 2.5 million acre-feet of storage for the Central Valley Project. The upper watershed has been heavily logged. In heavy rainfall years, large volumes of fine sediment are eroded from the watershed upstream of Trinity Dam and are flushed into the lake, reducing its storage volume. Water exports from the dam to the Sacramento River can experience extremely high turbidity levels during heavy rainfall years. The buildup of sediment in Trinity Lake reduces the available storage capacity that can shorten the expected life of the dam. The seriousness of the sedimentation issue has led the Trinity County Resource Conservation District to develop the Upper River Trinity River watershed Management Planning Project.

The overall objective of this community-based project is to develop a comprehensive watershed plan for the Upper Trinity River using a collaborative approach. Included in this process are the following activities:

- ✧ Form a new community-based watershed group entitled “Upper Trinity River Watershed Team”
- ✧ Conduct a sediment-source inventory
- ✧ Prepare a strategic fuels reduction and thinning plan and demonstration project
- ✧ Develop a comprehensive watershed assessment and action plan



*One key to watershed planning is learning about the resources from the landowners.*

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# WATER QUALITY IMPROVEMENT IN COW CREEK WATERSHED

Western Shasta Resource Conservation District



*Upper South Cow Creek water quality monitoring site.*

## PURPOSE

Improve water quality in the Cow Creek watershed

## PROJECT GOALS

- ✧ Identify the sources of known water quality problems, fecal coliform contamination, and elevated water temperatures, in the Cow Creek watershed
- ✧ Obtain baseline temperature data and fecal coliform data
- ✧ Determine options to remedy the water quality problems in the watershed
- ✧ Develop an implementation plan to address water quality issues
- ✧ Conduct a water quality monitoring program on Cow Creek

## AWARD AMOUNT

\$67,160

## WATERSHED

Cow Creek Watershed

## COUNTY

Cow Creek Watershed

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 4

## *Benefits to the Bay-Delta System*

Cow Creek is an eastside tributary to the Sacramento River, below Keswick Dam. Project-related improvements will reduce fecal coliform levels and lower water temperatures in the watershed. This will have direct benefits to stakeholders in the watershed, including improvements to municipal and domestic water supply, irrigation, stock watering, hydroelectric power generation, and contact and non-contact recreation. Lowering water temperature conditions in the watershed will also contribute to better conditions for Chinook salmon and steelhead by providing improved spawning habitat and migration for anadromous fisheries, and other habitat improvements. This project continues the collaborative efforts of agencies, landowners, and tribal interests to address problems in the Cow Creek watershed.

## PROJECT OVERVIEW

The Cow Creek watershed drains approximately 274,000 acres in Shasta County. Cow Creek is an eastside tributary to the Sacramento River, downstream of Keswick Dam, and is thus directly connected to the Bay-Delta. Water quality studies have identified high levels of fecal coliform in several of the main tributaries to Cow Creek and in Cow Creek. Elevated levels of fecal coliform prevent waters from being used for contact recreation, municipal and domestic water supply, and other beneficial uses.

In addition, previous studies have identified water temperatures exceeding preferred developmental thresholds for coldwater fish species. Such high temperatures have repeatedly been identified as limiting factors for species such as Chinook salmon and steelhead on Cow Creek.

This project includes monitoring fecal coliform levels in tributaries with known problems, as well as in the mainstem of Cow Creek. A technical advisory team will review results and develop remediation recommendations. Monitoring includes field temperature testing and evaluation of data to narrow sources and causes of elevated temperature, as well as an analysis of project feasibility to help lower temperatures in priority areas. Results will support the implementation of restoration activities in the Cow Creek watershed.



*"Tidbit" sensor used in water quality monitoring on Cow Creek.*

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# YUBA RIVER CITIZEN MONITORING PROGRAM—PHASE II

*South Yuba River Citizens League*



*The North Yuba River below Downieville.*

## AWARD AMOUNT

\$215,000

## WATERSHED

Yuba River Watershed

## COUNTY

Nevada County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2 and 4,

State Assembly: 3 and 4, State Senate: 1

## PURPOSE

Expand a successful volunteer monitoring program in the Yuba River watershed and use the data to evaluate effectiveness of previous work and report on water quality

## PROJECT GOALS

- ✦ Design and execute scientifically credible studies to assess Yuba River conditions
- ✦ Empower and educate citizens to be responsible stewards and decision-makers
- ✦ Screen for water quality problems
- ✦ Identify pollution sources
- ✦ Evaluate the effectiveness of restoration and management practices
- ✦ Evaluate the quality of water compared to specific water quality criteria
- ✦ Conduct a conference on monitoring by citizens
- ✦ Produce a handbook on the “how to’s” of monitoring by citizens

## *Benefits to the Bay-Delta System*

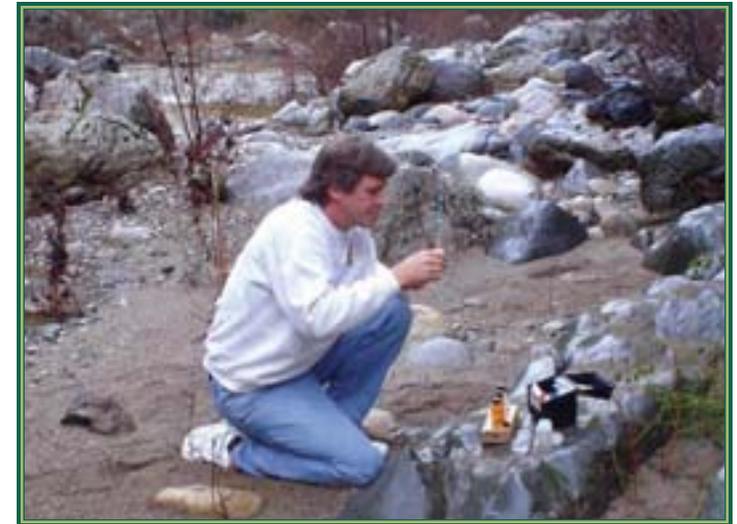
The Yuba River supports highly valued populations of steelhead trout and Chinook salmon. The river’s wild steelhead fishery is significant. The Yuba River historically supported 15% of the annual fall-run Chinook salmon in the Sacramento River system. In addition, the health of the watershed is critical to downstream urban water users who depend on the Yuba River for their drinking water. Implementation of this project:

- ✦ facilitates more informed decision-making by continuing to conduct water quality monitoring of the various parameters that can affect humans and fish in the Bay-Delta system and
- ✦ encourages continued collaboration by sharing the data compiled through this project with 13 local, state, and federal agencies, and seven restoration and planning efforts in the Yuba River watershed.

## PROJECT OVERVIEW

The Yuba River is one of the most diverted and dammed rivers in the Sierra Nevada. Its 1,325 square miles of watershed is a source of drinking and irrigation water for hundreds of thousands of consumers. During summer months, more than 95% of normal flows can be diverted out of the middle and south forks of the Yuba for delivery to Placer County residents. Damage from historical mining practices continues to degrade Yuba River water quality with the accumulation of mercury, arsenic, and other pollutants in sediment behind reservoirs and in riverbeds.

The Yuba River Citizen Monitoring Project was initiated in 2000 to address the degraded water quality in the watershed. The Monitoring Project has become a successful, collaboratively developed, watershed-wide monitoring and assessment program. Phase I of the project included the services of more than 65 trained citizen volunteers and 21 monitoring sites throughout the Yuba River watershed. Data on a variety of parameters, including pH, dissolved oxygen, water temperature, arsenic, iron, copper, zinc, mercury, and flow, have been compiled at the monitoring sites on a monthly basis since October 2000. This project—Phase II of the Yuba River Citizen Monitoring Program—expands the program to include additional parameters and sites that are relevant to new or forthcoming resource issues. Phase II monitors six additional parameters (lead, chromium, enterococci bacteria, turbidity, nitrogen, and phosphate), increases the number of monitoring locations to include eight new monitoring sites, and continues an investigation into the extent and causes of enterococci contamination in the Yuba River. Additionally, this project will help build the capacity of other volunteer monitoring programs by developing curriculum and materials for a Citizens Monitoring Academy.

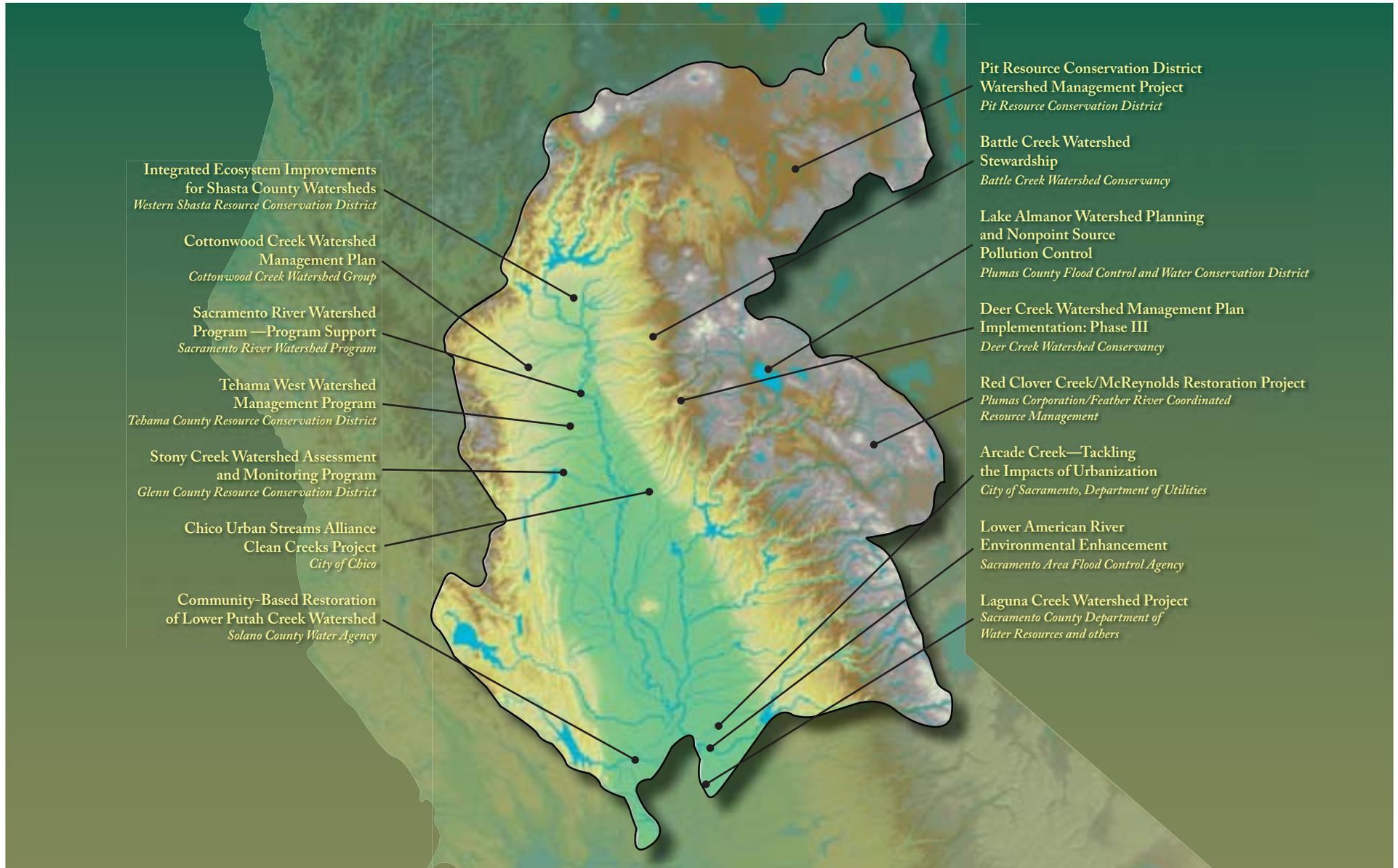


*Dissolved oxygen sampling on the South Yuba River in December 2004.*

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# ARCADE CREEK—TACKLING THE IMPACTS OF URBANIZATION

City of Sacramento, Department of Utilities



Site of the planned Del Paso Park Detention/Filtration Wetland, which will treat the stormwater runoff from this outfall.

## PURPOSE

Expand the planning process for the Arcade Creek watershed and implement restoration activities

## PROJECT GOALS

- ✦ Increase participation of local residents in the Arcade Creek Watershed Group through public outreach and education
- ✦ Perform in-depth watershed assessment to provide information baseline
- ✦ Develop plan to manage and/or eliminate nonnative invasive plants
- ✦ Construct a stormwater runoff detention basin and filtration wetland for multiple benefits

### AWARD AMOUNT

\$930,000

### WATERSHED

Arcade Creek Watershed

### COUNTY

Sacramento County

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 3, 4, and 5; State Assembly: 4, 5, and 9;

State Senate: 1 and 6

## *Benefits to the Bay-Delta System*

The Arcade Creek watershed is located within the city of Citrus Heights and unincorporated areas of Sacramento County. The watershed is a major source of polluted urban runoff to the Bay-Delta system. The Arcade Creek project raises public awareness and understanding of watershed health issues and improves collaboration among local residents and government agencies. The project will expand the planning process through increased public participation in the development of a watershed assessment. By eradicating invasive plants and restoring native riparian vegetation, the project will benefit local aquatic, terrestrial, and bird species, and migratory birds and mammals. The construction of a detention/filtration wetland as part of this project will also improve water quality in Arcade Creek that will benefit water users downstream in the Bay-Delta system. Local residents and local governments are primary beneficiaries of the improved natural environment, enhanced recreational opportunities, and improved water quality.

## PROJECT OVERVIEW

Arcade Creek watershed is located in Sacramento County, mostly within the city of Citrus Heights and unincorporated areas of Sacramento County. The watershed drains approximately 38 square miles of mostly commercial and residential neighborhoods. It is a major source of urban runoff to the Bay-Delta system. The Arcade Creek Watershed Group was formed in 2002 with support from the City of Sacramento and from the US Environmental Protection Agency. Members include city and county agency representatives and local residents. The group is working to improve water quality, reduce flood damage, enhance habitat, increase recreational opportunities, and encourage local participation in protection efforts within the Arcade Creek watershed.

This project implements priority tasks identified in previous assessment, planning, and outreach efforts. A watershed coordinator will help to increase support and involvement from homeowners and local residents by facilitating the watershed group, conducting field trips, and seeking public input. The project will increase public awareness about the effects of landscape maintenance chemicals on stream water quality and educate the community about the use of environmental restoration to treat urban runoff. The construction of the Del Paso Park Detention/Filtration Wetland will be used to demonstrate the value of environmental restoration. The wetland restoration will improve the flood-carrying capacity of Arcade Creek through moderate-sized storms, protect streambanks from excess erosion, enhance habitat, and improve downstream water quality through the detention and treatment of urban stormwater runoff. Furthermore, the Phase II Watershed Plan and the Invasive Species Eradication and Management Plan will be developed in concert to provide better information about the watershed in order to improve and protect its long-term health. Together, the plans will improve watershed planning efforts, prioritize several watershed improvement projects, and enhance riparian and aquatic habitat. The plans will be developed by the Arcade Creek Watershed Group, local residents and neighbors, the cities of Citrus Heights and Sacramento, and the County of Sacramento.



*This thicket of Arundo donax on Arcade Creek highlights the need for a nonnative invasive species management plan.*

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*North Fork of Battle Creek.*

## PURPOSE

Increase protection, implement restoration of stream conditions, and build capacity for landowners and resource agencies to manage watershed restoration efforts

## PROJECT GOALS

- ✦ Continue to implement the Battle Creek Watershed Conservancy's Watershed Strategy and evaluate outcomes of previously implemented projects
- ✦ Implement and monitor erosion reduction actions and restore riparian areas in the watershed
- ✦ Design and implement a stream condition monitoring plan and a water quality monitoring program
- ✦ Provide community outreach and training about watershed processes, protection needs, and restoration opportunities

### AWARD AMOUNT

\$680,380

### WATERSHED

Battle Creek Watershed

### COUNTY

Shasta and Tehama Counties

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 2 and 3, State Assembly: 2, State Senate: 4

### *Benefits to the Bay-Delta System*

The Battle Creek watershed is located on the southwestern slopes of Mt. Lassen and drains to the Sacramento River. Battle Creek is historically one of the most important Chinook salmon and steelhead spawning streams in the Sacramento Valley. This project is helping to reduce or eliminate sediment sources that degrade anadromous fish habitat in Battle Creek. Integral to the project are community outreach programs that educate local watershed residents and children about how to protect and restore habitat in the Battle Creek watershed. This project will also develop and implement a stream conditions monitoring plan based on protocols used by state and federal agencies. The resulting data will be made available to other public interests to aid in similar efforts. This project provides direct benefits to landowners and water users in the watershed and water users of the Central Valley Project. Local, state, and federal agencies, including the Lassen National Forest, will benefit from their investments in this project.

## PROJECT OVERVIEW

The Battle Creek watershed is situated on the volcanic slopes of Mt. Lassen in southeastern Shasta and northeastern Tehama Counties and covers approximately 360 square miles. Battle Creek flows from the foothills of Mt. Lassen, enters the Sacramento River southeast of the town of Cottonwood in Shasta County, and drains to the Bay-Delta. The Battle Creek watershed is widely recognized as a watershed critical to the survival and restoration of Chinook salmon and steelhead populations listed under the federal and state Endangered Species Acts.

The Battle Creek Watershed Conservancy (BCWC) is implementing the Battle Creek Watershed Stewardship project in partnership with the Lassen National Forest. Two independent scientific assessments of Battle Creek conducted by the BCWC and Lassen National Forest have indicated that stream conditions may be negatively affected by increased erosion and sedimentation in the upper Battle Creek watershed, which could impair water quality and reduce salmonid spawning success. These assessments have identified a need to increase protection and implement restoration of stream conditions, especially the stabilization or elimination of sediment sources that could further degrade anadromous fish habitat in Battle Creek.

The BCWC project has four components: evaluating the effectiveness of previous restoration investments in Battle Creek; continuing the implementation of the Battle Creek Watershed Strategy, which includes sponsoring watershed landowners and resources agencies in community education and outreach programs; identifying and eliminating significant sediment sources that are degrading the Battle Creek watershed; and designing and implementing a stream condition monitoring plan.



*Riparian corridor along Battle Creek.*

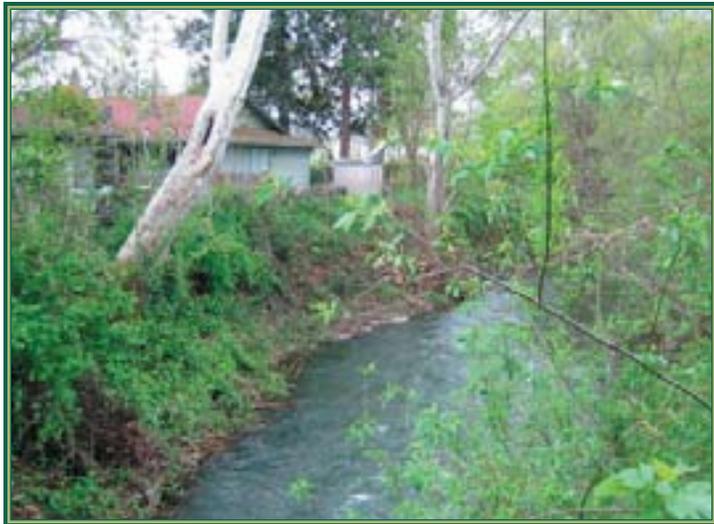
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# CHICO URBAN STREAMS ALLIANCE CLEAN CREEKS PROJECT

City of Chico



*Little Chico Creek flowing through Chapmantown.*

## PURPOSE

Conduct a community-based water quality and habitat assessment of Big Chico Creek and Little Chico Creek watersheds

## PROJECT GOALS

- ✦ Increase the awareness and understanding of urban runoff problems and solutions by the public, particularly Chico area residents
- ✦ Enhance volunteer participation in stream assessment programs
- ✦ Assess the performance of water quality management practices used in the City of Chico
- ✦ Improve migration, spawning, and rearing habitat for multiple fish species in Big Chico and Little Chico Creeks
- ✦ Increase recreational opportunities on Little Chico Creek

### AWARD AMOUNT

\$400,714

### WATERSHED

Big Chico Creek and Little Chico Creek Watersheds

### COUNTY

Butte County

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 3, State Senate: 1

## *Benefits to the Bay-Delta System*

Big Chico Creek and Little Chico Creek flow through the City of Chico and discharge into the Sacramento River and ultimately the Bay-Delta. The quality of the creeks' water and habitat for multiple fish species is impaired by urban runoff pollutants, including sediments, pathogens, and trash. This project will conduct a community-based water quality and habitat assessment of the Big Chico and Little Chico Creek watersheds. The project will also increase public awareness and involvement in order to better manage urban runoff problems. Extensive public outreach, education, and volunteer monitoring efforts will provide direct benefits to the City of Chico and its citizens. Decreased pollutant loads benefit surface water users, locally and downstream, by improving Delta source water quality. The project provides multiple benefits to the general public by increasing salmonid populations and by improving the drinking water quality of the Bay-Delta system. This project also benefits recreational users of the creeks by increasing the safety of water contact sports and improving habitat conditions for fish.

## PROJECT OVERVIEW

Big Chico and Little Chico Creeks are tributaries to the Sacramento River near the city of Chico. Water quality is good for the creeks upstream of the Chico urban area, but downstream water quality has been impaired by pathogens, sediments, trash, and other runoff pollutants from the urban areas. Big Chico and Little Chico Creeks provide migration, spawning, and rearing habitat for several fish species, including steelhead and winter-, spring- and fall- run Chinook salmon. Pollutants from the urban area affect the quality of these habitats and also affect the water quality of the Sacramento River and the Bay-Delta. The pathogens discharged into Little Chico Creek have also compromised the recreational use of the creek near the low-income community of Chapmantown.

Several organizations, including the City of Chico, the Big Chico Creek Watershed Alliance, the Butte Environmental Council, and Kennedy/Jenks Consultants, are working together as the Chico Urban Streams Alliance (Chico USA) to reduce impairment to Big Chico and Little Chico Creeks' water quality and habitat. Chico USA is evaluating public knowledge about urban runoff pollution as part of a large public outreach campaign. The outreach campaign also includes public service announcements, presentation booths at multiple events, brochures, billboards, posters, and one-on-one outreach with businesses that have potential to pollute the creeks. The project will increase public knowledge about urban runoff characteristics to encourage public willingness to implement water quality management practices and reduce urban runoff pollutant input to the creeks. The project also establishes a Creek Watch Hotline to provide information to the public on water quality regulation, urban runoff pollution prevention, and violation reporting. Voluntary citizen participation in water quality monitoring programs for the creeks is increasing as a result of the project.



*Big Chico Creek at the Chico city limits.*

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# COMMUNITY-BASED RESTORATION OF LOWER PUTAH CREEK WATERSHED

Solano County Water Agency

## PURPOSE

Restore fish and wildlife habitat and water quality in the Lower Putah Creek watershed balancing science-based and stakeholder-focused approaches

## PROJECT GOALS

- ✦ Increase community stewardship and awareness of natural resources
- ✦ Improve watershed partner and stakeholder collaboration
- ✦ Improve habitat restoration monitoring and implementation practices
- ✦ Prepare a project assessment and evaluation plan
- ✦ Prepare a watershed action management plan



*Ken Davis leads a citizen monitoring event focused on aquatic invertebrates.*

### AWARD AMOUNT

\$992,236

### WATERSHED

Putah Creek Watershed

### COUNTY

Solano County

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 1 and 3; State Assembly: 2, 7, and 8;  
State Senate: 2 and 5

## *Benefits to the Bay-Delta System*

While the Lower Putah Creek watershed has much of the best remaining habitat in the south Sacramento Valley, the watershed requires improvements to restore it to its full potential, including providing fish and wildlife habitat and clean water for beneficial use. This project builds on previous work in the watershed by preparing a Watershed Management Action Plan (WMAP). The WMAP will include objectives and suggested projects to further improve resources in the Lower Putah Creek watershed based on a project assessment and evaluation plan and the interests of stakeholders. This project also includes natural resource education and community outreach, facilitation and coordination of watershed groups and protection activities, long-term volunteer community stewardship, and comprehensive partnership and collaboration to ensure the success of watershed management efforts and the long-term sustainability of watershed stewardship, maintenance, and restoration.

## PROJECT OVERVIEW

The Lower Putah Creek watershed begins at Monticello Dam and ends at the confluence of Putah Creek and the Yolo Bypass. The Yolo Bypass carries Putah Creek water to the Bay-Delta. Lower Putah Creek supports a riparian corridor that links the Yolo Bypass wildlife area with contiguous natural areas that extend from Lake Berryessa to Clear Lake and into the Mendocino National Forest, forming a significant wildlife migration pathway from the north coast to the Bay-Delta. Lower Putah Creek contains critical habitat for Chinook salmon and valley elderberry longhorn beetle and provides high density nesting habitat for Swainson's hawk and other birds.

While the Lower Putah Creek watershed has much of the best remaining habitat in the south Sacramento Valley, it requires watershed improvements to restore it to its full habitat potential. Community-based restoration is needed to reverse the habitat- and water-degrading effects of dams, channelization, gravel mining, invasive plants, solid waste dumps, fish barriers, bank erosion, lack of spawning gravels, roads and bridges, and significant riparian vegetation loss from agricultural and urban development.

This project includes preparation of a project assessment and evaluation plan. The project assessment and evaluation plan will identify non-point water-pollution sources, describe baseline water quality, describe proposed measures to be implemented, evaluate effectiveness of proposed measures in preventing or reducing pollution, monitor fish and wildlife populations, measure aquatic and riparian species composition, and provide success indicators and assessment protocols for fish and wildlife population and habitat restoration. This project also encourages community support and develops community awareness of natural resources in the Lower Putah Creek watershed through the coordination and implementation of restoration and monitoring events, updating of the Putah Creek Guidebook Series, enhancement of a project website, and implementation of the Putah Creek Discovery Corridor Master Plan, which will be a resource for other community outreach projects.

Additionally, this project includes preparation of a watershed management action plan (WMAP). The WMAP will include objectives and suggested projects to further improve resources in the lower Putah Creek watershed based on the project assessment and evaluation plan and the interests of stakeholders.



*Local children using photo keys to identify aquatic invertebrates.*

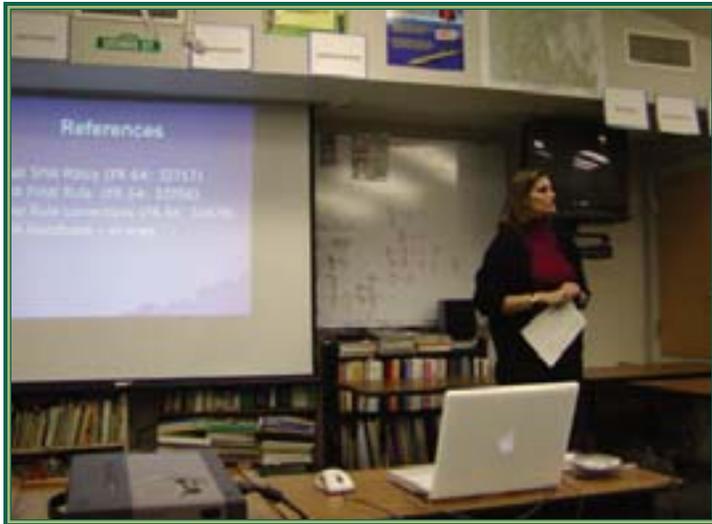
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# COTTONWOOD CREEK WATERSHED MANAGEMENT PLAN

*Cottonwood Creek Watershed Group*



*Vicky Campbell of the U.S. Fish and Wildlife Service speaking at a regular stakeholder meeting for the Safe Harbor Agreement.*

## PURPOSE

Develop a locally based management plan and supporting monitoring program to inform management of the Cottonwood Creek watershed, and improve the local capacity to implement these programs

## PROJECT GOALS

- ✦ Build on the Cottonwood Creek Watershed Group's (CCWG's) recently completed watershed assessment and other planning and monitoring efforts to develop a comprehensive watershed management plan in a science-based, adaptive management framework
- ✦ Develop long-term support of the implementation of the watershed management plan
- ✦ Provide additional support to the CCWG and its watershed coordinator

### AWARD AMOUNT

\$300,000

### WATERSHED

Cottonwood Creek Watershed

### COUNTY

Shasta and Tehama Counties

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 4

## *Benefits to the Bay-Delta System*

As the largest undammed tributary to the Sacramento River on the west side of the Sacramento Valley, as well as the largest contributor of salmon spawning gravels for the Upper Sacramento River, the Cottonwood Creek watershed has a significant and direct impact on the Bay-Delta. Over the last few years, CCWG has developed and mobilized a strong network of local landowners, agencies, and resource professionals who actively collaborate to provide organized stewardship of the watershed. This project builds on those successes, as well as a completed watershed assessment, to bring together agencies, organizations, and landowners who make land and resource management decisions under one comprehensive watershed management plan. Improved watershed conditions benefit local landowners; wildlife, including neotropical birds, Chinook salmon, and steelhead; and downstream water users, including those using Delta water sources.

## PROJECT OVERVIEW

Cottonwood Creek is a significant tributary to the Sacramento River, draining more than 900 square miles of Coast Range and western Sacramento Valley lands. This project builds on previous and concurrent CCWG efforts, including the completed Cottonwood Creek Watershed Assessment and the ongoing Cottonwood Creek Watershed Management Strategy. The watershed assessment documented existing available data, defined current watershed baseline conditions, recommended further studies, and identified gaps in the data record. The ongoing Cottonwood Creek Watershed Management Strategy involves workshops initiated by CCWG with agencies and stakeholders to define desired conditions in the watershed. This project continues the successful leadership of CCWG and stewardship of the Cottonwood Creek watershed.

This project develops a watershed management plan that outlines a vision for the watershed. It includes strategies for environmental management, long-term monitoring, and education. This watershed management plan will fill data gaps and incorporate technical analyses identified in the Cottonwood Creek Watershed Assessment. It recommends specific action alternatives to achieve watershed objectives outlined through the concurrent Watershed Management Strategy workshops. It enables the CCWG to systematically coordinate planned and ongoing restoration and monitoring actions throughout the watershed by various agencies and organizations, including the CCWG. As a part of this process, the CCWG will design studies and analyses to further the understanding of key watershed processes (natural and land-use-driven) identified in the Cottonwood Creek Watershed Assessment and Watershed Strategic Plan.

This project will conduct a series of plan development workshops to cover water quality and quantity; channel and riparian conditions; plant, fish, and wildlife resources; fire and fuels management; and urbanization. The workshops are advertised in the local newspaper and a quarterly newsletter. The Watershed Management Plan will contain a strategy for long-term stakeholder participation in management so that watershed management remains responsive to changing watershed conditions and issues.



*Fall-run Chinook salmon in the mainstem of Cottonwood Creek.*

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# DEER CREEK WATERSHED MANAGEMENT PLAN IMPLEMENTATION: PHASE III

Deer Creek Watershed Conservancy



*Eighth grade Chester schoolchildren learning about watershed restoration in the Lassen National Forest.*

## PURPOSE

Implement actions of the Deer Creek Management Plan's Watershed Management Strategy

## PROJECT GOALS

- ✧ Increase coordination, public outreach, and effectiveness of activities in the watershed
- ✧ Increase citizen understanding of fish ecology and water quality in the watershed
- ✧ Develop a coordinated water quality monitoring program to establish baseline conditions that can be used to assess the effectiveness of watershed restoration actions and to make better-informed watershed management decisions
- ✧ Improve conditions in the upper Deer Creek watershed to protect and enhance habitat for anadromous fish species
- ✧ Improve and expand information-sharing with other entities who address similar environmental issues in the watershed and elsewhere

## AWARD AMOUNT

\$457,150

## WATERSHED

Deer Creek Watershed

## COUNTY

Tehama County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 4

## *Benefits to the Bay-Delta System*

Deer Creek is known to have significant potential for restoring populations of spring-run Chinook salmon and steelhead, and the DCWC is a cornerstone in this effort. This project will promote watershed stewardship by increasing collaboration among various stakeholders in the Deer Creek watershed, including increasing citizen understanding of fish and water quality issues, and developing a coordinated monitoring program that will help to assess effectiveness of watershed restoration actions to assist in better-informed decision-making. In addition, the information can be used by stakeholders in other watersheds who are addressing similar environmental issues. An investment in Deer Creek provides direct benefits to the creek and valuable information about how to improve overall watershed health; how to integrate local, state, federal, and private efforts into a large-scale restoration program; how to design and implement actions to benefit salmonids; and how to best manage ecological processes such as sediment transport and stream meander in a partially modified stream system.

## PROJECT OVERVIEW

The Deer Creek watershed contains important habitat for naturally reproducing stocks of anadromous fish in the Sacramento–San Joaquin River system. Conservation and improvement of habitat for these fish are priorities of the Deer Creek Watershed Conservancy (DCWC), a collaborative organization of private landowners, stakeholders, and public agency representatives. This project is rooted in several past assessment and planning efforts, including the Deer Creek Watershed Analysis, Deer Creek Watershed Plan, and the Deer Creek Watershed Management Strategy.

One of the main goals of this project is to develop and implement a surface water monitoring program to establish a baseline from which the effectiveness of watershed management and restoration activities can be assessed. A specific restoration activity of the project expands the efforts of the Lassen National Forest and the Collins Pine Company to enhance and protect habitat of anadromous fish species by treating sources of accelerated surface erosion and disrupted streamflow.

The project also extends the DCWC's outreach efforts to other organizations concerned with similar watershed issues. The DCWC will use a variety of communication tools for this outreach, including public meetings, newsletters, increased use of local and regional print media, presentations at local and regional organizational meetings, and field trips. The DCWC is also increasing their ability to share information about collaborative work in the watershed with other watershed groups, agencies, and interested stakeholders. In addition, this project expands educational programs focusing on fish ecology and water quality at local schools. The school curricula also reach the general public as students are given opportunities to present their findings from environmental education work to community groups. Furthermore, advanced students are given the opportunity to participate in an inventory, monitoring, and restoration work-study program with the Lassen National Forest.



*Upper Deer Creek Falls represents the upper limit of anadromous salmonid habitat.*

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# INTEGRATED ECOSYSTEM IMPROVEMENTS FOR SHASTA COUNTY WATERSHEDS

Western Shasta Resource Conservation District (WSRCD)



Site for fish screen retrofit to an established irrigation ditch.

## PURPOSE

Implement integrated ecosystem improvements and watershed education and outreach

## PROJECT GOALS

- ✦ Improve anadromous fish habitat and water quality in Cow Creek
- ✦ Create implementation procedure to follow for future watershed improvement projects in the Cow Creek watershed
- ✦ Increase landowner awareness of water quality and watershed issues
- ✦ Develop a watershed assessment for Stillwater and Churn Creeks to document existing conditions and to identify data gaps
- ✦ Increase community watershed group participation in the Adopt-A-Creek program
- ✦ Fund a watershed coordinator position for Stillwater Creek and Churn Creek to encourage watershed stewardship by the local community

## AWARD AMOUNT

\$821,727

## WATERSHED

Cow Creek, Stillwater Creek, and Churn Creek Watersheds

## COUNTY

Shasta County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 4

## *Benefits to the Bay-Delta System*

This project focuses on three watersheds in western Shasta County: Cow Creek, Stillwater Creek, and Churn Creek. These watersheds and their streams drain into the Sacramento River and ultimately into the Bay-Delta system. In 2002, several streams in the Cow Creek watershed were added to the Clean Water Act, Section 303(d) listing for impaired water bodies for constituents such as fecal coliform bacteria, cadmium, copper, and zinc. This project implements a number of actions to address threats to water quality, and includes an education and outreach program for landowners who often directly influence the entry of such constituents into local streams. These improvements provide multiple benefits to water users and habitat values. These improvements will have direct benefits for stakeholders in the watershed, including local, state, and federal agencies, and for municipal and domestic water supply and irrigation.

## PROJECT OVERVIEW

The health of Shasta County watersheds is directly connected to the health of the Bay-Delta system in several ways. Physical processes occurring in Shasta County watersheds result in sediment, nutrient, and streamflow contributions to the Sacramento River. Ecological functions provided by these same watersheds support many sensitive species, including steelhead trout, Chinook salmon, native resident fish species, neotropical birds, amphibians, and invertebrates.

The Integrated Ecosystem Improvements for Shasta County Watersheds project focuses on three western Shasta County watershed areas: Cow Creek, Stillwater Creek, and Churn Creek. The Cow Creek watershed is the largest in Shasta County with approximately one-third of the watershed used for agriculture and grazing. Issues of concern in this watershed include anadromous fish habitat protection and enhancement, water quality, fire and fuel management, and seasonal flow from irrigation diversions. Building from a watershed assessment prepared in 2001, the project goals for Cow Creek include:

- ✧ construction and monitoring of a tailwater recycling pond to reduce the nutrients, temperature, and fecal coliform entering Cow Creek, and to demonstrate best management practices for collection and treatment of pasture irrigation discharge;
- ✧ design, installation, and monitoring of two irrigation diversion fish screens to prevent entrainment of juvenile salmonids;
- ✧ feasibility studies for five ditch piping projects to enhance instream flow; and
- ✧ community education and outreach to increase participation in local restoration projects.

The Stillwater Creek and the adjacent Churn Creek watersheds share similar issues; thus, they are treated as one ecological unit. The watersheds drain rural and urban land use areas. Issues of concern in these watersheds include accelerated erosion and sediment discharge from flooding, degraded aquatic habitat, invasive species such as *Arundo* and *Tamarisk* in riparian habitat, urban source pollutants, and land use conversion from rural to urban. This project establishes a community process in the Stillwater Creek and Churn Creek watersheds to develop watershed stewardship, increase local capacity for improved watershed management, and educate the community about responsibility for natural resources. In addition, the project promotes improving and increasing aquatic and terrestrial habitats and ecological functions by addressing natural sediment supply and restoration of riparian and riverine aquatic habitats.



*Metering site on irrigation ditch near Cow Creek.*

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# LAGUNA CREEK WATERSHED PROJECT

Sacramento County Department of Water Resources, Laguna Creek Watershed Council, and Sacramento Chapter Urban Creeks Council



Stewardship and outreach programs in the Laguna Creek watershed target all age levels. Here, preschoolers learn firsthand about Laguna Creek and its habitat.

## AWARD AMOUNT

\$695,741

## WATERSHED

Lower Sacramento River Watershed

## COUNTY

Sacramento County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 3, State Assembly: 10 and 15, State Senate: 1

## PURPOSE

Develop a watershed management plan and support watershed education and stewardship

## PROJECT GOALS

- ✦ Assess watershed conditions and develop a balanced approach to address water quality improvement, habitat protection, flood and drainage conditions, recreation, and open space conservation in the watershed
- ✦ Prepare a watershed management plan to assess environmental conditions, identify problems and sources of pollution, and recommend prioritized projects
- ✦ Involve residents, schools, and public agencies in watershed protection and creek stewardship projects
- ✦ Support the activities of the Laguna Creek Watershed Council, including a watershed coordinator position

## *Benefits to the Bay-Delta System*

This project will benefit stakeholders in the rapidly urbanizing Laguna Creek watershed area of South Sacramento County by assessing watershed conditions and developing a watershed management plan to protect Laguna Creek's resources. This project supports coordination among government agencies, organizations, and the Watershed Council. The project will develop a watershed monitoring and assessment plan, support education and outreach to the community, and develop and implement actions to support the long-term sustainability of the Laguna Creek watershed. These efforts will pave the way to improved water quality by reducing sedimentation and runoff into the creek, and ultimately into the Sacramento River and the Bay-Delta system, benefiting users of the system statewide.

## PROJECT OVERVIEW

The Laguna Creek watershed consists of almost 50 square miles of land, draining to Laguna, Whitehouse, and Elk Grove Creeks in a rapidly urbanizing area of South Sacramento County. Laguna Creek is the last remaining stream inside the city limits of Elk Grove and Sacramento that has retained sufficient natural functions and values to provide contiguous, high-quality habitat for several threatened riparian species, as well as wildlife corridors to interconnect current and future habitat preserves.

The Laguna Creek watershed is home to more than 100,000 residents, with just over one-third of the watershed owned and/or managed by farmers and ranchers. This portion will most likely shrink as the current explosive rate of growth is expected to continue over the next 10–20 years. There is a critical need to collect environmental data, assess conditions in the watershed, and use the information in a collaborative planning approach to introduce management strategies and projects that will help mitigate impacts and avoid the irreversible damage caused by urban development on creeks in the area.

The grassroots-based Laguna Creek Watershed Council, established in late 2002, is directing the preparation of a watershed management plan in concert with education and stewardship outreach activities. The Watershed Council holds regular community meetings and conducts watershed tours and other hands-on field activities to inform and educate the community and stakeholders. This process will be used to solicit feedback on the watershed management plan as it is developed. The watershed management plan will recommend actions that address priority watershed stewardship needs.

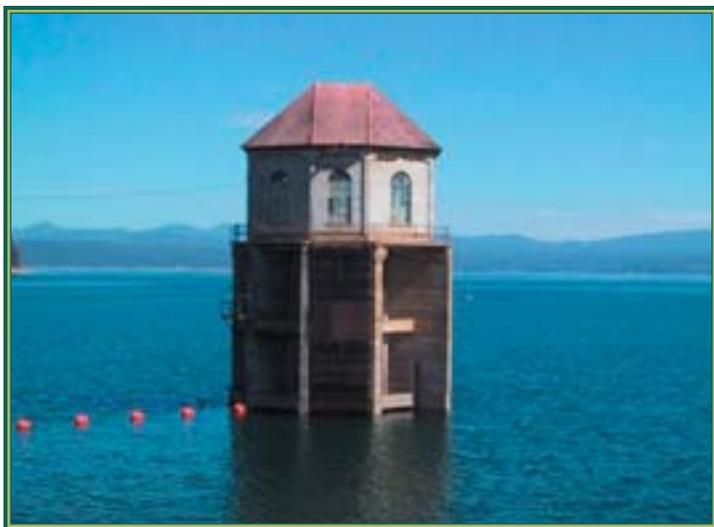
In addition to the watershed management plan, the project will support education and monitoring efforts to provide the basis for long-term support of sustainable habitat improvements and improved water quality in the watershed. Ongoing stewardship projects will lead to an informed citizenry that continues to support and implement restoration projects and monitor the health of the watershed for generations to come.



*Sedimentation in the older channelized sections of the creek is one of many problems that will be investigated during the assessment of the Laguna Creek watershed.*

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*Intake tower in Lake Almanor.*

## PURPOSE

Coordinate watershed management activities and water quality monitoring efforts

## PROJECT GOALS

- ✦ Organize a technical advisory committee (TAC) to guide and review watershed studies
- ✦ Facilitate stakeholder group meetings and share information among TAC participants
- ✦ Prepare a watershed assessment document and Geographic Information System (GIS) database to present information about baseline conditions of the watershed
- ✦ Enhance public awareness of water quality and watershed issues
- ✦ Compile a web-based database of water quality information
- ✦ Coordinate and supplement water quality monitoring and prepare monitoring reports
- ✦ Evaluate alternatives for septic waste collection and treatment along the East Shore of Lake Almanor

## AWARD AMOUNT

\$615,200

## WATERSHED

North Fork Feather River Watershed

## COUNTY

Plumas County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 3, State Senate: 1

## *Benefits to the Bay-Delta System*

Lake Almanor drains into the North Fork of the Feather River and then flows into the Feather River's mainstem. The watershed, which is a source area for water in the Bay-Delta system, has impaired water quality, and improving the conditions of Lake Almanor will provide benefits to those who rely on the Feather River for irrigation, drinking water, and other beneficial uses. The project coordinates stakeholder efforts to develop a watershed assessment and to compile technical information that can be used to increase public awareness and evaluate alternatives to manage water quality impairments in the Lake Almanor watershed. The evaluation of septic waste collection and treatment alternatives will provide direct benefits to local residents and local government. The project provides multiple benefits to the general public and those who use the Bay-Delta as their drinking water supply by improving the drinking water quality of the Bay-Delta by reducing pathogens, nutrients, and other water quality impairments that originate in the Lake Almanor watershed.

## PROJECT OVERVIEW

Water released from Lake Almanor, located on the North Fork of the Feather River, flows to the mainstem of the Feather River and ultimately into the Sacramento River and the Bay-Delta. Water quality in portions of the North Fork Feather River watershed, including Lake Almanor, has been affected by land use activities related to timber harvesting, agricultural and livestock practices, recreation, and urban development. Lake Almanor's water quality has particularly been affected by septic system failures, which result in discharges of pathogens and organics into the lake. Previous efforts to develop a Lake Almanor Watershed Management Plan, coordinate stakeholder groups, and protect watershed resources have been unfocused. In addition, water quality monitoring by various groups has not been coordinated, and data collected from these efforts have not been compiled into a centralized database. Involvement by the Almanor Water Quality Committee and the Forest Community Research group has furthered the efforts to involve other stakeholders and define the issues and needs of the watershed.

The Plumas County Department of Public Works is creating a technical advisory committee (TAC) to create a watershed management plan to understand the water quality issues of the watershed. The TAC is comprised of participants from federal and state agencies, landowners, businesses, and other interested entities. Its function is to guide and review watershed work. The project includes facilitating stakeholder group meetings, providing technical and administrative support, and facilitating the transfer of information and products among participants. In addition, the project develops a comprehensive watershed assessment report and a Geographic Information System (GIS) database to document baseline conditions throughout the watershed and support the efforts of the TAC.

The project also will introduce a public education campaign to increase the cooperation of landowners in implementing appropriate water quality protection measures and to increase the general awareness of water quality issues and watershed function. The project compiles water quality data collected by various groups and conducts additional water quality monitoring. The project evaluates septic waste collection and treatment options to reduce discharges from septic tanks, chiefly along the east shore of Lake Almanor.



*Erosion along Highway 147 into Lake Almanor.*

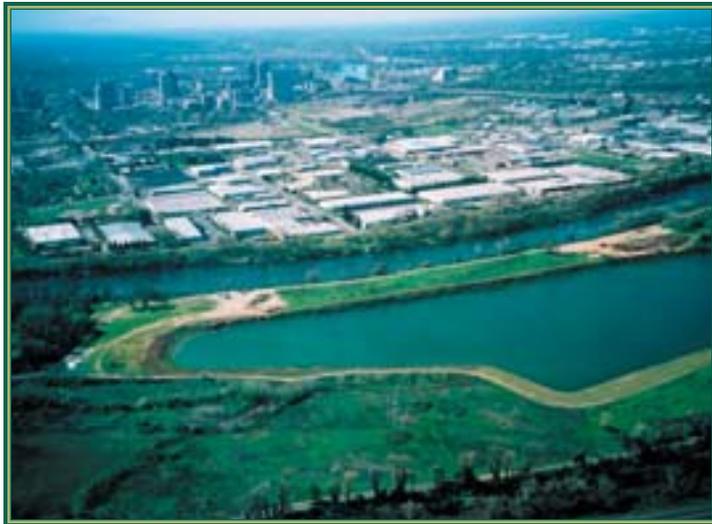
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# LOWER AMERICAN RIVER ENVIRONMENTAL ENHANCEMENT

Sacramento Area Flood Control Agency



*Aerial view of the Gardenland Mine site, a portion of which will be restored as a part of this project.*

## PURPOSE

Broaden and strengthen local capacity for integrated management of the riparian corridor along the Lower American River

## PROJECT GOALS

- ✦ Complete an integrated management plan covering approximately 1,000 acres of riparian land in the lower 5 miles of the American River Parkway as part of the update of the 1985 American River Parkway Plan
- ✦ Restore riparian habitat on a portion of the land in the management plan area disturbed by previous mining activities and currently occupied by the Gardenland Sand and Gravel Mine
- ✦ Engage stakeholders and interested citizens in planning and restoration efforts

### AWARD AMOUNT

\$1,733,680

### WATERSHED

American River Watershed

### COUNTY

Sacramento County

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 5, State Assembly: 9, State Senate: 6

## *Benefits to the Bay-Delta System*

By broadening and strengthening the local capacity for managing the Lower American River, this project will benefit those communities served by the Lower American River Parkway. The American River provides approximately 15% of total Sacramento River flow to the Bay-Delta. This project benefits ecological functions, as well as water quality for beneficial uses, by directly restoring a disturbed site, reconnecting the river with a lower floodplain, and buffering urban uses from the river with restored native vegetation. This locally led effort also involves extensive stakeholder consultation and involvement in the development of an integrated management plan for the lower 5 miles of the river and provides local environmental justice benefits by reaching out to lower-income and politically underserved communities of Sacramento. Increased community awareness and support of integrated management planning will significantly contribute to the long-term sustainability of local watershed stewardship activities.

## PROJECT OVERVIEW

The Lower American River extends 23 miles from the Nimbus Dam at the base of the Sierra Nevada foothills to its confluence with the Sacramento River near downtown Sacramento. From dam to confluence, this corridor is flanked by 5,000 acres of publicly held land and is known as the American River Parkway. The Parkway sustains important populations of fish and wildlife species, including up to 25% of the Central Valley's fall-run Chinook salmon population, and offers numerous recreational opportunities, including trails and parks. Recent assessments of the Lower American River show several threats to the Parkway:

- ✧ high flood terraces of Gold Rush era mining debris are subject to mass failure during floods at the expense of riparian vegetation and levee stability,
- ✧ riparian vegetation on the terraces is too high above the water table to naturally regenerate and is shifting toward upland and invasive species,
- ✧ infrequent flooding of the high terraces provides little spawning and rearing habitat for native anadromous fish, and
- ✧ management of parkway resources is directed by the 1985 American River Parkway Plan, which does not reflect current resource knowledge and does not contain area plans for Woodlake and downstream areas of the Parkway, which were privately owned when the plan was written.

This project includes development of an integrated management plan for the lower 5 miles of the parkway that balances habitat protection and enhancement with public access and public use of the landscape, and will ultimately be included in the current update of the Parkway Plan. Development of the integrated management plan involves stakeholder outreach and education, including targeting members of the environmental justice community, and is intended to lead to a high-level of local ownership and enthusiasm for the plan, as well as increase citizens' satisfaction with and continued interest in the management of the area. To energize the planning process, the project also includes restoration of a portion of the Gardenland Mine site using innovative designs that stabilize banks while increasing habitat values.



*Stakeholders tour a restoration site along the Lower American River.*

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# PIT RESOURCE CONSERVATION DISTRICT WATERSHED MANAGEMENT PROJECT

*Pit Resource Conservation District*



*Future restoration site located on the Shaw Ranch along the mainstem Pit River upstream of the community of Lookout.*

## PURPOSE

Assist the Pit Resource Conservation District (RCD) in implementing a more comprehensive, proactive watershed management program

## PROJECT GOALS

- ✦ Develop a watershed management strategy consistent with the broader assessment and management plan under development for the Pit River watershed
- ✦ Implement demonstration restoration projects and other activities consistent with the management strategy
- ✦ Assist the Pit River Watershed Alliance in a watershed monitoring program
- ✦ Improve communication between partners and stakeholders
- ✦ Support watershed education and outreach

## AWARD AMOUNT

\$305,000

## WATERSHED

Upper Pit and Lower Pit River Watersheds

## COUNTY

Lassen and Modoc Counties

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2 and 3,  
State Senate: 1 and 4

## *Benefits to the Bay-Delta System*

The Pit River watershed, one of the state's largest systems of channels and meadows, contributes about 67% of the inflow to Lake Shasta, which provides approximately 20% of the surface-water flow to the Bay-Delta system. Portions of the Pit River are degraded, and efforts are underway to improve management practices and implement restoration projects to improve water quality, aquatic habitat, and aesthetic values. Watershed improvements implemented through this project will contribute to improved water supply reliability for downstream project users. The Shaw Ranch and Ash Creek projects affect water quality parameters positively in the Pit River watershed, preventing loss of valuable land to erosion, reducing sediment loading, minimizing nutrient loading, increasing dissolved oxygen, and decreasing water temperatures. Developing Shaw Ranch into a working site for education and outreach expands the opportunities for watershed citizens to observe good stewardship in action.

## PROJECT OVERVIEW

Sections of the Pit River are listed as impaired water bodies for temperature, dissolved oxygen, and nutrient loading as defined in the Federal Clean Water Act, Section 303(d). Sediment and turbidity in the Pit River and some of its tributaries are also believed to be at levels that impair certain beneficial uses. The Pit RCD is in the early stages of establishing a proactive, locally directed watershed management program; this project is directed at two related activities—continued support for a watershed coordinator and implementation of Shaw Ranch Riparian Restoration and the Ash Valley Stream Protection Program to improve problem areas identified in a watershed assessment.

The watershed coordinator contributes to a more proactive Pit RCD watershed management program and a more informed and involved watershed community. The coordinator also works with individual landowners to identify project opportunities and seek funding and technical assistance to implement projects.

The Shaw Ranch Riparian Restoration project is located in southwestern Modoc County. The ranch, which contains 2.5 miles of the Pit River, has been progressive in promoting sound and innovative natural resource stewardship practices, serving as a model for other ranches. Components of this project include resloping 600 feet of high, vertically eroding banks to promote floodplain access on the mainstem of the Pit River; planting native vegetation to minimize erosion and promote bank stability; installing 1 mile of fencing to contain livestock; and providing a large-scale demonstration site for education and outreach.

Ash Valley is located in Lassen County and is the hydrologic start for Ash Creek, which flows into the Pit River. The unique spring-fed Ash Creek holds vital habitat for the endangered Modoc sucker. Riparian habitat on this creek is degraded. Fencing will be installed at selected reaches of Ash Creek to reduce livestock pressure on the creek. Newly planted vegetation will develop and shade Ash Creek. Other components of the project include filtering irrigation tailwater and unifying adjacent landowners to integrate stream restoration practices that will help improve the overall water quality in Ash Creek.



*The mainstem Pit River near the confluence of Stone Coal Creek near the Stone Coal Valley.*

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# RED CLOVER CREEK/MCREYNOLDS RESTORATION PROJECT

Plumas Corporation/Feather River Coordinated Resource Management (FRCRM)



FRCRM staff and tour participants assess an active headcut on Red Clover Creek that is continuing the degradation in a 50-foot-wide, 15-foot-deep gully downstream.

## AWARD AMOUNT

\$1,101,000

## WATERSHED

North Fork Feather River Watershed

## COUNTY

Plumas County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 3, State Senate: 1

## PURPOSE

Restore the meadow/floodplain functions that existed in a key subwatershed of the Feather River before gullies developed

## PROJECT GOALS

- ✦ Reduce peak winter flows and increase summer base flows
- ✦ Reduce sediment delivery to downstream areas and improve water quality constituents associated with excess sediment
- ✦ Eliminate active excess erosion of gully walls
- ✦ Improve fish and wildlife habitat

### *Benefits to the Bay-Delta System*

The Red Clover Creek/McReynolds Restoration Project restores floodplain function to the Feather River watershed and the Bay-Delta system, and provides watershed, ecosystem restoration, water use efficiency, water quality, and environmental justice benefits. This project reduces sedimentation, which has been linked with declining habitat in upper watershed streams. The reduced sedimentation maintains capacity of storage reservoirs, and the restructured flows increase water use efficiency by slowing water releases in winter and increasing them in summer. The meadows that are created by plugging the gully restore soil nutrients and historical wildlife and aquatic habitat. By eliminating the gully, turbidity is lessened, improving environmental and drinking water beneficial uses. This project will develop assessment protocols through its monitoring component, and will help build capacity to manage the watershed efficiently through education and outreach activities. Collaborating in the restoration of what was once an important cultural material gathering area, the local Maidu community gains an economic base for their cultural programs.

## PROJECT OVERVIEW

The Upper Feather River watershed has approximately 400 square miles of meadow floodplain, 98% of which has become dewatered by gullied, down-cut channels that formed over the last 100 years. The down-cut channels have undermined the function of the floodplain and have accelerated the flow of water out of the watershed, adding to the natural sediment supply through bank erosion and depriving the ecosystem of nutrients formerly captured in the wet meadows.

Local and regional initiatives have determined that restoration efforts in the Red Clover Valley have the potential to significantly improve the timing of flows, erosion control, water quality, wildlife and fisheries habitat, and quality of lands for agricultural production. Red Clover Creek is the fourth highest sediment-producing subwatershed in the North Fork Feather River Basin, with 70% of its sediment derived from gully-wall erosion of the entrenched stream channel system in Red Clover Valley. The vast majority of the sediment is transported downstream, negatively affecting instream habitat, channel stability, water quality, and reservoir storage capacity.

The Red Clover/McReynolds project area is dominated by a large and expanding gully—now averaging 11 feet deep and 95 feet wide. The gully contains all floodflows, contributing to extreme depths and velocities during moderate and major floods, and acts as a flume, delivering sediment-laden peak flows downstream. This project uses a method that has been very successful in other locations in the watershed to eliminate the gully and restore floodplain function. Ponds are created by widening and deepening portions of the gully, and the remaining channel is plugged back to the original grade with the excavated material. Channel flow is directed into remnant channels at the meadow elevation. The project is designed to be self-maintaining and includes a monitoring component. Additionally, Plumas Company is working with the Maidu Cultural and Development Group and others in the vicinity to help determine the original conditions of the area and develop training for archaeological monitors.



*FRCRM partners from DFG, DWR, and Plumas Corporation collect pre-project fish population data on Red Clover Creek.*

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# SACRAMENTO RIVER WATERSHED PROGRAM (SRWP)—PROGRAM SUPPORT

*Sacramento River Watershed Program*



*"Sacramento River Oxbow" by Geoff Fricker, April 2001. TNC Collection, Chico.*

## PURPOSE

Provide a network among local and regional watershed management efforts throughout the Sacramento River watershed to improve watershed health

## PROJECT GOALS

- ✦ Conduct watershed monitoring
- ✦ Coordinate environmental education activities and conduct public outreach
- ✦ Provide assistance and support to local watershed groups

## AWARD AMOUNT

\$2,262,760

## WATERSHED

Sacramento River Watershed

## COUNTY

Butte, Colusa, El Dorado, Glenn, Lake, Lassen, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sutter, Tehama, Yolo, and Yuba Counties

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 1, 2, 3, 4, and 5; State Assembly: 2, 3, 4, 7, and 10; State Senate: 1, 2, 4, and 5

### *Benefits to the Bay-Delta System*

The health of the Bay-Delta System is dependent on the rivers and streams that make up its watershed. The Sacramento River is the largest tributary to the Delta's watershed, providing about 80% of the inflow to the Delta. It is the largest riverine ecosystem in the State. Californians depend on this watershed for agriculture, drinking water, timber harvesting, hydroelectric power generation, fishing and recreation, and many other diverse and sometimes competing needs. Implementation of this project provides valuable information regarding the health of the watershed through a water quality monitoring program. It also raises awareness about the importance of watershed management through education and outreach, and assists local groups to manage their own tributary watersheds more effectively. Implementation of this project provides direct benefits to agriculture, municipal, and environmental interests, as well as recreational users of areas of the watershed and of the Delta.

## PROJECT OVERVIEW

The Sacramento River watershed encompasses more than 27,000 square miles, roughly 17% of the land area of California. The river itself is more than 400 miles long, stretching from north of Mount Shasta through the Sacramento Valley to San Francisco Bay. Its major tributaries include the Pit, Feather, Yuba, and American Rivers. The SRWP was founded in 1995 to serve as an “umbrella organization” to help coordinate local watershed efforts in the Basin. The SRWP brings together public and private stakeholders, including representatives of agricultural, environmental, industrial, and municipal interests. Using a watershed approach, the SRWP encourages these interest groups to come together in search of workable approaches to watershed management. This project focuses on three main areas (1) capacity building for watershed management efforts; (2) public outreach and education; and (3) watershed monitoring and technical support.

Capacity-building activities include establishing and maintaining relationships throughout the watershed to create successful collaboration and partnerships and to develop stronger regional and local watershed stewardship. The purpose of SRWP’s public outreach and education strategy is to promote greater understanding of what a watershed is, what constitutes watershed health, and to provide information about the Sacramento River Basin and its watersheds. Public outreach activities include implementing television public service announcements, media releases regarding watershed events, a website, exhibits at regional public events, educational workshops, and an annual stakeholders meeting. The SRWP also coordinates various K-12 environmental education activities such as the international GLOBE Program and River of Words competitions.

The third project component—watershed monitoring—has been a major component of the SRWP since its inception. The SRWP conducts water quality monitoring on the mainstem river to: (1) assess conditions throughout the watershed, including the attainment of beneficial uses and water quality standards; (2) identify and evaluate alternative management options to improve water quality in the watershed; and (3) provide information on watershed health to all stakeholders.

The SRWP provides for stakeholder input by using open subcommittees to oversee major program components and associated tasks. The subcommittees also serve as technical review and discussion groups for implementation of program plans. The four primary subcommittees include: Monitoring Subcommittee, Delta Tributaries Mercury Council, “Ag Issues” Subcommittee, and Public Outreach and Education Subcommittee.



*Art by SRWP 2003 Regional River of Words Grand Prize Winner Michelle Wurlitzer, age 14. Marsh Junior High School, Chico.*

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# STONY CREEK WATERSHED ASSESSMENT AND MONITORING PROGRAM

Glenn County Resource Conservation District



*Giant reed and salt cedar in the Stony Creek stream channel (Photo courtesy of Cindy Horney).*

## PURPOSE

Establish and implement a locally directed watershed management program for the Stony Creek watershed

## PROJECT GOALS

- ✦ Establish an active and locally directed watershed-wide management program
- ✦ Complete a comprehensive watershed assessment that will guide the management program
- ✦ Implement a watershed monitoring program to track long-term watershed conditions and trends
- ✦ Demonstrate applications of innovative mapping, eradication, and restoration techniques for managing giant reed and tamarisk

### AWARD AMOUNT

\$763,200

### WATERSHED

Stony Creek Watershed

### COUNTY

Glenn, Colusa, and Tehama Counties

### CALFED REGION

Sacramento Valley Region

### LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 4

## *Benefits to the Bay-Delta System*

Numerous studies and assessments have been performed in the Stony Creek watershed area. However, none of these efforts has addressed the watershed as a whole. The Stony Creek Watershed Assessment will examine all existing information and consider the watershed as a whole, providing a basis for improved local watershed planning and management. The monitoring portion of this project focuses on creek characteristics directly related to the watershed's impacts on the Sacramento River and Bay-Delta system, such as flow, water quality, channel morphology, and aquatic/riparian habitat conditions. Ultimately, this effort will lead to a watershed restoration strategy that provides a wide range of benefits, including reduced erosion; reduced sediment transport; improved hydrologic conditions; reduced populations of giant reed and tamarisk with corresponding reduction in propagule load transported to the Sacramento River; restored riparian corridors and associated linkages for wildlife; and improved landowner management practices. Landowners will benefit from the project, as will recreational users of the watershed.

## PROJECT OVERVIEW

The Stony Creek watershed is approximately 780 square miles of public and private lands in Glenn, Colusa, and Tehama Counties. It is the second largest tributary on the west side of the Sacramento River and provides habitat to many aquatic and terrestrial species. Land and water management activities, particularly in the lower reach, have resulted in degraded riparian habitat and altered streamflows and have accelerated stream bank erosion, excess sediment transport to the Sacramento River, and the establishment of significant giant reed and salt cedar populations.

This project builds on a previous CALFED Watershed Program grant that allowed the Glenn County Resource Conservation District (GCRCD) to hire a watershed coordinator to bring together individuals from various backgrounds to outline a watershed management strategy and initiate a community capacity-building process. Through this project, the GCRCD and the watershed coordinator will lead the establishment and implementation of a locally directed watershed management program for the Stony Creek watershed. This program is a multi-stakeholder effort and includes the following elements:

- ✧ The Stony Creek Watershed Assessment will be the basis for ecosystem planning and management and is necessary to initiate coordinated efforts to rehabilitate key segments of the watershed. The assessment process will characterize current and reference conditions and data needs. It will serve as an educational tool and platform for continuing the consensus-building process with landowners, agencies, and other stakeholders of the watershed.
- ✧ The monitoring program element is designed to monitor watershed conditions and track long-term trends. It will evaluate the effectiveness of watershed management actions, such as changes in land management practices, changes in reservoir release operations, and on-the-ground restoration projects.
- ✧ The eradication and restoration element establishes a demonstration site to examine existing technologies and develop strategies tailored to control nonnative invasive plants and establish native riparian habitats. This effort also engages local farmers and businesses in ecological restoration, demonstrating the cost-effectiveness of these techniques for future projects.
- ✧ A digital mapping effort will identify and plot nonnative, invasive giant reed colonies along the upper 10 miles of Lower Stony Creek. This task will provide the GCRCD and landowners with specific data on the total quantity of giant reed in the riparian area, and estimates of its rate of spread over a 12-month period. This information will be used to prioritize giant reed colonies for removal and to estimate restoration costs.



*Herd of Elk near the Snowy Mountain Wilderness (Photo courtesy of Dennis Nay).*

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# TEHAMA WEST WATERSHED MANAGEMENT PROGRAM

Tehama County Resource Conservation District (TCRCD)



Heavy infestation of *Arundo donax* along Burch Creek.

## AWARD AMOUNT

\$385,775

## WATERSHED

Westside Tehama County Watersheds

## COUNTY

Tehama County

## CALFED REGION

Sacramento Valley Region

## LEGISLATIVE DISTRICTS

US Congress: 2, State Assembly: 2, State Senate: 4

## PURPOSE

Collect needed watershed condition data, create a watershed management plan, and increase the involvement of citizens in the conservation of natural resources

## PROJECT GOALS

- ✦ Describe baseline watershed conditions in Western Tehama County
- ✦ Establish a monitoring program
- ✦ Continue education of and outreach to landowners by providing natural resources workshops on best management practices
- ✦ Continue restoration and education activities to increase community and landowner participation in support of the TCRCD mission to assist citizens with managing, conserving and improving the natural resources of Tehama County

### *Benefits to the Bay-Delta System*

The creeks in the Tehama West watershed flow from the east slopes of the coast range to the Sacramento River below Red Bluff Diversion Dam. This project takes the efforts of the Tehama West Watershed Assessment to the next level through data collection and development of a watershed management plan. This project recognizes the need to monitor baseline watershed conditions in Western Tehama County, and create a comprehensive management plan to guide the direction of land management and restoration activities beyond the time frame of the project itself. Local landowners will benefit directly from the improved conditions on their land and from the data collected there. Standard and accepted monitoring protocols will be used for the baseline data collection, resulting in data that can be shared across watersheds for comparison purposes. The added data will benefit larger management and ecosystem improvement projects in the upper Sacramento River basin. Improved conditions in the upper basin will help achieve the goals of CALFED and other management efforts such as the Sacramento River Watershed Program.

## PROJECT OVERVIEW

The creeks in western Tehama County watersheds flow from the east slopes of the coast range to the Sacramento River below Red Bluff Diversion Dam. They range in elevation from 200 feet at the valley floor to 8,092 feet at the crest of the Yolla Bolly Wilderness area. The westside Tehama County watersheds have complex natural resource issues and a diverse variety of ecosystems and land uses. In addition, the westside watersheds contain one of the largest concentrations of vernal pool habitat areas remaining in California. The Tehama County Resource Conservation District (TCRCD) is implementing the West Watershed Management Project, which integrates a number of aspects of environmental stewardship into a well-rounded project for long-term results.

Building on the soon-to-be-completed Tehama Westside Watershed Assessment, this project will continue the TCRCD effort to define watershed condition and management goals while implementing restoration and educational activities. TCRCD will conduct "how to" workshops on best management practices for local landowners and will assist with the creation of individual monitoring plans for landowners. TCRCD will also expand the book *Nature's Nursery: A Guide to the Beneficial Plants of Tehama County* to include twenty additional local native plants. Each new plant entry will have a color picture, and each description will include habitat types, growth characteristics, leaf characteristics, wildlife and livestock uses, propagation, and the plant's benefits. A key outcome of the outreach and education program is to communicate to landowners the important connection between the health and productivity of their lands and the health of the surrounding watersheds and natural resources.

TCRCD also uses the education and outreach program to facilitate the participation of stakeholders in preparing a watershed management plan. The plan will guide restoration, research, and management decisions in the Tehama West watershed. Although the watershed management plan will identify and prioritize restoration efforts, some priority restoration projects have already been identified. TCRCD is funding some demonstration restoration projects including removing *Arundo donax* and *Tamarisk*, fencing cattle out of waterways, and planting native vegetation to restore riparian corridors.

TCRCD works with a Technical Advisory Committee (TAC) to develop a meaningful monitoring plan for Red Bank, Reeds, Elder, and Thomes Creeks. The TAC concluded that collecting watershed condition data, including socioeconomic parameters, would be emphasized in the monitoring plan.



*Portion of Jewett Creek where Arundo donax eradication has been maintained.*

## CONTACT INFORMATION

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