


A DISTRICT RUNS THROUGH IT

A Guide to Locally Led Conservation Projects



CALIFORNIA ASSOCIATION OF RESOURCE CONSERVATION DISTRICTS

NOVEMBER 2005

Acknowledgements

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CARCD dedicates this publication to all of the people who have committed their personal and professional lives to the conservation of California's natural resources at the local level. Their extraordinary efforts are generating some of the most inspiring success stories in conservation. A small handful of them are chronicled in these case studies, and there are countless others whose stories remain to be told. 

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Introduction

RESOURCE CONSERVATION DISTRICTS WORK where the needs of human communities and natural resources intersect. The purpose of RCDs is to help people be good stewards of the land on which they live and earn their livelihoods. When people think of the environment, they often think of far-off mountains and beaches, parks and wilderness areas, and other places distant from the traffic of our daily lives. The focus of an RCD is local, near at hand, and immediate.

RCDs educate the public about natural resource stewardship in their community, provide assistance to private landowners on a voluntary basis, and take a leadership role in local conservation initiatives. They work in residential communities, the “wildland-urban interface,” and working landscapes like farms, range, and forestland. They provide a vital link between private landowners and public land management agencies to meet common conservation goals.

In California, local RCDs are involved in a huge range of activities, including educating schoolchildren about conservation, helping farmers improve air quality, organizing local watershed groups, providing workshops on technical issues, encouraging fire-safe communities, helping landowners navigate the environmental permitting process, removing invasive weeds, operating native plant nurseries, and restoring habitat for fish and wildlife (to name just a few).

This document focuses on one part of Resource Conservation Districts’ mission: implementing conservation projects that benefit landowners, the community, and the environment. Following a brief primer on the local conservation process, a series of eight case studies demonstrate the local conservation process in action.

Whether as a leader or a partner, taking on conservation projects can be an important step towards growth and achievement for RCDs. Successful projects generate enthusiasm and provide a tangible goal that brings people together with a common purpose. They advance the RCD’s goals. They help forge strong partnerships in the community. They help sharpen the RCD board’s judgment and

increase the technical capacity of staff. Successful projects can strengthen an RCD’s reputation and attract funding for future initiatives as well.

Vision and leadership — beginning with a willingness to look at old problems in new ways — are essential ingredients to success in local conservation. Resource Conservation Districts are involved in projects all over the state that exhibit such vision and leadership.

In the Central Valley, the East Stanislaus Resource Conservation District joined forces with a local farmer, the Tuolumne River Trust, and a network of government agencies to transform more than 200 acres of flood-damaged farmland into a natural riparian forest. They are turning the tables on decades of debilitating floods with a non-structural approach to flood management that benefits the landowners, the local community, and the river alike.

In Modoc County, the local Resource Conservation District turned an empty building into the educational center for their local watershed, organizing dozens of volunteers who put in thousands of hours of time. The River Center now boasts GIS maps, interactive displays, and educational events for local school kids and lifelong learners, K through one hundred and two.

The Mojave Desert RCD is taking on saltcedar, a highly destructive invasive species which infests the Mojave River and many of its tributaries. The RCD took the lead role in forming a Weed Management Area to coordinate landowners, land management agencies, and regulators, and completed a demonstration project in partnership with a local school. They are now embarking on an ambitious effort to map the entire watershed and develop a plan for saltcedar control efforts throughout the region.

Ten years ago, the Western Shasta RCD embarked on an ambitious project on Lower Clear Creek, at a time when many agencies were looking for innovative and motivated local leadership. Since then, the district has grown from one staff person to more than twenty and has become a major player in ecological restoration in Shasta County.

Twenty years ago, the Feather River Coordinated Resource Management Group brought together a diverse array of stakeholders to develop strategies for preventing erosion in the Feather River watershed. Through a voluntary, consensus-building process, they repaired nearly forty miles of channels and rejuvenated 7,500 acres of streamside meadows, reducing erosion while also increasing grazing forage and improving habitat for plants, fish, and wildlife.

In the early 1990s, the Yolo County RCD took a leadership role in conservation practices on farmland long before it was fashionable. The RCD became an incubator for new groups like Audubon California's Landowner Stewardship Program and Center for Land-Based Learning. As a result of their cooperative efforts with local landowners and NRCS, Yolo County is recognized nationwide as a leader in wildlife-friendly farming.

The Alameda County Conservation Partnership is helping local ranchers navigate a complex environmental permitting process. As a result, these ranchers can repair man-made stock ponds that endangered frogs and salamanders depend on for habitat in the highly altered landscape of the Bay Area.

Finally, a pair of fourth-grade boys exploring a creek with a local biologist came upon the first steelhead trout seen in Topanga Creek in nineteen years. They also found wrecked cars polluting the creek and threatening the survival of this valuable species. With the help of the local Resource Conservation District of the Santa Monica Mountains, they set in motion a remarkable community-wide volunteer effort to clean up the creek.

These stories comprise a very small sampling of the hundreds of the remarkable locally led projects involving Resource Conservation Districts throughout California. Most of these projects take place within working landscapes: land that has been harnessed for human use yet continues to have important ecological functions. They share a common principle of helping people restore a new balance within the economic, social, and environmental constraints of an altered land.

Restoring this balance is a vast undertaking, requiring a unique and localized approach in every community. Resource Conservation Districts are increasingly taking a leadership role in these pioneering efforts toward sustainability that is only just beginning to be fully recognized. We hope the guide that follows will provide tools to help anyone who is interested in becoming involved in the local conservation process. 

How to Use This Guide

THIS PRIMER ON LOCALLY LED CONSERVATION PROJECTS presents successful examples of recent projects done by Resource Conservation Districts and their partners to restore habitat and improve environmental resources in California. The guide is designed to offer insights and inspiration for both new and seasoned RCD directors and staff, as well as participants in local watershed groups, conservation professionals, agency personnel, decision-makers, students of natural resource and environmental science, and anyone else interested in making conservation happen at the ground level.

Part One offers a practical introduction to the local conservation process. It is intended to be an overview of the basics for people who are new to districts and local conservation. It outlines the key ingredients of successful conservation projects and provides references and links to in-depth information on specific topics. Part One is intended as a starting point for learning about how districts work. A complete set of technical guidelines concerning district operations is available in the *Resource Conservation District Guidebook: A Guide to District Operations and Management*, published in 1999 by the California Department of Conservation, included in the Appendix.

Part Two presents a series of case studies that cover a range of landscapes and conservation strategies. Each case study spotlights an exemplary project that provides multiple environmental, social, and economic benefits. The case studies

profile landowners, conservationists, districts, and their local partners, explaining how they achieved major conservation goals in their local watershed and community. Each case study highlights the following elements:

- **Anatomy of a Conservation Project** shows what was done and how it worked
- **Local Partnerships** describes the team that made the project happen
- **Critical Steps to Success** summarizes the key ingredients, lessons learned, and innovative strategies that made the project a success

By outlining general principles common to all projects in Part One, and illustrating specific case examples of what worked at a particular place and time in Part Two, we hope to provide insights into the local conservation process for current and future practitioners. The **Appendices** provide examples of management plans, agreements, budgets, and additional details about the specific case studies and local conservation in general.

The incredible diversity of California's landscape is reflected in the diversity and range of conservation projects presented in this Guide. We hope that these examples will demonstrate the outstanding conservation ethic of the people involved in voluntary efforts on the local level and illuminate the local conservation process for practitioners and general audiences alike. 

California Association of Resource Conservation Districts

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CARCD is a voluntary association whose mission is to enhance Resource Conservation Districts' effectiveness by offering unified representation and advocacy; by coordinating and supporting district activities; and by providing information, education and training programs. CARCD is committed to help districts develop a land stewardship ethic that promotes long-term sustainability of California's rich and diverse natural resource heritage.

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AFTER THE FLOOD

Putting a Lifetime of Farming to Work on the Tuolumne

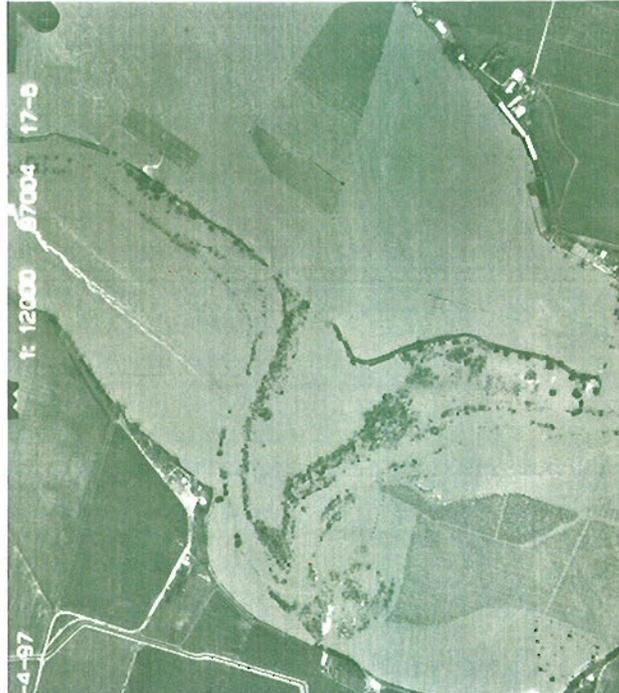
TIM VENN'S FINGER DARTS ACROSS A MAP as he sums up a decade of farming in a few short words:

So, originally, I farmed this whole area. I had 100 acres of almonds here, they were ten years old. Asian pear orchards here, and here. I was farming this field in melons. I had a truck garden for the farmer's markets. We had pecans. Then it flooded in '97 and after a few years I lost everything.

He had seen floods before, in 1981, 1982, and 1983, but nothing like this. His property is situated in a flood-prone spot in the middle of the "Big Bend," where the river channel makes a giant hairpin turn. Following the earlier floods, Venn and his father built a stronger levee to protect low-lying farm fields. They put in valves so when the river got too high they could just let it run through, flooding the fields during the storm but preventing damage to the levees.

My dad and I were always in a big fight about what we were doing, because it's impossible to fight the river. You can't do it! Just because you've been here fifteen years doesn't mean you've seen what can happen. I always knew that with some of the stuff we were farming here... we shouldn't put anything permanent in, because there's always a chance. Just 45 days of rain and anything can happen. It's that easy. And it happened.

When the '97 flood subsided, he tried to save the 15 or 20 acres of almond trees left standing, but they died within a couple years.



The flood of 1997 consumed the entire Tuolumne River floodway. Photo by Ceonex Cartwright Aerial Surveys, courtesy of the Turlock Irrigation District.

They had invested \$750K in the orchard ten years earlier; it was just beginning to produce income when the flood struck. A sewage treatment plant that flooded in Modesto sent wastewater downstream and all over his fields. The County condemned his property. "I spent \$87K just picking up garbage" he recalls, "another \$280K trying to save the land. It looked like the only way I could even come close to recouping the losses was selling the whole property."

Luckily, he discovered the Natural Resources Conservation Service (NRCS) Emergency Watershed Protection Program, which enabled him to take a marginal, flood-prone parcel permanently out of production while keeping

title to the land. This was possible because the 1996 Farm Bill created a new provision that empowered NRCS to purchase "floodplain easements" in response to local flood emergencies. NRCS' local partner, the East Stanislaus Resource Conservation District, recognized the catastrophic circumstances of farming along the river and made the decision to declare floodplain protection a top priority in 1999. Three years later Tim made a second easement transaction with help from the Tuolumne River Trust and the California Department of Water Resources.

The purchase of floodplain easements on Venn's property is part of a bold effort—that also includes the US Fish and Wildlife



Venn's low-lying orchards were overwhelmed by the flood. • Photo by T. Venn

Service, the California Bay Delta Authority (CALFED), and a host of other partners—to restore the fifty-two mile floodway along the lower Tuolumne River.

The floodplain easements enabled Venn to retain ownership of the property along the river, and reimbursed him for giving up the rights to farm it. “I had a bunch of other properties and I sold them all so I could make do with the easements. I probably could have made another \$300-400K selling this property on the open market, but I moved here with my parents in 1968—and into my own house in ‘78—so I’ve been here a long time. It’s not as much money, but I’m still home.”

A FARMER TAKES UP RESTORATION

Today, if you visit Tim Venn’s place you are likely to find volunteers from the local high school basketball team hauling trash out of the river or a local Cub Scout troop planting native sycamores and box elders in a well-groomed field where rows of almond trees once stood.

The initial floodplain preservation measures at Venn’s property have evolved into the Big Bend Restoration Project, a locally-led initiative to turn more than 240 acres of flood-prone farmlands back to a natural condition and reconnect the river to the newly protected floodplain.

The Big Bend Restoration Project took shape in 2000 when Patrick Koepele, Central Valley Program Director at the Tuolumne River Trust, approached the Board of Directors of the East Stanislaus RCD with a proposal to strengthen their ongoing efforts at the Venn property by recreating the natural hydrology of the floodplain along the Big Bend and replanting a forest of Native Valley oak and cottonwood. In addition to flood damage reduction benefits, the project would improve habitat for juvenile chinook salmon and steelhead trout, improve habitat for wildlife and resident and migratory birds, and slow an invasion of noxious weeds.

Today, the project encompasses privately owned land on both sides of the river: Venn’s property on the south side and a smaller parcel on the north side recently purchased by the East Stanislaus RCD.

The Tuolumne River Trust successfully sought grant funding to design and manage the project and coordinate the partnership. Venn submitted a bid to the Trust and won the contract to implement the on-the-ground reforestation work. The East Stanislaus RCD, in addition to purchasing the land, provides a vital link to the community at large. For example, when the project needed to be reviewed for compliance with the California Environmental Quality Act (CEQA), the RCD

served as the lead agency, providing a forum for public review and comment.

The restoration at the Big Bend has even created opportunities for the local school district. Through a connection with a Director at the East Stanislaus RCD, the Tuolumne River Trust has forged a partnership with the Salida Elementary School to create an “Outdoor Classroom” project that brings fourth grade children and their parents to the RCD’s property for hands-on science lessons at a real-life conservation project. (See *Mending the Bend* included here.)

Tim Venn’s life-long skills as a farmer are being put to excellent use on the restoration project. As he looks down a row of fresh plantings, he points out the species: “red and black willows, sandbar willows, arroyo willows, box elder, oregon ash, buttonbrush, California rose, and California blackberry...” The rows of small saplings curve in a gentle arc across the field, measuring precisely seventeen feet from one another, the minimum spacing required by the California Reclamation Board. Tim bought new equipment that enables him to spray, mow, and cultivate between the rows in one pass.

Will other farmers along the river be doing this one day? Shaking his head, he comments:

You know, the meetings people put together... the announcements they send out... they all take agricultural people and turn them off immediately. If I went to my neighbor up there, and told him, “I’m doing a riparian wetland restoration to restore the hydrology of the river and improve water quality up and downstream,” he couldn’t care less! But if I told him “I’m planting a forest at 17-foot spacing on a diamond, and putting down a two line drip,” he would understand that right away, and probably be interested.



Venn explains planting techniques to volunteers at the “Mend the Bend” Field Day
Photo by Patrick Koepele—Tuolumne River Trust

Developing a Non-Structural Approach to Flood Management

THE BIG BEND RESTORATION PROJECT is part of a larger story of restoration on the Tuolumne River. The headwaters of the Tuolumne River begin in the High Sierra and flow through Yosemite National Park, passing through a series of reservoirs on the upper section of the river. The largest dams are O'Shaughnessy Dam, which forms Hetch-Hetchy Reservoir and provides drinking water and electricity for San Francisco and the Bay Area, and the New Don Pedro Dam, which forms Don Pedro Reservoir and stores water for irrigation, hydropower, and flood control. Two miles below, the smaller La Grange Dam crosses the channel once more, then the river cuts a meandering path to the west, across the Central Valley, through foothills, cities, and farmland to its confluence at the San Joaquin River.

Along the Lower Tuolumne, much of the low-lying land around the river was developed for agriculture by farmers in the early 20th century. They built berms along the banks to hold back high water, and installed tiles to drain the fields and reclaim them for farming. The response to floods has traditionally been to rebuild and strengthen levees, armor the riverbanks, and build dams to control the floodwaters at their peak.

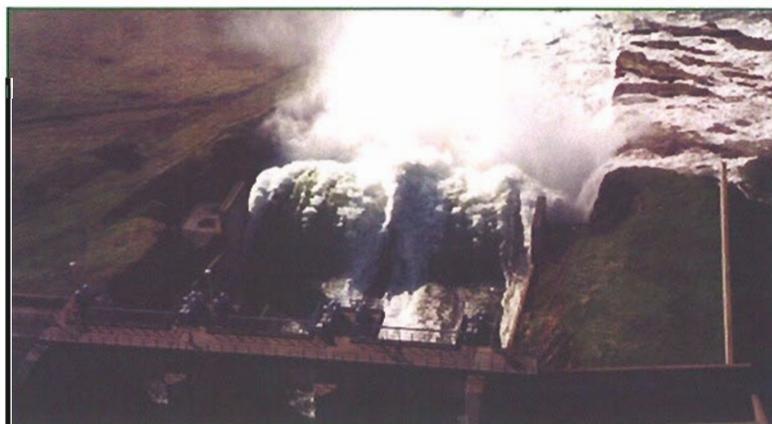
Despite decades of traditional flood control interventions, the flood in 1997 on the Tuolumne carried flows as high as 60,000 cubic feet per second, which caused devastation to communities and individual landowners up and down the watershed. As Mike McElhiney, the District Conservationist for the Natural Resources Conservation Service, recalls "We almost lost Modesto! The dam did its job, but let me tell you, when you've got water coming over the dam, banks falling in, levees breaking... that brought a whole new focus to a river that previously had not received one nickel of support."

Community leaders approached the river with a new sense of urgency after the flood. A blue ribbon commission was formed and local leaders came together to seek long-term

solutions to perennial problem of flooding on the river. This resulted in an unprecedented partnership between local, state, and federal agencies that created a pipeline of funding and technical assistance to help local groups achieve major changes in the river system.

In the early 1990s, John Hertle, then an RCD Director, and McElhiney worked with a group of local farmers and the Stanislaus County Board of Supervisors to consolidate a number of small Resource Conservation Districts scattered around the eastern half of the County. The consolidation created the new East Stanislaus Resource Conservation District, enabling a single District to serve private landowners throughout the watershed of the lower Tuolumne River.

Around the same time, a review of the license for New Don Pedro Dam raised challenging questions about the future regulation of water flows in the river. Controversy was brewing between environmental groups, the Turlock and Modesto Irrigation Districts, San Francisco Public Utilities Commission, which supplies water to San Francisco, the California Department of Fish and Game, the U.S. Fish and Wildlife Service, and the U.S. Federal Energy Regulatory Commission over declining salmon stocks and environmental conditions brought about by years of human alterations to the river, raising the prospect of a prolonged legal battle over the river.



Floodwaters rushing down the spillway at the New Don Pedro Dam.
Photo by Turlock Irrigation District

Gridlock was averted when a group of eleven organizations and agencies forged a historic settlement, agreeing to outline a recovery strategy for the wild salmon population, including improved in-stream flows for dwindling fish populations, to mitigate declines in the fish population. Among other things, the 1995 FERC Settlement Agreement set up a

team of local stakeholder groups and agency representatives called the Tuolumne River Technical Advisory Committee to coordinate restoration efforts on the river, and established a fund for restoration projects with payments from the San Francisco Public Utilities Commission.

These new institutions were just finding their feet when the flood hit in 1997. The East Stanislaus RCD quickly recognized that floodplain easements could offer a financial lifeline to farmers struggling with losses, and established local priorities that enabled NRCS to purchase easements from willing sellers along the river. The East Stanislaus RCD, because of its strong connections with local farmers and willingness to work cooperatively to seek innovative solutions in the floodplain, was also selected to administer the riparian restoration fund set up by the FERC Settlement Agreement.

Tim Ramirez, then a Scientist with the Tuolumne River Trust¹ and member of the Technical Advisory Committee, submitted an op-ed² to the local newspaper giving voice to a new vision for managing the river. "The January 1997 flooding on the Tuolumne, while creating economic hardships and threatening lives, also signaled the rebirth of a river that had not seen a real flood in almost 50 years," Ramirez wrote. "Driven by the river's dwindling wild salmon population, traditionally opposed interests are making an unprecedented effort to restore the 52 miles of the Tuolumne River between LaGrange [Dam] and the river's confluence with the San Joaquin River."

¹ *The Tuolumne River Preservation Trust changed its name to Tuolumne River Trust in 2003*

² *Our Communities' Lifeblood. The Tuolumne River Provides Water, Power, Recreation. Modesto Bee, 12/8/1998*



The Big Bend Restoration Project and an earlier conservation project at Grayson Ranch form a large patch of restored floodplain and riparian habitat on the Lower Tuolumne. • Photo by Turlock Irrigation District

Over the next two years, the Technical Advisory Committee produced the *Habitat Restoration Plan for the Lower Tuolumne River*, presenting a non-structural approach to floodplain management. The plan went beyond simply mitigating damage and waiting for the next flood to occur. Instead, it proposed an expanded floodway that would reconnect a series of parklands and flood-prone, hard-to-farm properties near the river into a corridor for fish, wildlife, water quality, and flood protection. The goal was to reduce economic damage from future floods by taking people and crops out of harm's way, while simultaneously recreating natural functions of the river so that it would rebound more rapidly, and doing it all *without* building new dams or control structures that disrupt the flow of the river.

Local conservation efforts were propelled forward by the partnerships formed on the Technical Advisory Committee. With funds from the Emergency Watershed Protection Program, McElhiney worked with Tim Ramirez and others to raise funds for the purchase of floodplain easements on the river. "That's when we figured out how to fund the projects that everybody wanted to fund," recalls McElhiney. "We went from 0 to 13 easements in a matter of years."

Mike McElhiney received a national award from USDA, honoring his leadership in the restoration of the floodway along the river. Today, the lower Tuolumne River is recognized nationwide as the leading example of non-structural floodplain management in the West.



Mike McElhiney receiving national NRCS achievement award "for leading and coordinating the protection of 5,000 acres, resulting in established wildlife corridors and habitats." • Photo by NRCS

IMPLEMENTING FLOODPLAIN RESTORATION AT THE BIG BEND

Anatomy of a Conservation Project

THE BIG BEND RESTORATION PROJECT is reconnecting a 0.9 mile reach of the Lower Tuolumne River to its natural floodplain and restoring native riparian forest on 242 acres of low-lying farmland. The goal is to provide forage and rearing habitat for juvenile salmon as well as wetland areas for birds and other wildlife species. In keeping with the Habitat Restoration Plan of the Tuolumne River, the project aims to demonstrate that a dam-regulated river can be rehabilitated to function as a natural, free-flowing river would.

The Big Bend restoration is really a combination of projects undertaken by a variety of cooperating partners involving easements, acquisitions, and landscape alterations happening over the course of many years. The main tasks are committing the land to conservation (preservation), reconnecting the river to its floodplain, and replanting a riparian forest (restoration).

In 2002, the Tuolumne River Trust entered into a \$1.9 million contract with the Department of Water Resources *Floodplain Restoration Program* that enabled the Trust, NRCS and the District to consolidate the various projects into a coordinated, multi-landowner restoration effort.

BIG BEND FLOODPLAIN PROTECTION AND RESTORATION PROJECT

LANDOWNERS

Property Owners: Tim Venn and the East Stanislaus RCD
Location: Stanislaus County
Surrounding Crops: Almonds, Winegrapes
Soils: Columbia, Foster
Topography: 37' to 45' above sea level.
Water: All groundwater.

PROJECT DETAILS

Restoration Area: 239 Acres
Vegetation: Valley Oak Forest, Fremont Cottonwood Forest, and Valley Oak Savannah
Earthwork: Venn 5,000 yds³; ESRC 3,000 yds³.
Trees Planted: 8,000 and counting...
 The newly reconnected floodplain is expected to draw water every three or four years.

"The [RCD] directors may acquire by purchase, lease, contract, or gift all lands and property necessary to carry out the plans and works of the district." - CA Public Resources Code, Div. 9, Ch. 3, Sec. 9405.

COMMITTING THE LAND TO CONSERVATION

Tim Venn realized that floodplain easements from NRCS were the perfect solution to his dilemma, so in 1999 NRCS purchased the first floodplain easements on his land. The second easement was purchased by NRCS with matching funds from the Tuolumne River Trust's DWR contract. These parcels make up three quarters of the Big Bend Restoration site.

The land across the river had been flooded many times as well. The landowners were eager to have their property included in the restoration project so it would return to its original condition, but they preferred to sell the property rather than maintain ownership under an easement. Seeing an opportunity to expand on the Venn project, the East Stanislaus RCD purchased the property with funding from the FERC Settlement Agreement Restoration Fund (financed by the San Francisco Public Utilities Commission) and additional funds from the Tuolumne River Trust's DWR contract. NRCS purchased an easement on the property as well. Together with the Venn parcels, they comprise 239 acres of private land committed in perpetuity to conservation.

RCDs are eligible for tax-exempt status because they are chartered under Division 9 of the California Resources Code as an entity of state government. However, the partnership agreed that it would be best keep the property on the tax rolls. Therefore, the District took the unusual step of voluntarily having the property reassessed, and now pays taxes for their ongoing use of the land, so that the project does not cut into the tax base of their local community.

The Tuolumne River Trust's contract with DWR also provided for the establishment of a \$40,000 maintenance endowment for the RCD to manage the property.

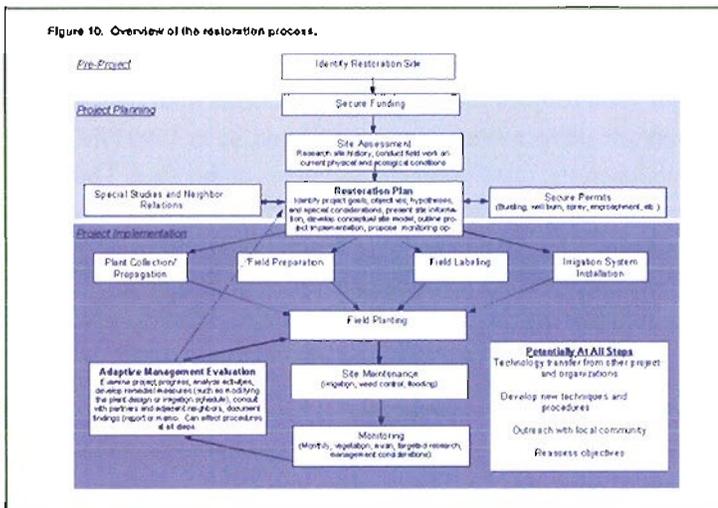
Reconnecting the River to the Floodplain and Re-planting a Riparian Forest

PATRICK KOEPELE FROM THE TUOLUMNE RIVER TRUST took the lead role in organizing the restoration phase of the project. With the DWR contract and additional funds from the NOAA Fisheries Community-based Restoration Program, he hired, through a competitive bid process, Philip Williams and Associates, an engineering firm, to conduct hydraulic analyses and design the earthwork for the project. He also hired River Partners, a non-profit restoration organization, to develop a revegetation plan, titled the *Riparian Restoration Plan for the Big Bend Project*. The Trust, with assistance from NRCS, the RCD, and consultants,

procured all the necessary permits as well. Reflecting on the paperwork, Mike McElhiney commented "You'd think we were building up a Wal-Mart in the floodplain given all the environmental documentation that got done on this project."

In late summer of 2004, the Trust solicited bids for reforestation work on the entire project area. Venn teamed up with Bitterroot Restoration, a professional restoration company, and submitted the lowest bid, winning the contract. For Koepele, hiring Venn provided a multitude of benefits: "He lives there, so he knows the subtle nuances no one would know unless they worked the land for 30 years. He'll remain on site to keep an eye on things, and he'll also have pride of ownership."

Figure 10. Overview of the restoration process.

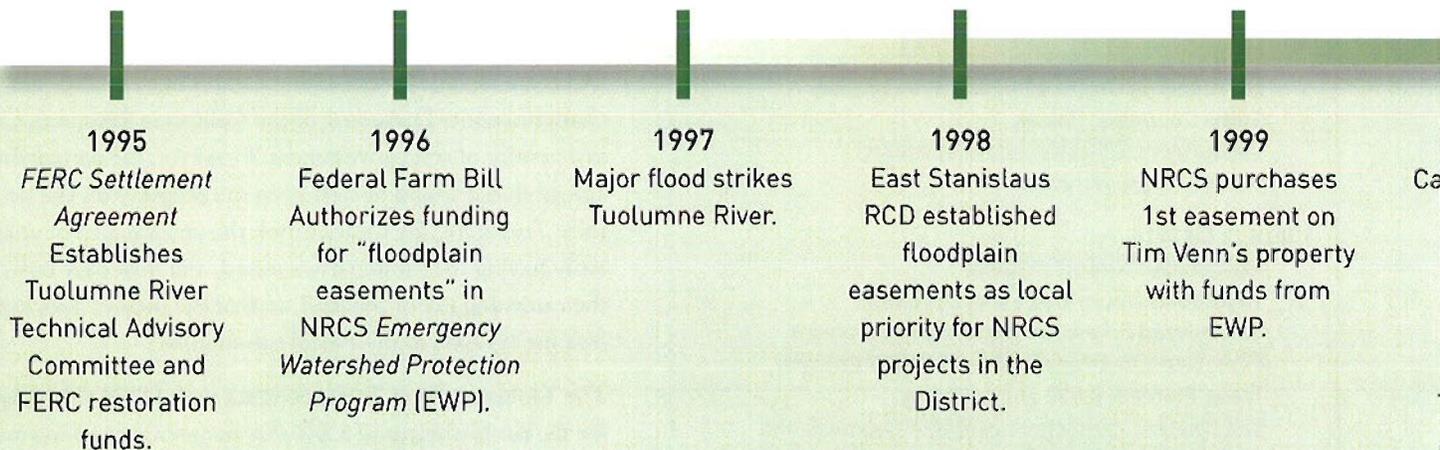


Project Implementation Schematic • River Partners, July 2004



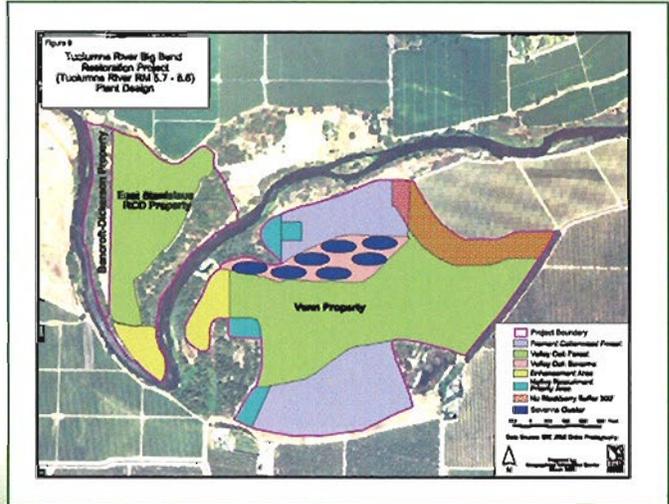
The berm protecting Venn's property from floodwaters was notched in strategic locations to allow the river back onto its natural floodplain. • Photo by Tim Venn

TIMELINE OF PRECIPITATING EVENTS

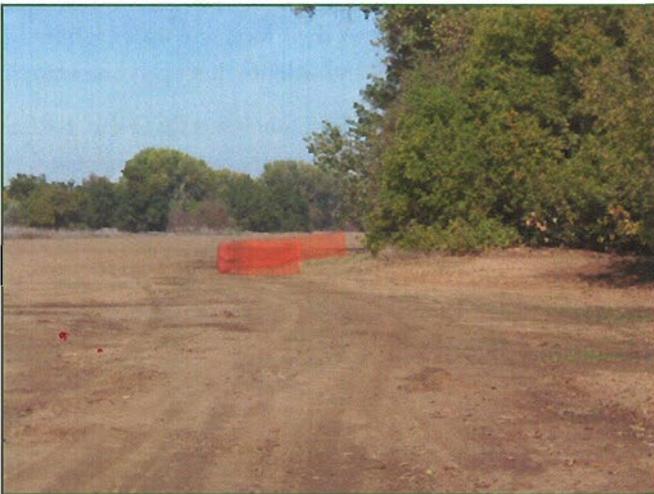




Koepele hired contractors to prepare the ESRCDC site for planting. The site was disked and leveled to smooth the surface for irrigation, mowing, and spraying. This truck is watering the field to keep down dust during the field preparations. Photo by Patrick Koepele – Tuolumne River Trust



The Riparian Restoration Plan provided a blueprint for restoring native Valley Oak Forest, Fremont Cottonwood Forest, and a Valley Oak Savanna. River Partners, July 2004



Orange fencing was set up to protect elderberry bushes from machinery. The plants provide habitat for the Valley elderberry longhorn beetle, a federally listed endangered species. • Photo by Patrick Koepele – Tuolumne River Trust



Many of the plant materials were propagated from trees onsite to ensure that the new plantings would be genetically adapted to the local conditions. • Photo by Patrick Koepele – Tuolumne River Trust

2000
California Voters pass Prop 13, the "Water Bond" Act. \$700 million designated to DWR Flood Corridor Protection Program. Tuolumne River Technical Advisory Team completes Habitat Restoration Plan for the Lower Tuolumne River.

2001–2005
NRCS, CALFED, DWR and FWS complete thirteen floodplain easements on the Tuolumne and San Joaquin Rivers between 1998 and 2005. Mike McElhiney receives national award in 2004 for leadership on Tuolumne River floodway projects.



Bitterroot Restoration planted a native Valley Oak Forest on the East Stanislaus RCD property. • Photo by Patrick Koepele – Tuolumne River Trust



Venn soon figured out he could apply traditional farming methods and get excellent results managing the work on his own. With help from hired work crews and community volunteers organized by the Tuolumne River Trust, he manages the planting and maintenance of a Valley Oak Forest, Fremont Cottonwood Forest, and a Valley Oak Savannah on his own property. © Photo by Ben Wallace

FLOODPLAIN RESTORATION PROJECTS are not without their critics. Mike McElhiney recalls the words of one farmer, a veteran of many battles with flooding on the Tuolumne: "If you only knew how hard I worked, how many truckloads I pulled out of that bottomland to make that farmland, it just breaks my heart to see you guys plant trees down there."

However, as the project evolves and natural floodplain functions come back to life, the project is creating new oppor-



Following spring snowmelt and a winter storm, the Tuolumne River rises onto the floodplain at the Big Bend. © Photo by Patrick Koepfle—Tuolumne River Trust

tunities to provide education and outreach that reconnects people to the land that grows their food and water, while harboring the open spaces and wildlife that everyone enjoys.

Looking to the future of the East Stanislaus RCD site, NRCS Soil Conservationist and Planner Mary Jane Nelson commented: "It's gone from being an abandoned cornfield with levees and berms, and there's a native riparian forest out there now. When the river was up this year, it began receiving floodwater. It's small today, but in five or six years it going to be quite significant."

BIG BEND PROJECT MILESTONES

2002	2003	2004	2005
<p>Tuolumne River Trust receives major contract with DWR Floodplain Restoration Program.</p> <p>2nd easement on Venn Property purchased with funds from EWP and DWR contract.</p> <p>East Stanislaus RCD purchases property opposite Venn with funds from DWR contract and FERC Settlement Agreement. Simultaneously, NRCS purchases easement on ESRCD property with funds from EWP.</p>	<p>Tuolumne River Trust hires consultants for site assessment and planning.</p>	<p>Site assessment and planning completed.</p> <p>East Stanislaus RCD submits plan for CEQA review.</p> <p>Tuolumne River Trust hires general contractor to complete earthwork and Tim Venn to implement reforestation.</p> <p>Berms notched, fields prepared, and reforestation work begins.</p>	<p>High spring flows emerge on the newly reconnected floodplain.</p> <p>Community volunteers plant trees at <i>Mend the Bend Field Day</i> on Venn restoration site.</p> <p>Salida Elementary School and Tuolumne River Trust organize first <i>Outdoor Classroom</i>, hosted by East Stanislaus RCD.</p>

MENDING THE BEND

An Outdoor Classroom for Fourth Graders at a Science Magnet School

NOW THAT THEY OWN THE LAND AND THE RESTORATION is underway, the East Stanislaus RCD is hosting an innovative new "Outdoor Classroom" project for children at the Salida Elementary School. Dozens of fourth, fifth, and sixth graders and their parents are taking part in a series of field trips to the Big Bend Restoration Project for lessons in life science and earth science on the Tuolumne River.

During their first trip to the Big Bend in June 2005, the young scholars explored four different educational stations with real-life scientists, learning skills such as:

- Plant identification, using a dichotomous chart to distinguish different species of plants by their leaves;
- Collecting plant specimens to press, dry, and mount in the classroom;
- Drawing field sketches of riparian habitat to develop observational skills and make a record of how the site looks for comparison in the future; and
- Planting young tree saplings to give students a personal stake in the project.

Lynn Hansen, a retired biology teacher from Modesto Junior College, designed the lesson plans as part of a larger "Trekking the Tuolumne" curriculum that meets the requirements of California Science Standards. Over the course of 18 months, the school children will return to the site three more times to study new subjects and track the growth of the trees

they planted, seeing the restoration site progress from a newly planted field into a riparian forest ecosystem.

Jeri Passalaqua, Principal of Salida Elementary School, wants her students to appreciate the place they live. "We do a really good job educating children about the rain forest and the arctic; this gives them a chance to learn about their own home environment," she says. Salida is a Science Magnet School, so hands-on learning at an actual restoration site fits right in with the school's mission.

Jeri and her husband Mike first got interested in the Big Bend Project when the RCD purchased the property adjoining their farm. Mike has since become a Board Member of the East Stanislaus RCD. The RCD went on to build a bus ramp, providing safe access for the students, and covers liability insurance and other expenses to get the site ready for students and their families.

Patrick Koepele at the Tuolumne River Trust raised \$24,000 from the National Fish and Wildlife Foundation and PG&E to help the school buy scientific equipment and train the teachers.

Having seen the land evolve from an unused patch of flood-prone farmland to a vibrant learning environment for the children, Passalaqua reflects: "One day they may be able to bring their kids here, when these young seedlings have turned into giant oaks, and tell them how it was only two feet tall when they planted it. Maybe it will become a heritage site for them. That's my dream."



Patrick Koepele shows Salida Elementary fourth graders how to prepare a native plant for planting. •Photo by Jenna Olsen – Tuolumne River Trust



Three Salida Elementary School students try their hand at restoration work. Photo by Jenna Olsen – Tuolumne River Trust

BIG BEND RESTORATION PROJECT TEAM

Local Partnerships

FUNDING

- Natural Resources Conservation Service's Emergency Watershed Program purchased two floodplains easements from Tim Venn, removing 193 flood-prone acres from farming. The same program allowed NRCS to purchase an easement on the ESRCDC property, permanently protecting 49-acres of floodplain.
- California Department of Water Resources' Flood Protection Corridor Program provided a grant to the Tuolumne River Trust and the East Stanislaus RCD to purchase the 49-acre Todd Property, matching money for NRCS to purchase the second Venn easement, and money for restoration planning, implementation, and monitoring. It also provided a \$40,000 endowment to help the RCD pay for long-term maintenance of the property.
- National Oceanic and Atmospheric Administration Community-based Restoration Program funded \$50,000 towards restoration work.
- National Fish and Wildlife Foundation and the Pacific Gas and Electric Corporation's Nature Restoration Trust funded \$24,000 to the "Big Bend Outdoor Classroom" Educational Project.
- The East Stanislaus RCD funded \$22,000 towards acquisition for the property across the river with funds from FERC Settlement Agreement Restoration Fund. The fund is financed by payments from the San Francisco Public Utilities Commission and is administered by the East Stanislaus RCD.

MANAGEMENT AND TECHNICAL ASSISTANCE

- Tuolumne River Trust coordinates the activities of the partners, raises funds, manages the grants for the restoration work and outdoor classroom project, and recruits volunteers to assist with planting.
- East Stanislaus Resource Conservation District purchased a key property, provides support to the outdoor classroom project, and as lead agency for CEQA, held hearings and collected public comments on the project.
- Natural Resources Conservation Service's Conservation Technical Assistance Program conducted a biological consultation with the Fish and Wildlife Service to ensure the project would not harm endangered species. NRCS also monitors its easements to ensure management and maintenance are consistent with the terms of the easements.

ON-THE-GROUND WORK

- River Partners conducted a Site Assessment and wrote the *Big Bend Restoration Plan*.
- Philip Williams and Associates developed earthwork designs and conducted a hydraulic analysis of the site.
- Moore Biological conducted a baseline biological resources inventory for wildlife and plants.
- EMC Planning Group, Inc. developed the Initial Study and Mitigated Negative Declaration for the project, as part of CEQA compliance.
- Tim Venn and the Tuolumne Trust implemented the Restoration Plan.
- Bitterroot Restoration was hired by Tim Venn to plant the Valley Oak forest on the East Stanislaus RCD property.
- Stillwater Sciences conducts vegetation monitoring, flood-inundation mapping, and fish-utilization surveys.
- Salida Elementary School and the Tuolumne River Trust organized the outdoor classroom project.

CRITICAL STEPS TO SUCCESS

THE BIG BEND RESTORATION PROJECT exemplifies the kind of success that can be realized when a dedicated group of people forge a common vision and work together to make it a reality year in and year out. Key elements of success in the project are:

VISION: The vision that formed among the partners on the Tuolumne River Technical Advisory Council lay the groundwork for restoration work along the entire 52-miles of the lower Tuolumne River, including the Big Bend Restoration Project profiled in this case study. In the face of a natural and human disaster, Mike McElhiney and Tim Ramirez and a small group of local leaders saw the potential to fix the river and help the community.

COLLABORATION: Strong collaboration between the Tuolumne River Trust, East Stanislaus RCD, and NRCS enabled the Trust to generate major funding for the project. By purchasing the Todd Property, the East Stanislaus RCD enabled the project to involve both sides of the river. RCD ownership also keeps the land on the tax rolls and opens up new opportunities to educate the community.

RESOURCES: NRCS, DWR, CALFED, and the USFWS all worked together to create a pipeline of funding for restoration on the Tuolumne after the disastrous flood of 1997. The Tuolumne River Trust provides excellent management skills and coordination to make the Big Bend project happen. As a District with minimal staff and overhead, the East Stanislaus RCD was able to do a lot with a little by building strong partnerships and building a solid reputation in the community.

PLANNING: Tuolumne River Trust led the planning process for the Big Bend Restoration, hiring consultants to conduct physical and biological assessments that tier off a watershed-scale plan developed by the Tuolumne River Technical Advisory Council. The East Stanislaus RCD led the CEQA review process, taking public comments for the restoration plan before it was finalized.



Project partners at "Mend the Bend" volunteer field day: Patrick Koepele (Trust), Mary Jane Nelson (NRCS), Mike Passalacqua (East Stanislaus RCD), Tim Voss (landowner) Jenna Olsen (Trust). © Photo by Tuolumne River Trust

IMPLEMENTATION: *Farmer-Led Restoration.* When the Tuolumne River Trust hired Tim Venn as the restoration contractor, they got more than just the lowest bid. Mr. Venn brought decades of knowledge about the land and the river's behavior on that land, as well as practical experience with farm management and orchard cultivation that enabled him to reforest the site with efficiency and skill.

EVALUATION: The Tuolumne River Trust hired Stillwater Sciences to conduct baseline surveys and monitor the results of the restoration project. NRCS is in charge of compliance monitoring to ensure the terms of the floodplain easements are met.

EDUCATION: The *Mend the Bend* volunteer field days and the *Outdoor Classroom* project with Salida Elementary School continue to generate strong community buy-in and support for the restoration project.

INNOVATIVE CONSERVATION STRATEGIES

- **Non-structural Approach to Flood Management.** By reconnecting the river with its floodplain, the Big Bend Restoration Project solves multiple problems—taking crops out of harm's way, receiving water during peak flows, and creating fish and wildlife habitat—that contribute to a watershed-scale effort at managing floods on the Tuolumne.
- **Outdoor Classroom.** The partnership between Salida Elementary School, Tuolumne River Trust, and the East Stanislaus RCD has enabled all parties to forge new connections in the community. By combining the "Trekking the Tuolumne" curriculum with educational field trips to a real restoration site, elementary school children and their parents are able to learn about their home environment while gaining a quality learning experience that meets California educational standards for science. 



Biologists from Stillwater Sciences sample to determine salmon, steelhead, and other fish utilization of the floodplain. • Photo by Patrick Koepele
— Tuolumne River Trust



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PASSING THE TORCH

Natural Resource & Agricultural Education in a Rural Community

WHEN THE ENVIRONMENTAL PROTECTION AGENCY deemed the Pit River an impaired waterbody, which means the health of the watershed could be improved, the watershed community and the Central Modoc Resource Conservation District decided to fix the problem locally. The Central Modoc RCD recognized that the first step toward change is education, so part of their solution was the development of *The Central Modoc River Center (The River Center)*, an interpretive facility designed to educate the public about natural resources, agriculture, and watershed health on the Upper Pit River. The River Center is the educational arm of the Central Modoc RCD, and it complements ongoing stream bank restoration and improvement projects. The first step the Central Modoc RCD took to restore watershed health was to monitor the water quality. The second step was developing an educational program. Together these efforts seek to improve overall watershed health.

The north and south forks of the Pit River converge near the small town of Alturas in the Northeastern corner of California. The Pit River winds through Modoc and Shasta Counties and finally joins the Sacramento River north of Redding. Located in Modoc County, the Central Modoc RCD is composed of ranchers, farmers and community members who utilize and enjoy the Upper Pit River. They are working with an array of local partners to foster the long-term cultural, economic and environmental health of the watershed.

"(The community) took charge locally to improve the health of the watershed so they wouldn't be told what to do in the future (by outside agencies)," Paula Fields, former education coordinator and director of The River Center, said.

The RCD group determined that an educated community is the strongest foundation for long-term improved watershed health. "Education of the public on conservation issues is

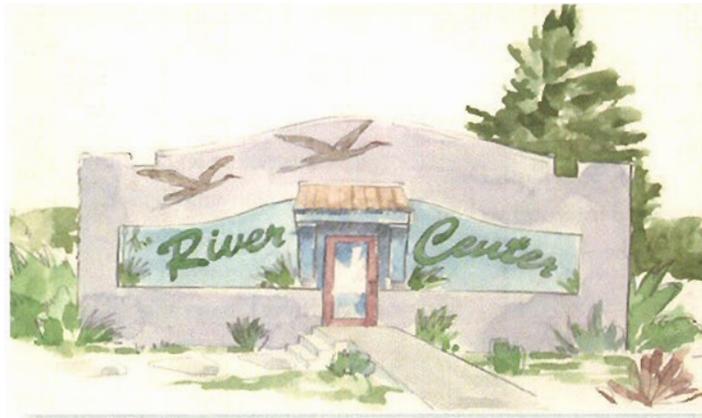
critical to getting things done," Dick Mackey, vice president of the Central Modoc RCD, said.

Prior to the development of The River Center, many children in Alturas didn't visit the Pit River or the Modoc National Wildlife Refuge, just minutes from town. Now, Alturas elementary and high school students not only visit the wildlife refuge, they also contribute to it through the Pit River Watershed Adoption Project, a hands-on learning program facilitated by The River Center. Adults and children in the

community are learning first-hand what a watershed is and how it supports their rural community.

"Kids are the future decision makers. Kids in our community can tell you what a watershed is. It's a basis for getting started," Fields said.

Today, two years after its grand opening, The River Center continues to grow.



What began as a house rented from the Modoc County Office of Education, with a few displays on the walls, is now the educational hub of the Pit River Watershed. The center facilitates elementary school field trips, interns from Modoc High School, hosts community meetings and participates in community festivals and events. The little house now has the look of a natural history museum, offering frequent tours for visitors and locals alike. They view professionally designed exhibits, including an interactive nocturnal room and an aquaria room filled with aquariums of fish native to the Pit River. The center has a display showcasing Modoc County agricultural products that are made with materials from the Pit River Watershed. There is also a garden of native plants on the grounds outside the center.

The transformation of The River Center from a barren house to a professional interpretive center was guided by two Central Modoc RCD education coordinators, Valerie Coe and Paula Fields. With the support of the District's board of

directors, they organized a network of volunteers, agencies and organizations who came together as The River Center Development Team. United by a shared vision, a passion for future watershed health, and a commitment to the quality of life in rural Modoc County, the team contributed an unprecedented level of volunteer time and expertise to make The

River Center a reality. All aspects of The River Center were created, designed or constructed locally, except for the printing of the display posters, which occurred in Reno, Nevada.

"The River Center is the community's place; it belongs to the community," Fields said.

CREATING THE RIVER CENTER

Anatomy of a Conservation Education Project

LAYING THE FOUNDATION:

THE VISION AND LEADERSHIP OF VALERIE COE

IN 1998, THE CENTRAL MODOC RCD PLACED THE REINS of their natural resource and agriculture education program into Valerie Coe's hands.

"It was very free, I only knew they wanted some sort of educational program, that's all," Coe said.

She researched other programs. In nearby Red Bluff, Dunsmuir and Bend, Oregon, Coe discovered interpretive centers that taught the importance and shared the wonders of their watersheds.

"It's important to do research and network so that you don't have to reinvent the wheel," Coe said.

"It's important to do research and network so that you don't have to reinvent the wheel."



~Valerie Coe

the small spaces and helped generate local involvement. The board's passion and ingenuity became a central theme in the development of The River Center.

Coe and Mackey agree that community support is the most vital component of the development of an interpretive center.

"Do your homework," Coe said. "See if you have community buy-in in your ideas. Consider the agricultural community,

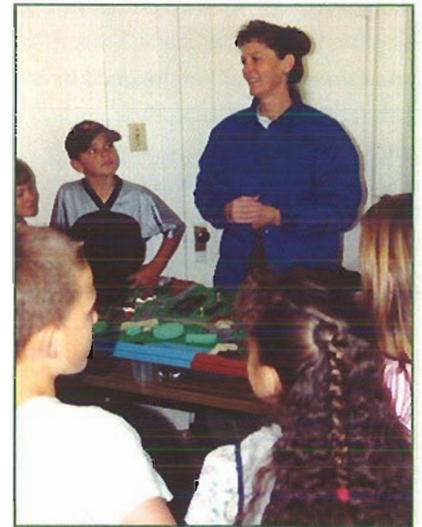
the natural resources community and especially the educational community."

After the RCD developed community support and motivated leadership, the planning began. Two committees were formed: The River Center Garden Committee and The River Center Exhibits Committee. A board member

knew a professional group facilitator and recruited her to facilitate a planning session to create a shared vision, a mission statement, and channel resources and ideas. "Creating a shared vision is a necessary step in any project development," Mackey said. The recently retired Modoc County Office of Education Superintendent Carol Harbaugh, a strong supporter of The River Center, offered a Modoc Office of Education building to the Central Modoc RCD to rent for the interpretive facility.

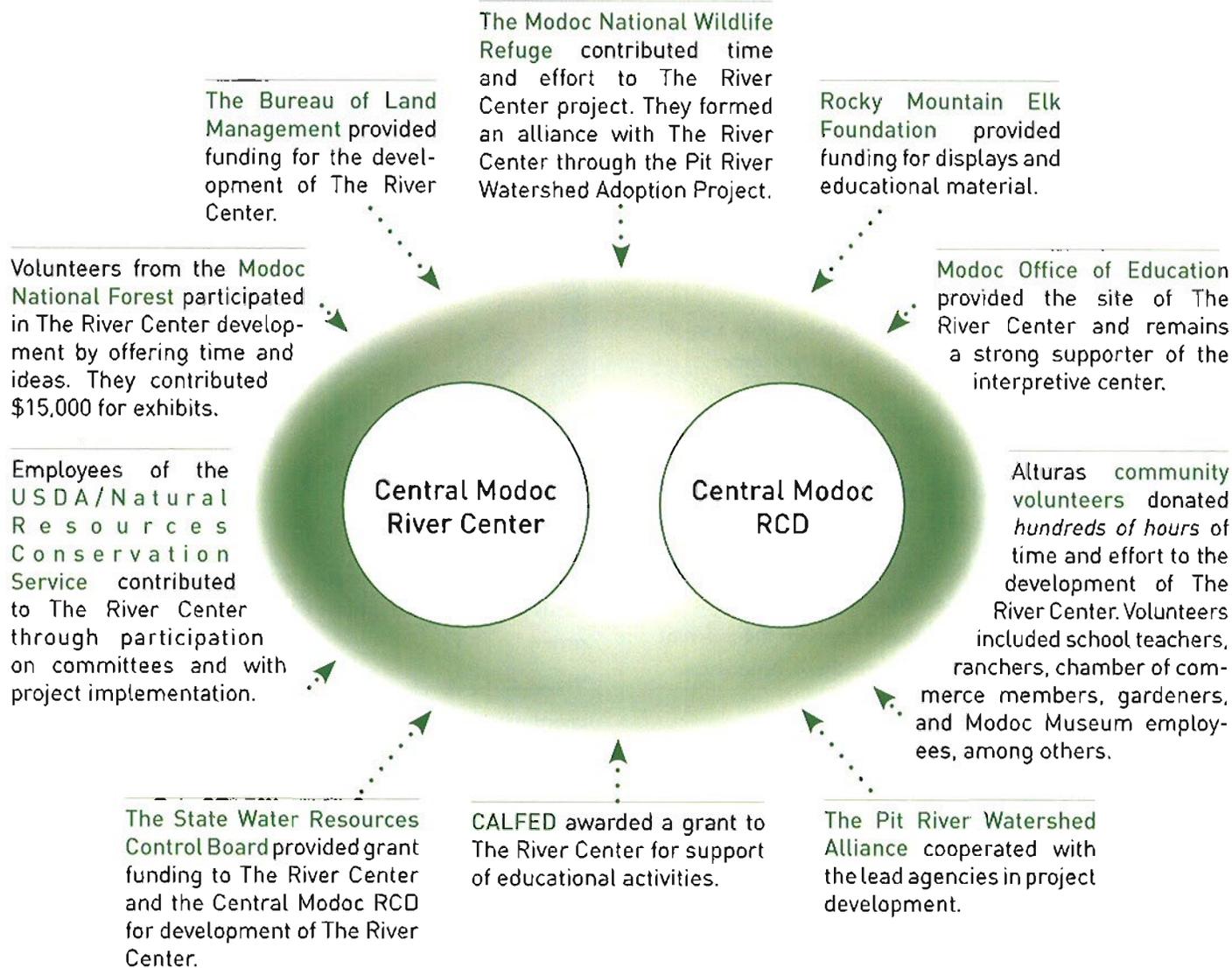
Then Coe began searching for grants and other funding. Coe said the Central Modoc RCD's search uncovered enough available funds to take the next step in the planning process.

At a natural turning point in the development process, Coe handed the project and education coordination over to a new education coordinator, Paula Fields. Funds were secured, the committees formed and the site located. Fields made it her mission to make The River Center a reality.

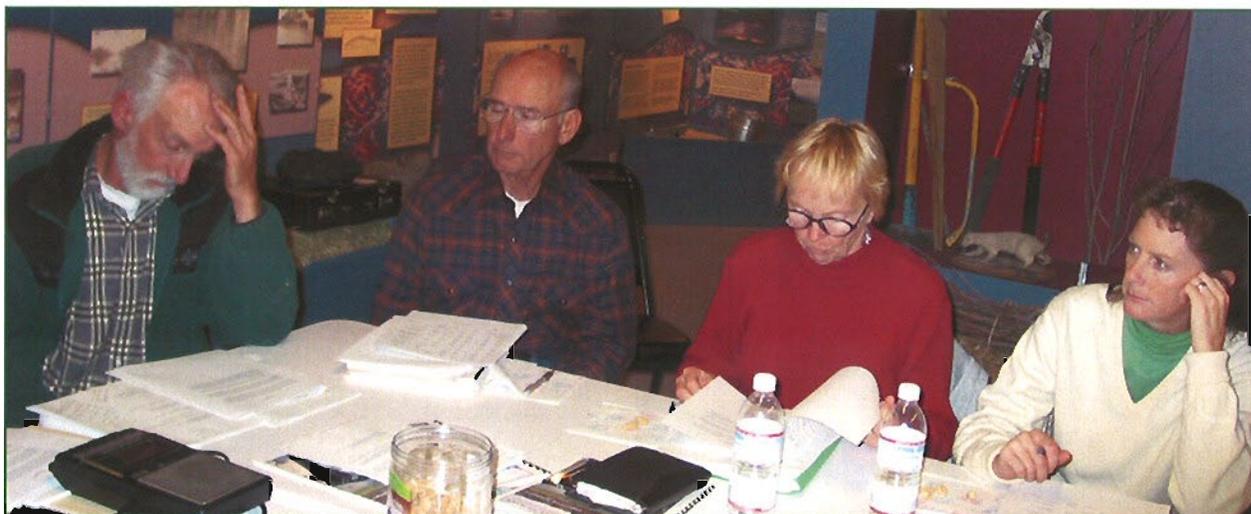


Valerie Coe

Local Partnerships



Central Modoc RCD board members meet monthly at the River Center to address watershed health issues.



MISSION ACCOMPLISHED:

PAULA FIELDS TURNS VISION INTO REALITY

After a few phone calls to interpretive centers, Fields said she realized The Central Modoc River Center would have to be different. Most of the centers she consulted with advised her that The River Center development team needed more money and more space. Fields had \$30,000 and less than 900 square feet to work with. Instead of responding negatively to the interpretive centers' perspective, the committees addressed these limiting factors with creativity and local talent.

"We were a team every step of the way," Fields said.

A graphic designer and artist, Sophie Sheppard, from a small town near Alturas was hired to create The River Center poster and mural. She had museum experience and said she felt confident leading The River Center design project. Her role was to design the panels that would line The River Center walls, including text and graphics to display to the community the importance of the Pit River Watershed.

This presented another hurdle: the task of creating a balanced, unbiased voice. The committee wanted multiple perspectives in the narration, a balance between the different voices in the community, including agriculture, economics, conservation and culture.

"Part (of the goal) of the Central Modoc RCD has always been to have a balanced perspective," Mackey said. The River Center development committees and the RCD went to great lengths to see that the text was accurate, objective and balanced. They recruited volunteers who were experts in local history, natural resources, agriculture and Native American history to review the panels, and presented each round of review before the RCD Board of Directors.



Paula Fields

Deciding the text of the panels was the most difficult task, Fields said. "It was an intense time; it was review, review, review."

Through the development process, Fields served as a project coordinator, a liaison between Sheppard, the exhibit committee and the Central Modoc RCD Board of Directors. The RCD board applied the final stamp of approval. "All decisions were run through the board," Fields said.

When the center opened in May 2003, approximately 150 people came to the grand opening. The hard work was recognized — the vision now a reality.

"We had no idea it would turn out this good," Fields said, "sometimes I walk in here and I think, 'Wow!'"

Before



RESEARCH: 1999
Valerie Coe visited interpretive centers in Red Bluff and Dunsmuir, California and the High Desert Museum in Bend, Oregon.

Vision & Ideas Session
The Central Modoc RCD hired a professional facilitator to conduct a planning session to create a shared vision and align ideas.

Gathering Funding/ Outreach
Grants were applied for and the idea of The River Center circulated.

THE RIVER CENTER



WATER, THE FOUNDATION FOR ALL LIFE

A graphic designer and artist, Sophie Sheppard, was hired to create The River Center mural to display the importance of the Pit River Watershed.



PROJECT COSTS

The following sketch of The River Center development budget shows that the committees and project coordinator worked with a limited budget. Most of their funding went to exhibit construction and installation. Volunteers from the community, local agencies and organizations donated significant amounts of time and skill to fill in the thin areas of the project budget.

River Center Development Budget

Item	Cost
Project Designer (contractor)	\$10,000
Exhibits	\$20,000
Total	\$30,000

*Grants provided funding for all costs.

Committee Decision-Making
Funds were distributed to the various tasks required to create the River Center.

Hiring: 2002
A graphic designer was hired to create the center design and exhibit panels. She led construction efforts.

River Center Grand Opening: May 2003
More than 100 people attended the event. The River Center is officially a reality.

After



A COMMUNITY ASSET FOR THE FUTURE

Educational Resources of The River Center

THE RIVER CENTER SERVES THE UPPER PIT RIVER Watershed community in several ways. Its primary role is to improve watershed health through education, but it has indirect benefits as well. Children growing up in rural areas do not have access to mainstream cultural endeavors to help form their identity. The River Center provides an opportunity for children to gain a deeper appreciation for the spectacular natural resources of Modoc County and to identify with their home. This helps the entire community take pride in their rural lifestyle by illustrating the importance of natural resources and focusing attention on watershed stewardship.

The facility is a focal point for learning about Pit River Watershed issues. The mission of The River Center is to showcase natural resources in Modoc County by developing an appreciation for how a watershed affects and benefits the community. The River Center provides support for local classrooms, the community and leisure learners who visit the area.

The River Center is a project of the Central Modoc RCD in cooperation with the Modoc County Office of Education. In 2004, the River Center formed an independent non-profit organization, continuing to work closely with the District and local schools.

RIVER CENTER STAFF

DIRECTOR: Coordinates projects, manages outreach efforts such as quarterly newsletter and regular updates to the website, writes grants, staffs the center, and facilitates strategic planning, among other administrative duties.

EDUCATION COORDINATOR: Leads educational programs and activities. Laura Van Acker, the current River Center education coordinator, has 17 years experience with natural resource management and possesses teaching credentials for the State of California. Every time she goes to the Alturas

Elementary School playground, she is flocked by students wanting to know when they get to go back to The River Center and the Modoc National Wildlife Refuge.

The Central Modoc RCD's project coordinator, watershed coordinator and assistant watershed coordinator also assist with educational activities at the River Center.

RIVER CENTER EXHIBITS & FEATURES

- Native American historical land-use component
- Front entrance mural displaying forms of life that are a part of the Pit River Watershed
- Water cycle display
- Water quality display
- History of agricultural and economic land use in Modoc County display
- Diverse agricultural products grown in the watershed display
- Native trees component
- A wildlife diorama
- An aquaria room contains native fish of the Pit River, information on each species, and artwork
- A stuffed mountain lion display
- A nocturnal wildlife room with sound and activity
- River Center store
- Watershed management display
- Resources library and curriculum
- Kids' hands-on activity area
- Challenges and solutions exhibit
- Laboratory area
- Invasive weeds display
- On-going watershed RCD project information
- A library
- Watershed rehabilitation materials and tools
- Elk display
- Native plants garden
- Public computer to access watershed information



RIVER CENTER ACTIVITIES AND EDUCATIONAL PROGRAMS

The River Center plays an active role in the community, a rural agricultural region in one of California's lowest income areas. The River Center has provided numerous field trips, tours, community environmental projects, in-class presentations and teacher workshops focusing on environmental education.

RIVER CENTER TOURS

To date, the River Center serves Modoc Joint Unified School District, Surprise Valley and Big Valley schools. In 2004, 700 students visited the center. Students receive an interactive educational experience through use and interpretation of the aforementioned exhibits and displays. Favorite activities for many students include the nocturnal wildlife room and playing with educational toys and games, the latter two include animal track identification, books, puppets, bird call box, mystery feel box, puzzles, games, art projects and more.

IN-CLASS PRESENTATIONS & TEACHER ASSISTANCE

This includes Enviroscope Model presentations by The River Center education coordinator who has 17 years experience with natural resource management. The model shows students how watersheds and wetlands function and how management decisions, good or bad, affect our watershed. Presentations have been given on native plants, vegetation mapping, watershed modeling, nonpoint source pollution, agricultural water use, geology of the watershed, careers in natural resource management and forest resources.



COMMUNITY OUTREACH

The River Center staff and supporters participate in and plan community interest programs such as the annual *Wings of the Warner's Migratory Bird Festival*, the National Wild Turkey Federation's *JAKES* event, the *Natural Resources and Agriculture Partnership Academy*, in which interns from Modoc High School work with agencies and organizations in the area. The River Center hosts an annual *Kid's Discovery Day* at the center and an annual *Pit River Clean-Up Day*. Other events include, the annual *Goose Roundup*, *"Evening with the Bats"* and *"Long Legs and Green Eggs,"* an informative program on Sandhill Cranes. The center provides information about the watershed at community events like *July Fandango Days*, the *Modoc County Fair* and the annual *Children's Fair*.



FIELD TRIPS IN THE WATERSHED

The River Center staff helps coordinate and lead field trips in the watershed. The staff work with other agencies and landowners, such as the Modoc National Forest, Likely Land and Livestock, the Modoc National Wildlife Refuge and many others, to facilitate the field trips.



THE PIT RIVER WATERSHED ADOPTION PROJECT

The River Center formed an alliance with Modoc National Wildlife Refuge and initiated a long-term adoption project. The Refuge staff identified 15 acres as an outdoor learning lab for students. Elementary students start service-based environmental projects that they continue to work on as they proceed through school. Instruction takes place at several "stations" on the site during field trips. Refuge staff biologists, Natural Resource Conservation Service volunteers, Modoc National Forest natural resource specialists, Bureau of Land Management specialists, parents and volunteers from the community serve as instructors. Students keep a portfolio that contains yearly monitoring projects, records of restoration work, reflection in writing, pictures and a critique. Students keep their portfolio through all grades so they may see their progress and accomplishments. The goal of the Pit River Watershed Adoption Project is to increase awareness of the Pit River and its watershed, give students and the community a sense of ownership and pride in our natural resources, provide opportunities to work on some of the watershed's problems, promote good land-use decisions and choices among emerging leaders, promote cooperation among competing interests, and create a shared vision of watershed enhancement in the region.



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THE RIVER CENTER

Critical Steps to Success

THE CENTRAL MODOC RESOURCE CONSERVATION DISTRICT struck a chord with their proposal to create a river center, inspiring the creativity and volunteer spirit of their rural community. The project exhibits all the essential ingredients for success.

VISION: The River Center Development Team found that the initial planning session was key to their success. A professional facilitator helped the group mold their ideas into a unified vision. Articulating a common vision at the outset greatly enhanced their efficiency, communication, and sense of teamwork.

COLLABORATION: District staff organized The River Center Development Team, generating local ownership in the project by involving the widespread community, including all related agencies, organizations and groups.

RESOURCES: The excellent staff, committed volunteers and a committed board of directors who made The River Center a reality are the project's most important resource.

PLANNING: Before making decisions, Valerie Coe and Paula Fields toured watershed education centers and conducted thorough research to see what other areas and communities had accomplished. This ensured that major planning decisions were well-informed and enhanced their network, aiding in the efficient allocation of time and resources.

IMPLEMENTATION: The RCD hired a local graphic designer and artist with museum experience to design and construct the exhibits. This decision resulted in both a coherent, professional look and a local flavor that reflects community values.

EVALUATION: Content evaluation was fully integrated with the planning and implementation process. All of the text and exhibits were fully edited and reviewed by professionals and experts in the respective topic areas, with many of them volunteering their skills. Today, the center's staff tracks student and visitor use of the center and are continually developing new programs to respond to the need for watershed education in the community.

EDUCATION: This was the originating purpose of The River Center. Since its opening, it has become a hub of activity for students of all ages, from grade school to adults. Every time Laura Van Acker, the current educational coordinator for The River Center, goes to the Alturas Elementary School playground, she is flocked by students wanting to know when they get to go back to the River Center and the Modoc National Wildlife Refuge.

RECOMMENDATIONS/LESSONS LEARNED

- Everyone in the community must be invited. When holding meetings, make sure all members of the community feel welcome to attend. The most successful projects don't exclude any segment. They are grassroots from the ground up and encourage a feeling of community.
- Creativity will come through. Wonderful ideas emerged as a result of limited space and funding. Do not allow apparent roadblocks to stand in the way of the vision.
- Plan ahead for transition. Transition of key staff can be a major blow to the developing project. However, Valerie Coe and the RCD board created a strong partnership team and completed critical steps in the planning phase before passing the torch to Paula Fields. This put Fields in an excellent position to build on the project's momentum and make it a success.

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SALT CEDAR CONTROL IN AN "UPSIDE-DOWN" RIVER

Forming a Weed Management Area in the Mojave Desert

"It runs backwards, upside down, crisscross, sometimes on top, usually underneath, all year in places, almost never in others, and its floods mark off the history of the desert as wars mark the history of the world."

- Beth Pinnell, describing the Mojave River in *Once Upon a Desert*

IF WATER IN THE MOJAVE DESERT IS TRULY LIQUID GOLD, then a river in this harsh environment is a gold mine.

The Mojave River, albeit "upside-down," running underground through much of its 100-mile or so journey, is a vital resource, providing water for thirsty humans, as well as critical riparian habitat to

unique mammal, fish, reptile, and bird species.

But there is a predator that threatens this vital resource: saltcedar (*Tamarix ramosissima*), a non-native invasive plant that guzzles water, crowds out native plants, and discards its salty leaves into the water and surrounding soil.

About 15 years ago, the Mojave Desert Resource Conservation District (Mojave Desert RCD), which had an annual budget just large enough to cover one part-time coordinator at the time, partnered with the Barstow Field Office of the Bureau of Land Management in their fight against saltcedar. Through a Cooperative Agreement, the RCD and agency worked

together to manage saltcedar in Afton Canyon, an important recreational and wildlife area on the Mojave River.

The Bureau of Land Management provided chain saws and brush cutters, spray equipment and herbicide, as well as overall project oversight. Val Page, project coordinator for the

RCD, oversaw the supervision and transport of a work crew from the Baker California Correctional Facility (CCF). The crew removed 100 acres of saltcedar using handtools and performed herbicide applications on the cut stumps and saltcedar resprouts.

"The RCD helped us tremendously,"

said Anthony Chavez of the Bureau of Land Management's Barstow Field Office. They continued partnering on projects, working with the California Conservation Corps on follow-up projects and even jointly hiring employees to manage saltcedar on lands managed by the Bureau.



Saltcedar removal in Afton Canyon inspired the formation of the Mojave Weed Management Area.
Photo courtesy of Mojave Desert RCD

But what to do about the other thousands of acres being threatened by saltcedar? The riparian habitat along the river is fragmented, with land ownership divided between hundreds of private individuals and businesses. If an invasive species is removed from public lands and is left untreated on nearby patches of private land, it will eventually invade the same area all over again. It is necessary to eliminate or reduce the impacts from invasive species throughout the entire watershed in order to protect, enhance, and restore healthy ecosystems.

However, coordination and cooperation between all of the hundreds of landowners pose a daunting challenge and requires extensive outreach and cooperative agreements with private landowners, actions that are beyond the scope of federal agencies. Fortunately, RCDs were created to provide the leadership and assistance necessary to coordinate just this type of local community natural resource conservation program. The logical first step would be to recruit all of the federal and state land managers in the saltcedar battle.

A small group of people, including Page, Chavez, RCD Board Member Pete Lounsbury, and Matt Brooks of the US Geological Service, began exploring ways to form a group that could coordinate weed control efforts throughout the Mojave Desert region. Around that same time, the California Legislature passed Senate Bill 1740 (Leslie), which appropriated \$5 million to the California Noxious Weed Management Account for implementation of local Integrated Weed Management Plans. This provided a unique opportunity to coordinate government land managers and private landowners in the saltcedar battle.

Steve Schoenig, Senior Environmental Resource Scientist for the California Department of Food and Agriculture, was manager of the SB 1740 account. Schoenig also recognized the need to coordinate weed management among the many stakeholders in the desert. He assisted the nascent effort by bringing educational and financial resources to help them get started. "RCDs are one of the best groups to coordinate private landowner participation," he commented.

Over the next several months, Page put on a series of presentations to various groups and agencies about the new partnership and the planned saltcedar control project. The Desert Managers Group joined, bringing in new representatives from the Bureau of Land Management, National Park Service, and Department of Defense, and greatly increased participation. Local representation was boosted when the Mojave Water Agency joined the effort as well.

Through this and other networking efforts, the Mojave Desert RCD and Bureau of Land Management recruited allies in the war on weeds which culminated in the formation of the *Mojave Weed Management Area* (WMA). This new local partnership brought together federal, state, and local agencies on a cooperative basis to share information and resources to help combat problematic weeds in the Mojave Desert region.

The WMA would include the entire area of the Mojave Desert RCD — San Bernardino County, north and east of the San Bernardino mountains — as well as all of Death Valley National Park (Inyo County) and Joshua Tree National Park (Riverside County). Two main factors were considered in determining the geographic boundaries of the new WMA. First, it made no sense to stop at county lines within the two national parks, so it was agreed that the WMA would follow the weeds, even though some projects might require coordination between more than one county agricultural department. Second, these boundaries would help the CDFA reach its goal of WMA coverage for the entire state, facilitating coordination of regional weed control projects between adjacent WMAs.

The group met every other month to develop a *Memorandum of Understanding* (MOU) and begin planning its first cooperative effort. "We had to do an MOU as part of the SB 1740 requirement," recalls Page. "I'm glad we did because it opened up a lot of communication and helped us focus on what we wanted to do." The MOU demonstrates the commitment of each of the partners to local invasive weed issues and provides a framework for the varied groups to make collective decisions and work together. At the same time, the MOU does not limit what any one agency can do on their land or within their own jurisdiction. By the fall of 2002, nineteen agencies signed the MOU.

The Mojave Desert RCD's role is to serve as the program coordinator and funding administrator for WMA grants. RCDs are ideally suited for this role because they can apply for and accept grant funding from sources that are not available to many of the federal and state agencies, and they are in a unique position to enter into cooperative agreements with private landowners.

The next step was to identify an appropriate site for the WMA's first on-the-ground project. The goal was to select a site that was highly visible, provided important habitat and water resources, and was not managed or protected by the

government. It was important to involve a private landowner to demonstrate to the local community that invasive weeds impact everyone, and that this new coalition was willing and able to assist the local community in dealing with important natural resource issues.

The WMA agreed to work with the Lewis Center, on their first project. The Lewis Center for Educational Research is a privately-owned charter school located at the Mojave River Narrows on land adjacent to the Kemper-Campbell Ranch in Apple Valley, California. The campus includes a natural "wildlands" area that serves as an outdoor classroom for students from the Lewis Center and throughout the Victor

Valley. Perennial surface water supports riparian areas and wetlands that provide important habitat for numerous animal species.

Matt Huffine, the Science Coordinator at the Lewis Center's *Academy for Academic Excellence*, was concerned about saltcedar at the site. A particularly dense thicket had taken over an area that was disturbed many years earlier, and another infestation was just starting in an area that recently burned. Matt's students were already conducting experiments to determine saltcedar's impact on water quality; a saltcedar management project would be an opportunity for them to observe the effects of a removal project first-hand. 

THE SCIENCE OF SALTCEDAR

HASTIN ZYLSTRA, A FIFTEEN-YEAR-OLD STUDENT at the Lewis Center's *Academy for Academic Excellence*, conducted a research project to determine what effect the saltcedar removal project would have on salinity levels at the project site. As a student in Matt Huffine's Mojave River Student Scientist class, his research provided important monitoring results for the saltcedar removal project while racking up multiple honors at the local, regional, and state science fairs in the process.

Saltcedar draws an enormous amount of water from the ground, so much so that evapotranspiration causes small salt crystals to form on its leaves. The salt washes off during the infrequent desert rains and concentrates in the soil creating a saline soil in which very few other plants are capable of growing. As a result, saltcedar is a very successful invasive species, often taking over an entire section of a riverbed. Dense thickets of thirsty saltcedar lower the water table and impact groundwater quality by raising the salinity of the soil.

Zylstra monitored salinity levels of the water at three locations around the project site: within the river, in a small stagnant pond near the river, and in another pond disconnected from the river. Using a research instrument loaned to the school by the Mojave Water Agency, he collected data before

the project, while saltcedar removal was in progress, and after the project.

"When we had the saltcedars, the salinity went way up and continued to rise after the big rains because they were taking up the water and leaving the salt deposits in the ground," explains Zylstra. "The main thing my research found was that after the first major rain of the season, the salinity increased for a while then dropped quite rapidly. After the removal of the tamarisk trees, you don't get an immediate gain, but over time it really makes a huge difference."

Zylstra's project won the school science fair and placed third in the regional competition, allowing him to compete in the state science fair in Los Angeles. He also delivered his results in a presentation called *Saltcedar and Its Affects on the Mojave River* to the Mojave Water Agency and later to a local chapter of the Audubon Society, which incorporated his findings in a publication explaining the impact of saltcedar on wildlife. "I was surprised at how much impact my individual project had on the community," he said. 



Saltcedar forms salt crystals on its leaves. The crystals create saline soil when they are washed off in the rain. © Photo: Lewis Center.

CONTROLLING THE THIRSTY INVADER AT MOJAVE NARROWS

Anatomy of a Conservation Project

SIGNIFICANT STRETCHES OF RIPARIAN HABITAT ARE RARE along the Mojave River, but the Narrows is an exception. With perennial surface water year-round, a county-managed regional park upstream and the Lewis Center for Educational Research downstream, the area supports a native cottonwood-willow forest with vital riparian and wetland habitat. The area provides habitat for the Mohave Vole, a species of concern, the Least Bell's Vireo, a federal and state listed endangered species, and many other species of wildlife and birds.

The foundation that governs the Lewis Center is committed to maintaining the natural environment of the riparian and wetland area on their campus. With water resources under constant stress from a burgeoning human population, protecting the area is a major concern for many citizens and groups in the region as well. Although the ecosystem in general is considered healthy, the infestation of invasive water-guzzling saltcedar had displaced native plants in some areas and was spreading through many other areas. The Lewis Center recognized the problem, but lacked the resources to take action.

The WMA partnered with the Lewis Center to treat saltcedar-infested acres. Funding was limited, especially for a saltcedar project—which often runs upwards of \$2,000 per acre—but with partner contributions of cash and equipment and volunteers, forty acres of riparian/wetland area were cleared with a \$15,000 grant.

Coordinating the project was relatively simple, primarily due to the various WMA partners already participating. The California Department of Fish and Game approved the project and the County

Agriculture Department issued the Operator ID number for herbicide use. The Lewis Center Science Coordinator, Matt Huffine, was eager to remove the saltcedar and facilitated development and approval of the Cooperative Agreement between the Lewis Center Board of Directors and the Mojave Desert RCD for the project.

It was important that this first project be a success. With limited funding, success depended on a truly cooperative effort. The Lewis Center delineated the project area and agreed to take responsibility for monitoring the site. They also coordinated with the local fire department to burn the saltcedar debris after treatment. The Bureau of Land Management provided and performed maintenance on the chainsaws required for cutting the saltcedar. The RCD purchased herbicides with funds from the SB 1740 contract.

Val Page, who coordinates the WMA for the RCD, served as the crew leader and state-qualified herbicide applicator in charge of the project. She and assistant Tony Espinoza cut and treated saltcedar on the site a couple times each week during the fall. A volunteer crew from the Apple Valley High School *Workability II Program*, a job training program for youth, assisted in handling and moving saltcedar debris once it was cut.



Prior to the project, the area was dense with saltcedar.
Photo courtesy of the Lewis Center.



Above: Saltcedar stumps after treatment. Herbicides are applied to stumps immediately after cutting to discourage resprouting. • Photo courtesy of the Lewis Center.

Bottom: After treatment, dense areas of saltcedar were cleared from the river. Photo courtesy of the Lewis Center.



Above: Piling and removing the brush is half the work in a saltcedar management project. Student volunteers from Apple Valley High School assisted with brush removal. • Photo courtesy of the Lewis Center.

During the project, the Lewis Center arranged for the Daily Press, a local newspaper, to visit the site and write a detailed article about the project. The Mojave Desert RCD's annual tour bus stopped at the site and gave a presentation to the local citizens and legislators on the tour. As a result, public awareness was greatly increased and the WMA has been invited to speak to many other groups in the area about invasive weeds.

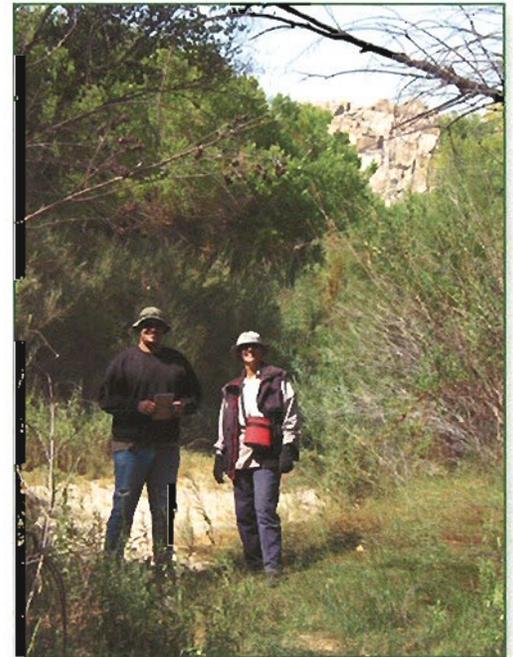
Although some saltcedar remains, both at the site and upstream from the property, the dense thickets and vulnerable areas have been cleared, making future treatments more manageable. Page is seeking funding for follow-up treatments to manage regrowth and ensure long-term success of the project.

Anticipating future challenges, Page says, "the greatest variable in this and future saltcedar control projects is the cooperation of private landowners. For this project, the landowner was knowledgeable about the problem and eager to cooperate on a solution."

Today, Hastin Zylstra is pursuing a degree

in electronics and computer technology at Victor Valley College and has plans to become a computer network engineer. His teacher, Matt Huffine, continues to lead the Mojave River Student Scientist class and other hands-on classes at the Lewis Center.

The WMA is currently seeking funding for follow-up management to control regrowth and expand the treatment area. However, the success of the project is measured not only by the number of acres treated, but by the partnership that was formed, the public interest generated, an increase in WMA participants, and subsequent grant funding awarded due in large part to the success of the project.



Above: Tony Espinoza and Val Page implemented the saltcedar removal project at the Lewis Center. Photo courtesy of the Lewis Center.

COOPERATING TO PROTECT WATER RESOURCES AND RIPARIAN HABITAT

Local Partnerships

TREATING SALT CEDAR AT THE MOJAVE NARROWS was the first step of a much larger effort to develop a watershed-based program for saltcedar management to protect water resources and riparian ecosystems. Before the WMA formed, saltcedar management in the desert region was confined to public lands, or it was removed only for development and flood control purposes. The WMA had created the opportunity to take a watershed approach to weed management.

The Lewis Center project demonstrated the power of partnerships between private landowners and local agencies when they work together on common goals. Although modest in size, it gave the WMA an identity and a track record, opening up new opportunities to fund additional cooperative efforts. For example, they successfully earned a grant from the Center for Invasive Plant Management to fund a *Mojave River Saltcedar Control Plan*. Expanding on that plan, the State Water Resources Control Board has recently funded the Mojave River Planning & Mapping Project, enabling the WMA to conduct workshops and an extensive public outreach campaign to involve private landowners in the development of an Integrated Weed Management Plan for the Mojave River.

Through a small group of people networking toward a concrete goal, federal and state land managers, local agencies and

citizens groups were brought together and agreed to cooperate on solving a common problem — saltcedar in the Mojave River. Delays and problems were avoided because regulatory agencies such as California Department of Fish and Game were involved from the beginning in the planning process. The partnerships formed by the WMA encouraged the sharing of resources and expertise, and greatly facilitated implementation of the project. "That's the beauty of the Weed Management Area," commented Chavez, "everybody can contribute through knowledge, equipment, and resources; there's a whole variety of ways."

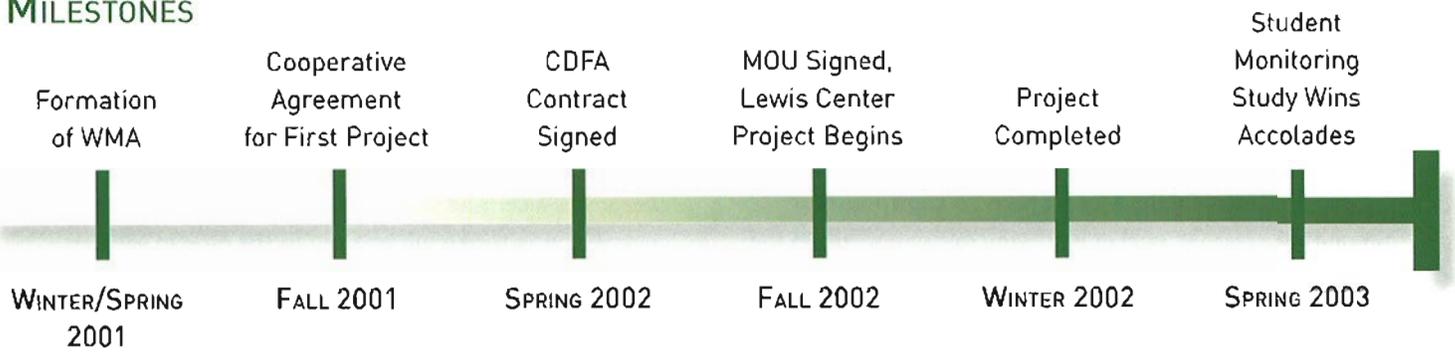
"Val Page took the helm and made it a very effective group," commented Pete Lounsbury, an RCD board member during the formative stages of the Weed Management Area. "Without the RCD's participation in the program, it would not have existed. The RCD took a leadership role that the federal entities would not have been able to do. We have been able to expand it to include state and local agencies and groups as well."

The success of the WMA continues to attract the cooperation of local agencies and organizations. Many individual citizens have asked for information and offered to volunteer for projects as well. As awareness grows, public education and outreach becomes easier and enables the WMA to enlist more private landowners in the war on weeds. *✍*



A recent workshop on *Saharan Mustard* sponsored by the WMA attracted nearly one hundred participants from California, Nevada, and Utah. • Photo by Val Page.

MILESTONES



BLM hosts a series of meetings with local agencies and groups. Invited guests from CDFA and other regions provide valuable information about how to form a Weed Management Area (WMA). The Mojave Desert RCD agrees to coordinate the new partnership.

The WMA agrees on a saltcedar control project at the Mojave River Narrows for their first cooperative effort. The Mojave Desert RCD and Lewis Center Boards of Directors enter a Cooperative Agreement for project implementation.

With funding from SB 1740, the RCD helps WMA draft an Integrated Weed Management Work Plan. The Mojave Desert RCD submits the Work Plan to the CDFA, and a contract is issued in March 2002

The WMA completes a Memorandum of Understanding defining its purpose and goals and outlining voluntary commitments from each participating group. By Fall 2002, nineteen federal, state, and local agencies and organizations sign the MOU.

The Mojave Desert RCD implements a saltcedar removal demonstration project at Mojave Narrows on land owned by the Lewis Center. Student volunteers from the Apple Valley H.S. *Workability II* program provide assistance. BLM provides chainsaws and equipment maintenance. A Lewis Center student conducts monitoring with equipment loaned by the Mojave Water Agency.

Forty acres of saltcedar are removed from Mojave Narrows. The Lewis Center generates press coverage. The RCD Annual Bus Tour stops at the site to raise public awareness of the project and the need to manage saltcedar along the river. The WMA continues to seek funding for follow-up treatments at the Lewis Center and to expand treatment to new areas.

Lewis Center student Hastin Zylstra wins the school science fair, places third in regional competition, and travels to the California State Science Fair on the strength of the monitoring study conducted at the site. He later presents results to the Mojave Water Agency and Audubon Society.



Critical Steps to Success

THE MOJAVE WEED MANAGEMENT AREA has enabled dozens of public and private stakeholders on the Mojave River to come together around the common goal of managing invasive weeds in the sensitive desert ecosystem of southeastern California. Key ingredients in the success of the WMA were:

VISION: Expanding on successful projects with the Bureau of Land Management, Val Page and the Mojave Desert RCD developed a watershed-scale vision to manage and control saltcedar throughout the Mojave Desert ecosystem.

COLLABORATION: With the leadership of the RCD, the WMA developed an MOU covering the entire Mojave Desert Region that generated the support and commitment of nineteen agencies and citizen groups.

RESOURCES: Thanks to contributions of tools, monitoring equipment, volunteer work, and expertise from many partners, the WMA implemented a demonstration project treating forty acres of saltcedar with \$15,000 in grant funding.

PLANNING: The WMA outlined its priorities and strategies in the *Mojave River Saltcedar Control Plan*. Building on early success, they are expanding their planning effort to include mapping and public outreach with support from the State Water Resources Control Board.

IMPLEMENTATION: The Lewis Center project at Mojave Narrows improved habitat in an important riparian ecosystem on the river and demonstrated the WMA's ability to partner with private landowners on saltcedar control.

EVALUATION: Hastin Zylstra, a high school student at the Lewis Center, conducted a research project that not only became a successful science fair project but also contributed valuable monitoring information to the project partners.

EDUCATION: The nexus with the Lewis Center enabled the saltcedar control project to become a research site for high school students, amplifying the value of the project to the community. The recent workshop on Saharan Mustard control and management demonstrates the increasingly important role the WMA plays in educating the public about invasive plant species in their desert community.

RECOMMENDATIONS/LESSONS LEARNED

- There is synergy at work in a WMA. If people agree to pool their resources, they can get a lot more done than they could individually. Agencies in particular are used to looking up the chain of command for resources, and either they get them or they don't. A common challenge is convincing people they can work collaboratively with the WMA to get what they need.
- Saltcedar comes back, and funding is needed to control regrowth. Seeking funding for multiple years of treatment when possible ensures that regrowth can be managed immediately in successive years. At the Lewis Center project site, the follow up treatment will be a bigger job due to the delay in raising additional funds.

Written by Val Page with assistance from Ben Wallace.



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THE COMEBACK OF CLEAR CREEK, REVISITED

The Lower Clear Creek Floodway Rehabilitation Project

IN THE FALL OF 2002, more than fifteen thousand Chinook Salmon swam upstream from the Pacific Ocean into the San Francisco Bay and Delta, turned north at the Sacramento River, and finally reached their spawning grounds in Shasta County in the shallow waters and gravel beds of Lower Clear Creek. By contrast, between 1967 and 1991, the average fall-run Chinook population was less than seventeen hundred fish per year.



A dredger mining for gold in a pond along Clear Creek.
Source: Shasta Historical Society

What accounts for the remarkable upswing in the fish population? It was not an accident of nature. Over the last decade, Lower Clear Creek has undergone a dramatic transformation from a severely damaged and degraded waterway toward a healthy and functional stream ecosystem.

The return of the salmon is part of the growing legacy of a visionary group of local leaders that have come together to restore the watershed. This multi-agency team, led by the Western Shasta Resource Conservation District, is implementing the Lower Clear Creek Management Plan. Their most ambitious project, the Lower Clear Creek Floodway Rehabilitation Project, is a working demonstration of an ecosystem-based approach to watershed management. It rehabilitates the natural form and function of a 1.8 mile channel and floodplain along the Lower Clear Creek corridor, providing improved habitat for salmon and steelhead, high quality riparian habitat for songbirds and native wildlife, as well as recreation and jobs for the people who live in the watershed.

BACKGROUND

Clear Creek originates near 6,000 ft elevation in the Trinity Mountains. Upper Clear Creek flows into Whiskeytown Lake, 11 miles west of Redding. The lower section of Clear Creek flows south from Whiskeytown Dam for approximately eight miles, then east for eight miles before joining the Sacramento River five miles south of Redding.

The decline of the Lower Clear Creek watershed began over 150 years ago. The discovery of gold at Reading Bar in 1848 led to a 100-year legacy of alteration and degradation, beginning with placer mining and dredger mining up through the 1940s. Floodplains and terraces were "turned upside down", removing all riparian and upland vegetation, leav-

ing piles of cobbles unsuitable for revegetation. Commercial in-stream aggregate mining began in the 1950s and continued through the mid-1980s, further destroying the natural channel and floodplain morphology. The aggregate mining removed most of the gravel within a 1.8-mile reach, leaving the channel bed surface exposed to the underlying clay hardpan, and creating large pits both in and around the stream that stranded adult and juvenile salmon and steelhead species.

Additional ecological degradation in the watershed occurred in 1963 with the construction of Whiskeytown Dam as part of the Trinity River Division of the Central Valley Project. Since Whiskeytown Dam was built, the amount of water flowing into Lower Clear Creek has decreased by 60%. All of the alluvial materials—cobbles, gravel and sand—that would normally wash down from the upper watershed during high water and flood events is now trapped by the reservoir. Large floods would normally occur every 10–20 years, but occur less frequently under the altered flow regime.

These changes have had a dramatic impact downstream. Gravel beds for spawning salmon and steelhead have become infiltrated with fine sediment, and riparian vegetation has encroached along the channel margins thereby fossilizing the banks and locking the channel in place. The natural cycle of floods that would transport sediment, scour the channel bed, and form new gravel bars has been disrupted and the natural migration of the channel has been severely impaired as well. These geomorphic processes are essential components in creating the dynamic river system necessary for high quality salmon and steelhead habitat and riparian habitat.

FORMING A COLLABORATIVE TEAM WITH A COMMON VISION

Local Partnerships

IRONICALLY, THE COMBINATION OF ISSUES FACING CLEAR CREEK began to gain prominence in the mid-90s in response to a forest planning process prompted by the listing of the Northern Spotted Owl as an endangered species. Although there is minimal habitat for the owl within the watershed, the President's 1994 Forest Plan prompted a shift in federal agencies toward ecosystem-based land management, focusing on entire watersheds and larger landscapes, rather than on the smaller individual parts that comprise the system.

At the same time, Western Shasta County's timber-dependent communities, which were hard hit by reductions in timber volume, became an area of focus for federal programs that sought to invest in watershed activities using displaced timber workers to do work. The Shasta-Tehama Bioregional Council, a group of local elected officials, industry representatives, and natural resource agency leaders recognized that a unique mixture of natural resource issues, public and private land, and social and economic circumstances would make Lower Clear Creek an excellent demonstration site for ecosystem-based management and community re-investment.

In response, a partnership between local, state, and federal agencies and local stakeholders came together with the goal of reversing the large-scale ecosystem disruption that occurred in the Clear Creek drainage system over the previous 150 years. The resulting Lower Clear Creek Restoration Team compiled a Watershed Analysis in 1996, gathering the best available data concerning the physical, biological, and economic conditions in the watershed.

The Western Shasta RCD, a participant on the Restoration Team, was a small District, with only one part-time employee at the time. However, the Board of Directors recognized the need for voluntary-based, local leadership to coordinate and implement the growing partnership on Clear Creek. Members of the board volunteered their personal time and

reputation to fundraising, successfully obtaining a grant from the newly authorized Central Valley Project Improvement Act. They soon hired the District's first full-time manager.

The District then formed the Lower Clear Creek Coordinated Resources Management and Planning (CRMP) group, providing a consensus-based forum for all stakeholders—private landowners, recreation groups, industry representatives, agencies, and other community members—to provide input on an equal basis concerning issues in the watershed.

The CRMP took on initial projects that would make an immediate impact at first, such as augmenting gravel in the creek to create spawning habitat for the dwindling salmon population. The Bureau of Reclamation, represented by Jim DeStaso on the Restoration Team and the CRMP, initiated controlled flow releases from Whiskey-town Dam in 1996 for the benefit of the fall-run Chinook salmon. Early success helped keep the group motivated, and built the reputation of the Western Shasta RCD as a group that could get things done.

By 1998, the group had completed a consensus-based management plan, providing the vision for the future restoration and management of the watershed.

Entitled the *Lower Clear Creek Management Plan*, the document laid the foundation for many of the projects currently underway in the watershed. The Lower Clear Creek Floodway Rehabilitation Project is designed to reverse the impacts of historic gold mining, in-stream gravel mining, and the installation of Whiskeytown Dam.

The Comeback of Clear Creek, a video produced by the Western Shasta RCD in 2001, contains beautiful images of the stream and documents the early phases of the project.

*Members of the board
volunteered their personal
time and reputation to
fundraising.*

RECONSTRUCTING AN ALTERED FLOODWAY: AN ECOSYSTEM-BASED APPROACH

Anatomy of a Conservation Project

THE PURPOSE OF THE LOWER CLEAR CREEK FLOODWAY Rehabilitation Project is to promote the recovery and maintenance of resilient, naturally reproducing salmon and steelhead populations and to restore riparian plant and animal communities on the floodplain by revitalizing critical hydrologic, geomorphic, and ecological processes within the current flow and sediment conditions system of Lower Clear Creek.

Prior to the project, BLM owned many small, isolated parcels scattered across north-central California that were difficult and costly to manage. Led by Francis Berg, Chief of Resources for the BLM's Redding Resource Area, the agency put together a Resource Management Plan in 1993 that recommended selling these parcels in order to acquire land in several key areas large enough to be managed more intensively. The Lower Clear Creek watershed, particularly the floodway and areas along the creek in the upper canyon, was identified as an area to acquire lands for restoring anadro-

mous fisheries. Consolidation of land ownership was a critical step that allowed geomorphologists to design a project to rehabilitate the entire floodway.

The Restoration Team completed a conceptual design for the floodway rehabilitation site in 1999. The conceptual design calls for major construction activities to recreate functional channel segments, increase salmon spawning habitat, repair the floodplain, and improve riparian habitat and wetlands for the benefit of both wildlife and recreation. The project includes three phases:

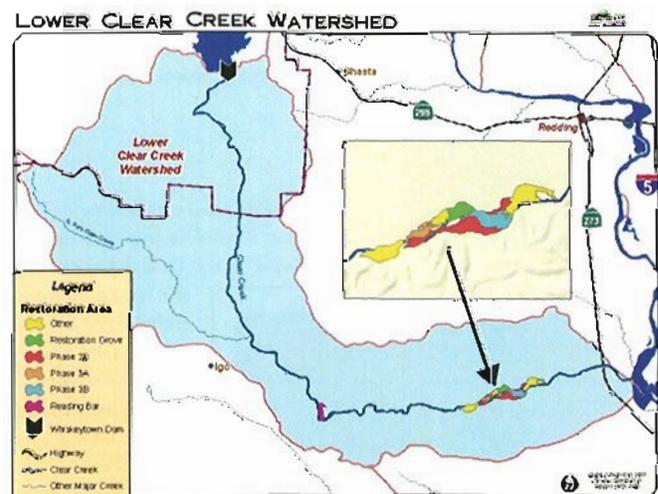
- PHASE 1: REDUCTION OF SALMON STRANDING
- PHASE 2: FLOODPLAIN CREATION
- PHASE 3: IN-STREAM CHANNEL WORK

The Western Shasta RCD, with a team of restoration specialists and field staff, is implementing the project in partnership with the Restoration Team and the Lower Clear Creek Watershed/CRMP Group. Currently, two phases and a portion of the third have been completed. Annual monitoring of fish, songbirds, geomorphic changes and riparian vegetation is underway.

THE SCIENCE OF RIVERS: KEY CONCEPTS

Hydrology is the study of water and the way it courses through landscapes. Geomorphology is the study of the evolution and configuration of landforms. In the case of Lower Clear Creek we are interested in fluvial geomorphology. The term "fluvial" is a derivation of the Latin word "fluvius" meaning river. Fluvial geomorphology examines the processes that operate in hydrologic systems and the landforms which they create.

Hydrology and fluvial geomorphology are important tools in the "ecosystem approach" used to rehabilitate the channel and the floodplain of Lower Clear Creek. For example, these concepts are helping land managers understand how changes in the flow of water resulting from Whiskeytown Dam cause the shape of the channel to change over time, and how changes to the shape of the channel can interact with spawning gravel for salmon or with the riparian vegetation growing on the floodplain around the creek.



Source: Western Shasta RCD

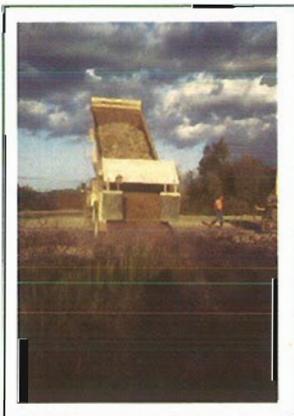
PHASE 1: REDUCTION OF SALMON STRANDING

The history of mining left a complex of large pits and ponds along the lower reaches of the creek that become isolated from the main channel each time the flow drops below 2000cfs. As a result, both adult and juvenile salmon and steelhead get stranded, causing the next generation to perish before it can get back to the river and migrate downstream.

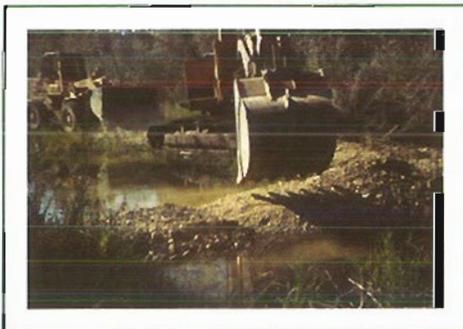
The Western Shasta RCD completed Phase 1 during the beginning of overall project design phase as an interim measure to prevent fish from getting into the most severe stranding locations.



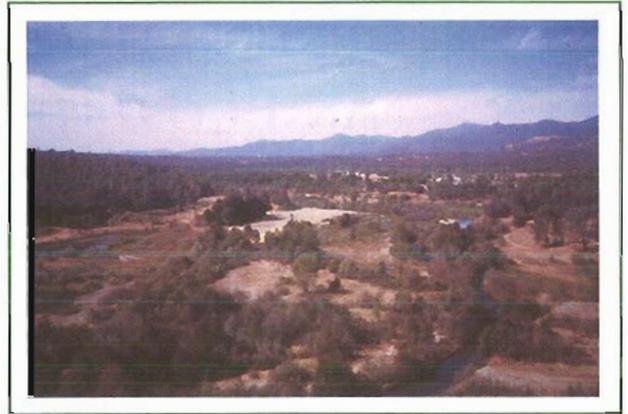
Above: Fill material was obtained from an upstream "borrow site" called Reading Bar, where the elevated floodplain was rarely inundated, which was then used to isolate a large salmon and steelhead stranding pit downstream. By removing the fill and leveling the site, Reading Bar has been lowered to an elevation that is more likely to receive floodwater under the controlled flow regime established by the dam. The trees at the center show the original grade of the site. Reading Bar has been restored with native riparian vegetation in a later phase of the project. • Source: Western Shasta RCD



Left: Forty-foot end-dumps were used to transport fill material. They used the fill to raise the elevation and regrade the "plug area" between the main channel and the ponds to prevent the likelihood of stranding adult and juvenile salmon and steelhead. Source: Western Shasta RCD



Below: Earthen berms were constructed to filter the water as it exited the plug area. Berms were also built across the high flow channel that lured salmon and steelhead into the adjacent pond and caused them to get stranded when the water subsided. Source: Western Shasta RCD



Above: Phase One completed. The plug area (center of photo) was put into place to prevent salmon and steelhead from reaching the pond (left side of photo) during high water and getting stranded after flows subside. • Source: Western Shasta RCD

PHASES 2 AND 3: FLOODPLAIN CREATION AND IN-STREAM CHANNEL WORK

In a natural condition, Lower Clear Creek would be in a dynamic process of continual change, exhibiting expected functions such as a meandering channel, scouring and transport of gravel and sediments, and periodic inundation of the floodplain. These functions are essential to maintaining high-quality in-stream and riparian habitat.

The second and third phases of the Floodway Rehabilitation Project focus on recreating these processes within the altered hydrologic and geomorphic conditions brought about by human activity in the watershed. During the implementation of these phases, the Western Shasta RCD is:

- restoring a historical meander to the channel;
- reconstructing an appropriately confined channel to improve the transport, storage, and routing of gravel;
- reconstructing floodplains to encourage natural processes of floodplain creation, deposition, and inundation;
- encouraging natural channel migration and floodplain processes; and
- restoring the stream grade and reducing exposed clay hardpan by increasing gravel supply.

During Phase 2, the Western Shasta RCD filled off-channel mining pits to eliminate the worst salmon and steelhead stranding areas and reconstructed over 60 acres of floodplain and replanted 36 acres. An additional 7 acres of reconstruction and approximately 2 acres of revegetation took place upstream at the Reading Bar "borrow site." The implementation of Phase 2 took place between 1999 and 2001.

RECREATING THE FLOODPLAIN AT RESTORATION GROVE



Above: At "Restoration Grove," a 12-acre floodplain was constructed in an area that was previously a death-trap for salmon and steelhead. The constructed scour channels were designed to intercept spring groundwater to encourage natural recruitment of riparian vegetation. • Source: Western Shasta RCD



Above: Restoration Grove was replanted with native trees and shrubs, creating a patch of riparian habitat (second year growth) for songbirds and other wildlife. Source: Western Shasta RCD



Above: Restoration Grove during spring flooding with the floodplain functioning as designed. • Source: Western Shasta RCD



Above: A portion of the Lower Clear Creek Floodway Restoration Site with Restoration Grove in the background and a newly created 51-acre floodplain in the foreground. • Source: Western Shasta RCD

PRBO Conservation Science conducted avian monitoring while restoration was in progress to determine the optimum conditions for native songbird habitat. In response to their findings, the Restoration Team incorporated mosaics of vegetation into the revegetation plan. Data suggest planting dense shrub patches, interspersed with tree/shrub patches, can achieve a semi-open canopy which invigorates the

understory and middle story growth required for many of the songbird species nesting in the area.

IN-STREAM CHANNEL WORK

The goal of Phase 3 is to convert a barren bedrock channel back to a cobble-bedded stream with natural gravel bars, pools and riffles. The Western Shasta RCD relocated and reconstructed the channel in the uppermost 1,500 ft of the project site and installed large trees and root-wads that protect the new bank and provide shelter for juvenile fish.



Above: Before implementation, the creek followed a barren bedrock channel.



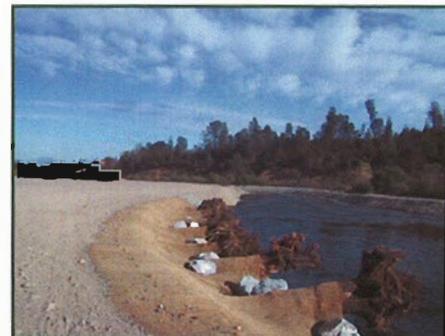
Above: The Western Shasta RCD redirected the Creek into the cobble-bedded channel that provides much better spawning habitat for fish.

ROOTWAD BANK STABILIZATION



Left: Using root-wads as bio-technical bank stabilization structures to armor the banks of the new channel and provide habitat for juvenile salmon and steelhead. Source: Western Shasta RCD

FLOODPLAIN AND CHANNEL



Left: Newly created floodplain and cobble-bedded channel. Source: Western Shasta RCD

Future phases will return the creek to its historic location at the downstream end of the project reach where it had been diverted for past gravel mining operations. Additional work will involve relocating and reconstructing the channel in the lower portion of the project reach and constructing and revegetating additional floodplain areas.

RELATED PROJECTS

The Floodway Rehabilitation Project is just one element in a concert of actions to restore Lower Clear Creek. In keeping with the ecosystem-based approach of the Lower Clear Creek Management Plan, related projects are happening throughout the watershed:

- The gravel augmentation project initiated by the CRMP continues. Since 1996, 95,000 tons of gravel have been added to Lower Clear Creek, helping reverse the loss of spawning habitat for fall, late fall, and spring-run Chinook salmon and steelhead.
- The Bureau of Reclamation CVPIA (b)(2) Program is continuing controlled flow releases from Whiskeytown Dam, providing increased flows for the benefit of fall-run Chinook salmon. They began modifying the flows for the spring-run Chinook Salmon in 2000 as well.
- The McCormick-Seltzer Dam, a 15-foot-high structure built in 1903, was a barrier to fish spawning and rearing habitat

in the upper 10 miles of Clear Creek. It also blocked the transport of important spawning gravels to Lower Clear Creek. In October of 2000, Interior Secretary Bruce Babbitt and California Secretary of Resources, Mary Nichols, presided over demolition of the dam to improve habitat and river functions in the watershed.

- Management of upland areas in a watershed has a profound affect on fisheries and the healthy functioning of streams. The District and its many partners are involved in a wide variety of projects to inventory and manage upland erosion, prevent catastrophic wildfires, and implement projects to improve the condition of the watershed as a whole.

RESULTS

The Lower Clear Creek Floodway Rehabilitation Project and related restoration efforts in the Clear Creek Watershed are increasing riparian habitat and rehabilitating the most degraded area of Lower Clear Creek. Success to date has included:

- Increased fall-run and spring-run Chinook salmon
- Increased riparian habitat
- Reduced juvenile fish stranding
- Improved fish passage
- Increased spawning habitat

Floodway Rehabilitation Project Partners

THE LOWER CLEAR CREEK FLOODWAY REHABILITATION PROJECT is being implemented by the Western Shasta Resource Conservation District on public lands managed by the Bureau of Land Management (BLM). The Lower Clear Creek Restoration Team, with input from the Lower Clear Creek CRMP, developed the project's objectives. They are consistent with the goals of the CALFED Bay-Delta Ecosystem Restoration Program, Central Valley Project Improvement Act—which both provide funding for implementation—as well as the US Fish and Wildlife Service's Anadromous Fish Restoration Program and the California Department of Fish and Game. Through this unique partnership, the watershed and its salmon and steelhead populations are now being restored.

CALFED & CVPIA

The majority of the funding for the project has been provided by the CALFED Bay-Delta Program. Additional funding has also been provided by the Central Valley Project Improvement Act (CVPIA) administered by the Bureau of Reclamation, the USFWS, and the Bureau of Land Management.

RESTORATION TEAM

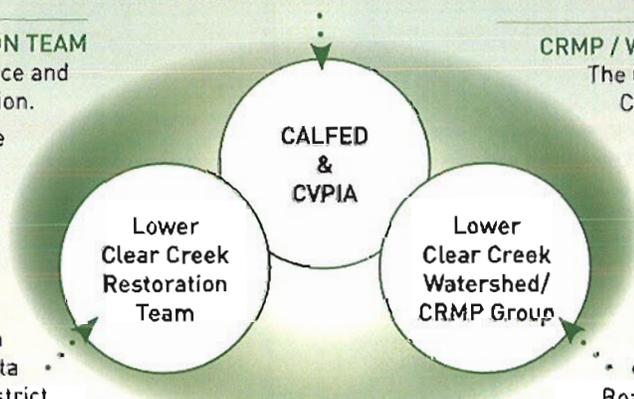
Provides technical assistance and overall project direction.

- Members CA Dept of Fish & Game
- CA Dept of Water Resources
 - Natural Resource Conservation Service
 - National Marine Fisheries Service
 - National Park Service
 - Shasta Co Environmental School
 - USDI Bureau of Land Mngmt
 - USDI Bureau of Reclamation
 - US Fish & Wildlife Service
 - Western Shasta Resource Conservation District
 - Consultants Graham Matthews & Assoc
 - Pt Reyes Bird Observatory Conservation Sciences
 - Souza Environmental Solutions

CRMP / WATERSHED GROUP

The CRMP drafted the Lower Clear Creek Management Plan in 1998 and provided input and cooperation with implementation of the plan. The CRMP recently changed its name to the Lower Clear Creek Watershed Group.

- Members Lower Clear Creek Restoration Team
- Landowners
 - Shasta Co
 - City of Redding
 - Regional Water Quality Control Board
 - Horsetown Clear Creek Preserve
 - Other Local Stakeholders



A COMPREHENSIVE STRATEGY FOR MONITORING AND ADAPTIVE MANAGEMENT

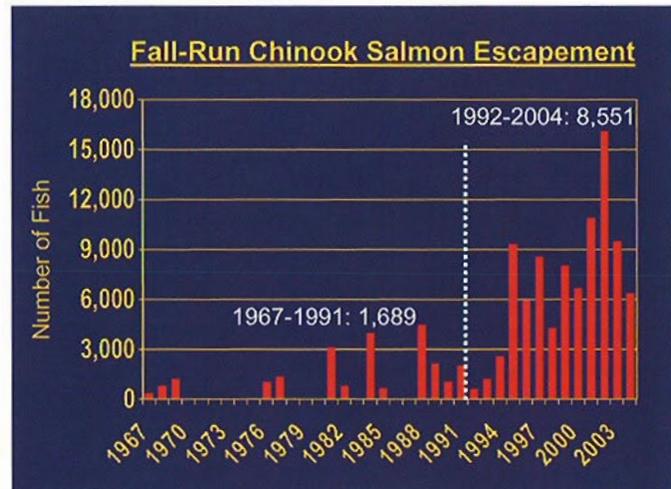
ALL ASPECTS OF THE LOWER CLEAR CREEK FLOODWAY REHABILITATION PROJECT are being carefully monitored, and information collected is part of an adaptive management feedback loop.

Geomorphic Monitoring at the project site is being conducted by Graham Matthews and Associates to determine how the channel location and morphology is adjusting during high flow events. The consultant is helping the Western Shasta RCD develop a detailed sediment budget for the entire Lower Clear Creek watershed in order to properly route coarse sediment through the system. Proper routing will ensure that the ecological function at the restoration sites and stream-wide is restored effectively.

The District hired Souza Environmental Solutions to conduct *Riparian Revegetation Monitoring* of woody vegetation, herbaceous vegetation, exotics, groundwater, and wetlands. For example, the consultant is monitoring the survival and productivity of woody vegetation in the "active" restoration plantings on the constructed floodplains as well as the "passive" recruitment of volunteer seedlings on the constructed floodplains, scour channels, and stream channels. Future monitoring will include exotic woody vegetation throughout the entire 100-year floodplain in the lower eight river miles of Clear Creek as well. Measurements of groundwater fluctuations on the constructed floodplains and in the scour channels will enable the Restoration Team to study the relationship between annual hydrologic fluctuations and the

natural recruitment of herbaceous and woody vegetation in the scour channels and on the floodplain.

Matt Brown of the US Fish and Wildlife Service is conducting fish monitoring, using a variety of methods to evaluate the quantity and quality of spawning habitat for adult salmon and steelhead and rearing habitat for juveniles. Incidences of juvenile stranding are being monitored as well. Fish populations have risen dramatically in Lower Clear Creek.



Source: US Fish and Wildlife Service

Ryan Burnett of PRBO Conservation Science is leading an *Avian Monitoring* effort that includes nest monitoring, territory mapping, point count surveys, and mist netting. This data is helping determine abundance and species richness of native songbird in the watershed, as well as the breeding density, nesting success and adult survival of focal species in restoration areas.

The 2004 Point Reyes Bird Observatory Songbird Monitoring Report showed a marked increase in the number of territories and nests found in revegetation sites for three of the focal species: Black-headed Grosbeaks, Song Sparrows and Yellow-breasted Chats. Proportional nest success for all nests combined was the highest recorded in the six years of songbird monitoring at Clear Creek. Of special note, in 2004 a single California Endangered Yellow-billed Cuckoo was observed at the Reading Bar restoration in mid-June. It is the first confirmed record of this species in Shasta County.



Song Sparrows are a focal species for avian monitoring at Lower Clear Creek • Photo by PRBO Conservation Science

Critical Steps to Success

WORKING WITH THE LOWER CLEAR CREEK RESTORATION TEAM and the Lower Clear Creek CRMP enabled the Western Shasta RCD to take local leadership to a whole new level. Faced with a relentlessly declining ecosystem around the creek, a powerful partnership is rehabilitating the creek and creating a new legacy of stewardship in the watershed.

VISION: The project is founded on a bold but achievable vision to re-establish the critical hydrologic, geomorphic and ecological processes of Lower Clear Creek within the current regulated flow and sediment conditions.

COLLABORATION: This is central to the project. As Mary Schroeder, District Manager for the RCD explains, "There aren't too many projects that we do where we don't have a technical advisory committee. Before we begin, we contact all the interested local groups and agencies, get everyone together, explain what the project is about, and solicit both professional and community input."

RESOURCES: By identifying where local priorities and the broad public interest intersect, the District generated strong support from state and federal partners for restoration efforts on Lower Clear Creek. The project's goals are explicitly aligned with major state and federal program goals such as the CALFED Bay-Delta Ecosystem Restoration Program, Central Valley Project Improvement Act, and the Anadromous Fish Restoration Program.

PLANNING: The Restoration Team completed a Watershed Analysis and a Management Plan for the entire area, and worked with the RCD to design site-specific projects that have complementary effects in the watershed. By consolidating land ownership in the floodway, the BLM made it possible for the Restoration Team to design a project covering the entire floodway. The ecosystem-based approach is both

drawing on and contributing to the science of hydrology, fluvial geomorphology and ecology.

IMPLEMENTATION: The RCD is implementing the Floodway Rehabilitation Project in three phases, each with a clear objective: reducing salmon stranding, repairing the floodplain, and improving in-channel habitat. Other projects in the watershed, including gravel augmentation, flow adjustments, barrier removal and upland management complement and reinforce the floodway rehabilitation project.

EVALUATION: In keeping with the ecosystem-based approach, the project includes a comprehensive adaptive management process with ongoing monitoring of vegetation, songbirds, fish and geomorphic changes. In addition to generating vital project data, monitoring results gain credible information so that management activities can be adapted and improved.

EDUCATION: *The Comeback of Clear Creek* video exemplifies the importance of educational outreach and maintaining local support for the project. Through newsletters, watershed group meetings, school field trips and events such as educational "Kids in the Creek Days", the community is kept informed, gives input, and is educated on Clear Creek and the Rehabilitation Project.

RECOMMENDATIONS/LESSONS LEARNED

Even success brings new and unexpected challenges. For example, because the entire restoration area historically had gold mining operations, concerns arose over the potential presence of mercury in the project area and the materials used for fill. Uncertainty over these concerns has required additional research, a longer construction schedule and cost increases. A Mercury Synthesis and Data Summary is now in development to aid and guide future management decisions.

Case study written by Leslie Bryan and Ben Wallace.

CONTACT INFORMATION

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 www.westernshastarc.org

BUILDING CONSENSUS & RESTORING RIVERS

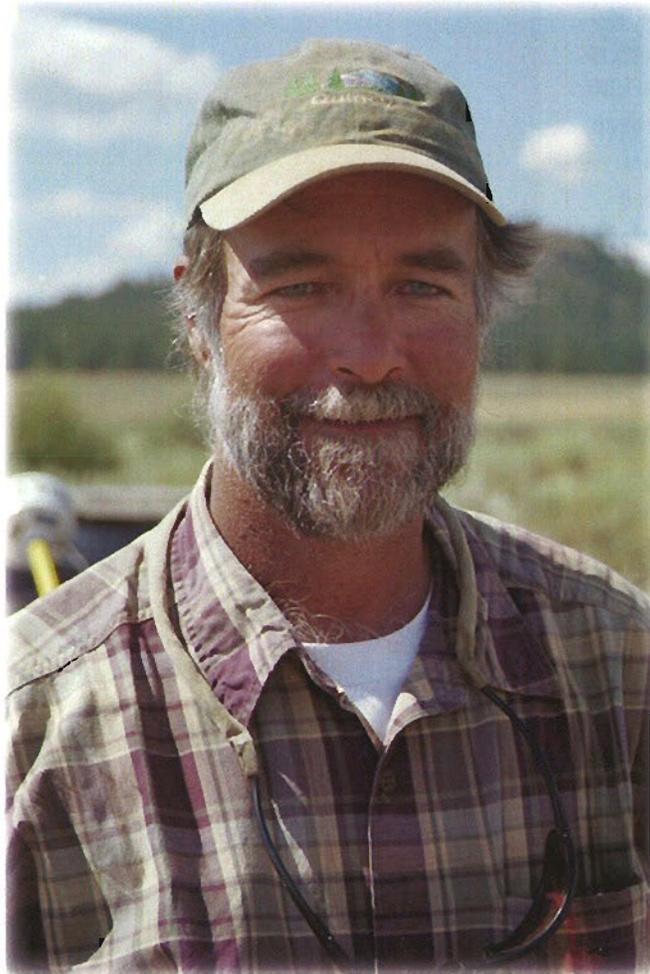
Twenty Years of Coordinated Resource Management in the Feather River Watershed

“Everybody benefits from a functional watershed.”

THAT'S THE WAY JIM WILCOX EXPLAINS how the Feather River Coordinated Resource Management Group (CRM), a 20-year-old partnership of federal, state, and county agencies with private organizations, corporations, and landowners has overcome its frequently strained individual relationships on other issues to become a model for innovative and successful watershed restoration.

Wilcox is the Program Manager with the CRM. He is also becoming a nationally recognized specialist in geomorphic restoration, largely due to his involvement in the CRM's success restoring natural river processes on severely degraded reaches of the Feather River and its tributaries. By his count, the CRM has completed at least 70 erosion control projects since installing its first in 1986. That adds up to some 40 miles of restored streams and more than 7,500 acres of re-watered meadows.

“A lot of these people have each other in court all the time over lots of other issues, but they all agree that a dysfunctional watershed doesn't meet anybody's mission, whether its water supply, recreation, fisheries, water quality or hydro electric generation,” Wilcox said. “The CRM works because we stay focused on finding solutions that benefit everybody.”



Jim Wilcox, CRM Erosion Control Project Manager • Photo by Will Stockwin

It's been that way since the beginning, when the original 13 CRM members signed a Memorandum of Understanding (MOU) committing them to the immense task of restoring the Feather River Watershed from the ravages of 140 years of resource extraction activities. The MOU sets out the goal of optimizing beneficial uses of water, emphasizing education and prevention over regulation, and resolving the concerns of all participants through a consensus-based planning process.

“Getting a project going on the ground will do more to galvanize a partnership than a piece of paper will,” said Leslie Mink, CRM monitoring coordinator. “Getting the first project built so quickly in 1985 really showed them what was possible.”

CRITICAL STEPPING STONE: THE CRM'S FIRST PROJECT

The first project completed by the Feather River CRM was a series of four check dams on Red Clover Creek. It was an experiment designed to verify two concepts: that sediment being flushed downstream could be reduced by erosion-control techniques and, more importantly, that the federal, state, and private signatories of the newly formed CRM could actually put aside years of differences and work together.

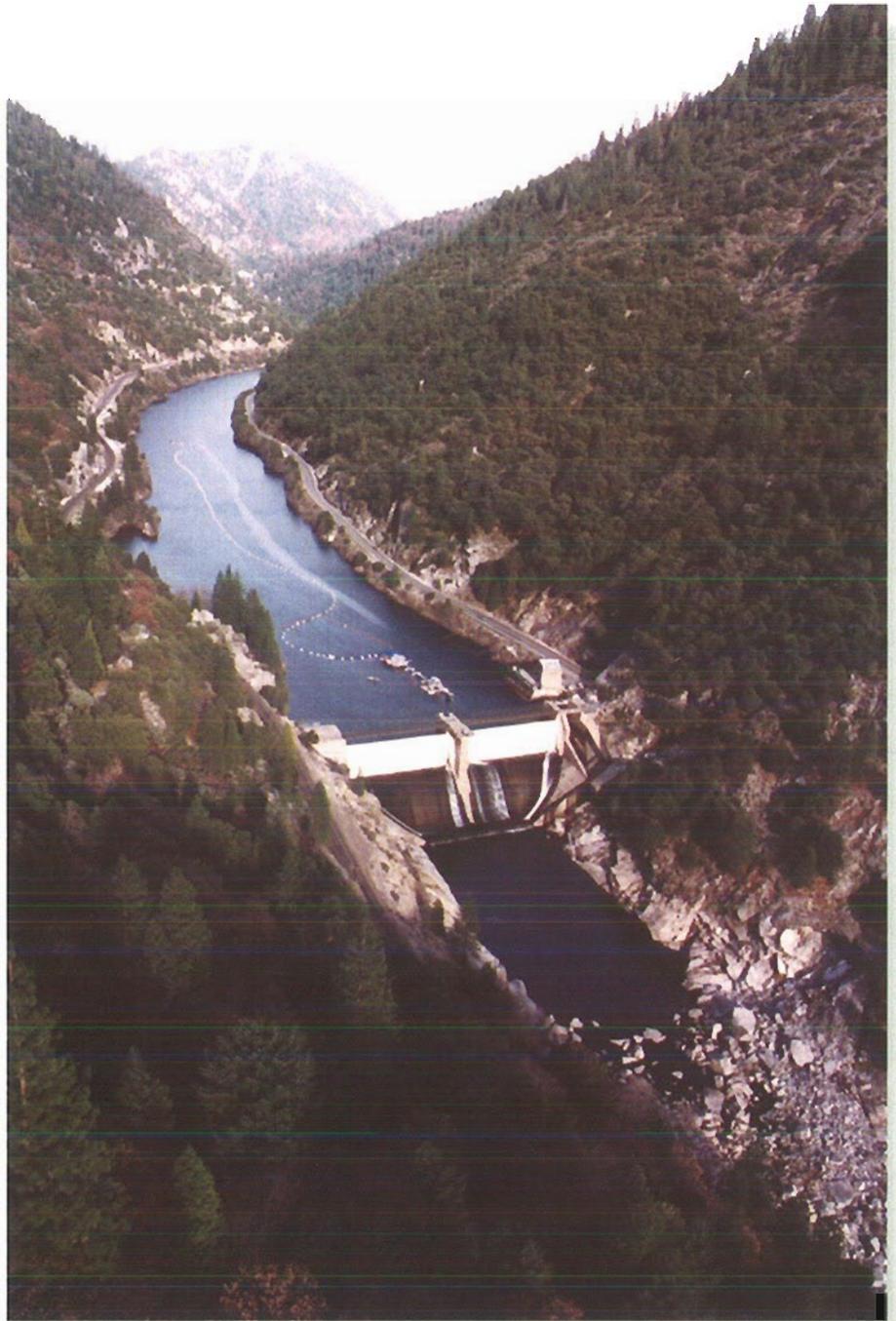
Red Clover Creek, which feeds into the East Branch of the North Fork of the Feather River, drains 75 square miles of the Red Clover Valley, 30 miles north-east of Quincy. Surrounded by Plumas National Forest land, the valley is privately owned and used for grazing cattle. The one-mile stretch of creek where the project was situated is privately owned today by the Goodwin Ranch.

By the mid-1980s, the lush pastures and meadows that had lured dairy farmers to the Feather River Watershed in the 19th Century were largely gone, lost to deepening gullies that drained high country water tables and flushed away eroded soil, which left sage brush and thistle where tall grasses had once thrived. These problems were common throughout the watershed.

On Red Clover Creek, the relentless erosive forces that formed deep, wide gullies were annually washing away 830 tons per square mile of sediment, or fully 640,000 cubic yards in the last half century. The sediment from Red Clover Creek and other tributaries was accumulating 60 miles downstream behind Pacific Gas and Electric's (PG&E) Rock Creek and Cresta dams on the North Fork of the Feather River. The reservoirs had each lost roughly half their respective holding capacity by 1984, when the utility convened a series of meetings on the problem with all the government agencies responsible for controlling upstream erosion.

The first meeting of what would become the Feather River Coordinated Resource Management Group (CRM) took place around John Schramel's kitchen table. Then Plumas County Supervisor, today Schramel is president of the CRM and the Feather River RCD.

"PG&E had identified Red Clover Creek as the biggest contributor of sediment to the huge siltation problem behind its



Massive sedimentation filling in behind PG&E's Cresta Dam on the North Fork of the Feather River prompted the eventual formation of the Feather River CRM and the beginning of restoration work in the watershed. Photo courtesy of Larry Harrison

Rock Creek and Cresta dams, so we decided to put a demonstration project there," he said.

"Getting to that decision wasn't easy," he said, "because everyone had to agree to leave all of their turf issues outside the door. We weren't looking very far beyond that first project and thinking what might come next because we knew the CRM's future would hinge on how this project turned out."

The project's objectives were to stabilize severely cut creek banks and reduce sediment transport by trapping it behind the check dams. Other objectives included raising the ground water table and water storage capacity of the restored meadow, improving range forage for cattle, water quality, and fish and wildlife habitat.

"When we first proposed the project in May 1985, most people figured it would take us at least five years to jump through all the government permitting hoops," Schramel recalled. "But we had a director, John Whiteman, at the fledgling Plumas Corporation who hand-carried the permits around to the various agencies and got them approved in a matter of days."

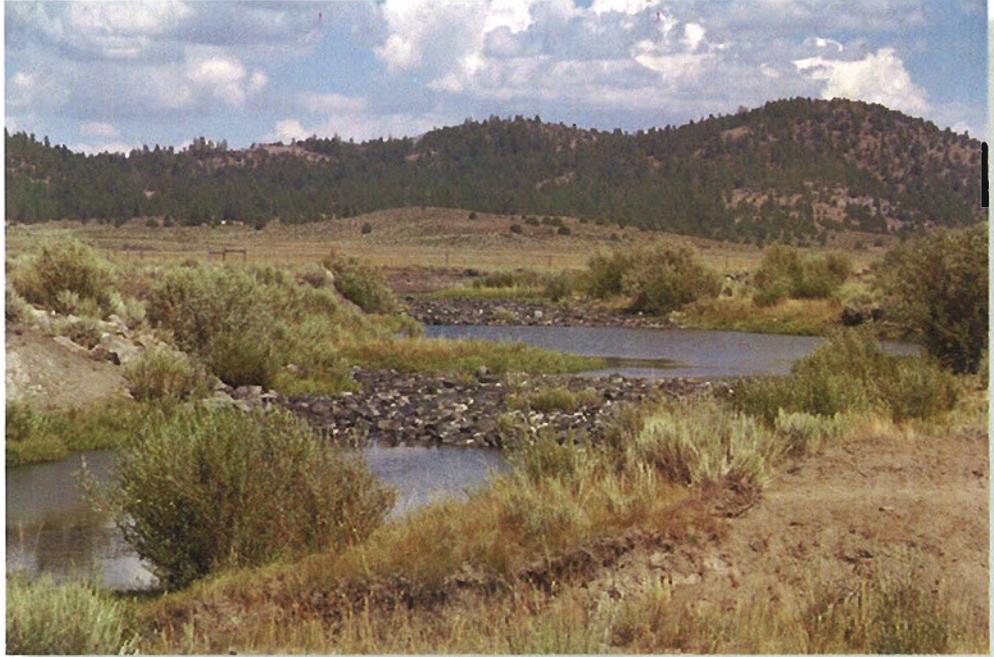
Project planning, based on the objectives of stabilizing stream banks to reduce erosion and sediment loss, and raising the water table to increase ground water storage, began in August and construction shortly after that. The check dams were finished in early 1986 and stream bank re-vegetation was completed the following spring.

"Getting it done that quickly gave us a great deal of confidence," Schramel said. "And then we got an even bigger boost when the project held up through a huge water year and serious flooding in 1986."

Continued monitoring of the project shows that slowing stream flow velocities and replanting stream banks has reduced erosion and significantly raised groundwater table levels, benefiting the return and increasing diversity of riparian and floodplain vegetation.

The monitoring has also successfully demonstrated that erosion control measures can restore a damaged ecosystem in a broader sense. For instance, improved water quality in the project area encouraged increases in trout populations, and waterfowl usage and nesting increased 700% over control sites.

"The CRM partners proved to themselves with this project that they could work together and do something like this," CRM project director Jim Wilcox said. "It was critical to build the kind of trust they needed amongst themselves to work for a common goal. It was an important stepping stone."



The middle two dams of the CRM's first project as seen in 2005. The CRM constructed four loose-rock check dams, replanted stream bank vegetation, and fenced the riparian corridor to keep livestock and vehicles out during a 10-year monitoring period after the work was completed. • Photo by Will Stockwin

In the 20 years since that first success on Red Clover Creek, the CRM has experimented with and installed an impressive array of structural and vegetative geomorphic restoration techniques in a variety of situations. Though generally small-scale, the projects were all focused on the CRM's overall goal of reducing erosion by improving the long-term stability of a treatment area.

Their efforts are a powerful demonstration of two important lessons in watershed restoration: raising the water table increases productivity by restoring natural water storage function of the land, and dealing with erosion problems system-wide, on a large scale rather than symptomatically, results in higher success rates.

Of the first, Mink said, "In over 90% of this watershed, the meadows aren't holding onto water because stream gullying is so severe. A functioning meadow that absorbs water in the spring releases it slowly through the season, so there's more water in the entire system longer. More water for longer in the year benefits everyone who depends on this watershed. Erosion control and increased land productivity is the win-win we're working for."

The CRM's recently completed project on nine miles of Last Chance Creek was the perfect site to take everything that had been learned on smaller projects and apply them system-wide on a large scale.

A SECOND CHANCE FOR LAST CHANCE CREEK

Anatomy of a Conservation Project

LAST CHANCE CREEK DRAINS THE EAST SIDE of the Feather River Watershed, cutting across private and public land on the edge of the Sierra Valley northeast of the small town of Beckwourth.

The highly-degraded, deeply gullied creek has long been identified as the main source of sediment from this area of the watershed, and is a priority in the CRM's overall watershed management strategy. To Wilcox, the obvious solution was to reconnect the channel and floodplain using a practice the CRM had developed on past projects called the "pond and plug technique."

"On the upper reaches of Last Chance the gully grew out of a cattle trail, which is evident above the gully area, so we didn't restore a channel," he said. "Instead, we decided to eliminate the gully and then just let the water sheet flow over the meadow. That's a phenomenal change in thinking."

Plumas County cattle rancher John Matley and his wife Corrine are landowners who are partnering in the Last Chance Creek project. They worked for years on their own fighting erosion and trying to prevent the annual flow of tons of sediment from Last Chance Creek on their property into the North Fork of the Feather River.



Alkali Flat reach on Last Chance Creek, 2003, showing deep-cut gully. Project funding came from a \$980,000 grant from CalFed, awarded in August 2000. The project restoration area takes in 4,330 acres, 4,300 of which are privately owned by John and Corrine Matley (Valley View Ranch) and the rest being public land in the Plumas National Forest.



Alkali Flat reach on Last Chance Creek, 2005, showing one of the ponds that provided fill to plug the gully. "Last Chance verified the soundness of the technology of spreading water across a meadow," Wilcox said. "This is the tenth year we've been using this technique on different projects, but Last Chance was the first on a landscape scale, rather than a postage stamp scale." • Photos courtesy of Feather River CRM

The Matleys run 300–400 head of cattle on their 1,800-acre Valley View Ranch and neighboring US Forest Service land. "We went as far as we could dumping rocks into gullies and fencing off corridors to keep the cattle out, but none of those techniques really work all that well," Matley said.

Over the last several years, the Matleys began to keep an eye on the neighboring erosion-control projects being conducted by the CRM. They were intrigued by the CRM's process and success rate, but wary of getting involved in a large-scale project. It eventually took about a year to convince themselves to become partners in the CRM's biggest project to date.

John expressed his vision and goal for the land simply as "we just want to leave the land better than we found it." Matley explained "I didn't like the idea of tearing up the ground and having raw earth out there for a year or more because of the chance we'd get a large weather event and the damage that would do. The potential for making things worse than they already were scared me to death."

Working through that concern meant looking at a lot of the CRM's other projects and some long question and answer sessions with Wilcox. "Their concerns about a series of big storms blowing the project out before it was finished were valid, and we worked with that in mind," Wilcox said. "They were also thinking along the lines of what they were already familiar with – check dams or fencing – but through a two-year planning/scoping process they came to see pond and plug as the best option to meet their own stewardship goals for the land. They just had to get comfortable with it." 🌿



John and Corrine Matley contributed fencing and 3-5 years of deferred and restricted grazing on restored creek areas. They were so pleased with the results of the work on their property in 2002, that they requested, and received, additional restoration work in 2005. • Photo by Will Stockwin



Construction on this reach of the Last Chance Creek project began in fall 2002. Filling the deep gully seen running parallel to the road required material taken from borrow pits that would become ponds when the water table rose. Eliminating the gully produced seven plugs (1.8 acres) and seven ponds (2.6 acres). Photo courtesy of Feather River CRM



The project also required moving a section of county road 150 feet upslope, off the Matley's property and onto Forest Service land. The Plumas National Forest Beckwourth Ranger Station and Plumas County Department of Public Works led the road re-construction effort. Roadside revegetation was done by students from the Jim Beckwourth Continuation High School with locally collected seeds. • Photo courtesy of Feather River CRM



The gully was replaced with 4,781 feet of new stream channel designed to readily spill onto the floodplain. The CRM put in 5,187 feet of new fence to protect the area from grazing cattle. This picture was taken in 2005. Photo courtesy of Feather River CRM



John Matley (far right) meets with the CRM Technical Advisory Committee (TAC) in May 2001 to finalize project plans. Landowner objectives and concerns are an integral part of project design. Other TAC members bring expertise in engineering, vegetation, and hydrology into the project design. • Photo by Will Stockwin

STRUCTURE OF THE FEATHER RIVER CRM

Local Partnerships

THE FEATHER RIVER CRM BEGAN with the Coordinated Resource Management & Planning (CRMP) process. CRMP is a voluntary, locally-led planning process that brings together all local stakeholders, both private and public, to develop common natural resource management strategies that affect their community. A "people process," CRMP is open to everyone who has an interest in resource issues and strives to balance environmental concerns with economic and social needs at the local level. It enables government agencies, community groups, private landowners, schools, and businesses to come together on an equal footing to find cooperative solutions to conservation dilemmas.

At the Feather River CRM, governance relies on an Executive Committee that is responsible for policy guidance and dispute resolution; a Management Committee that administers projects; and a Steering Committee that reviews program status, approves new projects, and interacts with landowners. The CRM forms a Technical Advisory Committee (TAC) for each project, consisting of interdisciplinary teams of

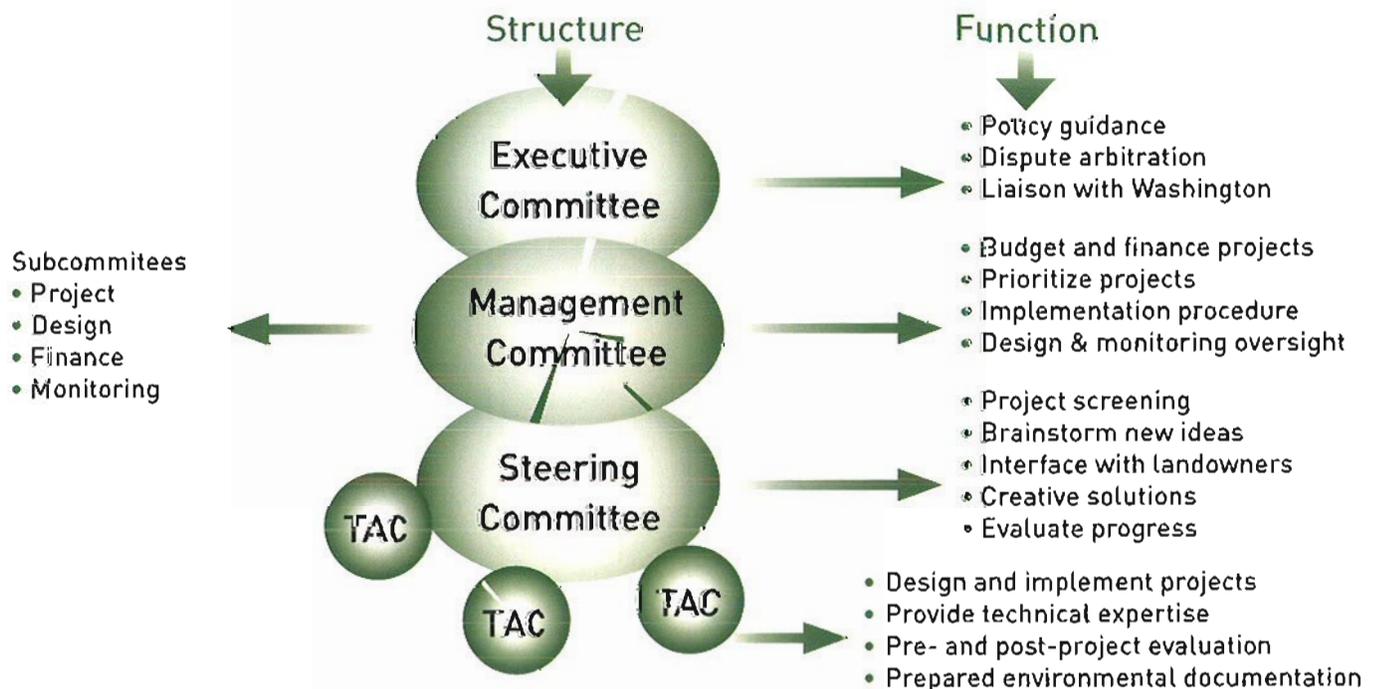
interested and qualified CRM members that provide technical guidance and oversight and develop detailed plans. CRM Members are listed in the Appendix.

After becoming an official Coordinated Resource Management Planning group (CRMP), they dropped the 'P' because they felt it placed too much emphasis on planning, where they were more focused on actually doing projects.

"One of the reasons for our success is that everything runs through the TAC," Wilcox said. "Project leaders work up all the data and bring it to the TAC, then we take their input plus input from the landowner and work that into an overall plan. Revisions go back through the same process."

"Some might call it design by committee but after 15 years of using this process I'd be a lot less comfortable if I was the only one trying to figure out all the hydrologic, physical, chemical, and biological aspects of a project," he said. "All of the perspective and experience the TAC members bring to the problem make for a much better solution in the end."

FEATHER RIVER COORDINATED RESOURCE MANAGEMENT (CRM)



Implementation and funding requests are coordinated by Plumas Corporation, a local non-profit dedicated to economic development, increasing tourism, and watershed restoration. Landowner cooperation and participation in the CRM, facilitated by the Feather River Resource Conservation District, is critical as most of the alluvial valleys where the sediment originates is privately owned.

THE ROLE OF THE FEATHER RIVER RCD

The Feather River Resource Conservation District (RCD) plays a number of important roles in the overall CRM process. "It's a critical check and balance against the potential of the CRM, or any of its agency partners, to run over a landowner's rights," CRM project manager Jim Wilcox said. "We also need a strong presence in the CRM to represent the landowners and encourage them to keep working with us."

He said the RCD, which can also invest in a CRM project, essentially acts as the gatekeeper for landowners wanting to bring project proposals to the CRM.

"If a landowner comes directly to us for help, the first thing we do is have them write a letter to the RCD requesting that it forward their proposed project to the CRM," Wilcox said. "That letter triggers a formal process by the CRM to evaluate and eventually adopt the project."

Government agencies do not have to go through the RCD, unless there is a private landowner's grazing lease involved in a proposed project.

"Then we have the agency go through the RCD to make sure the landowner has a voice as well," Wilcox said. "There have been times in the past when landowners haven't had a voice in USFS proposals and the agency's projects have been subsequently turned down by the CRM when the RCD refused to support them because of the agency's tactics with the landowner."

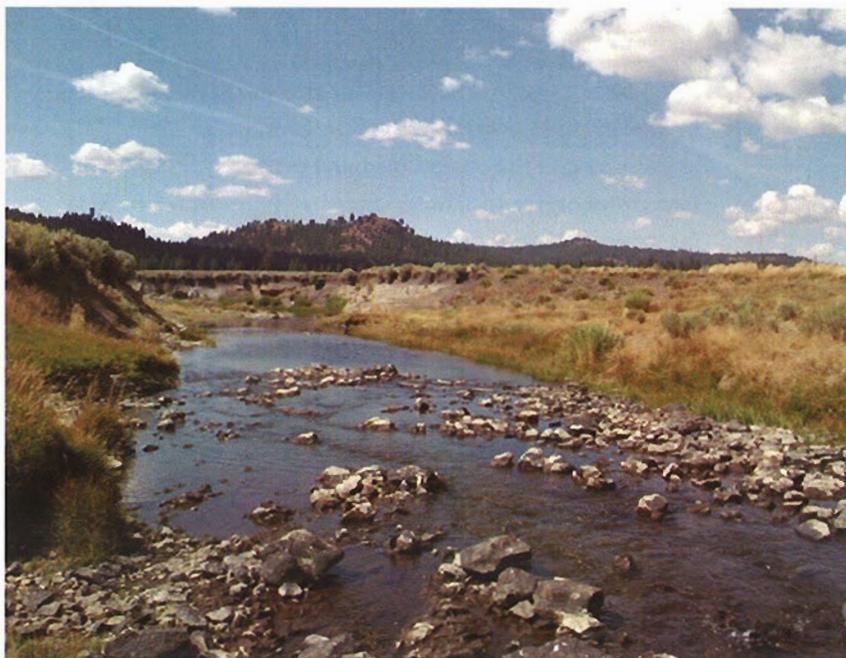
Back to Red Clover Creek

AND NOW CRM PLANNERS ARE COMING BACK TO RED CLOVER CREEK for what will be their biggest project yet. Wilcox said it will restore four miles of channel, including smaller tributaries, in just five months starting July 2006.

"The creek will be diverted into a new channel, but won't be connected to the ponds," Wilcox said, adding that this project will also be tied to the four check dams built for the CRM's original project. "That project was so important in terms of being the CRM's first one, and it holds a strong spot in people's hearts. The preferred design will submerge the lower two dams but the upper two will remain in place and functioning."

The project site is on land owned by the 7,000-acre Goodwin Ranch. Ranch manager and partner Scott Thompson is amazed by how much has changed in the twenty years since the check-dams went in at Red Clover. The on-going effect the original project is still having on the land was his main inspiration for doing this project, adding "every time I go out there I can see new things that are different."

The new project on Red Clover Creek promises to usher in another twenty years of cooperation and success on the Feather River.



Red Clover Creek, seen just below the original project, will be diverted into a new channel before the gully treatment begins. It will incorporate as many as 45 ponds of varying shapes and sizes, including "pot-hole ponds" that will provide fill material to plug 3-foot to 6-foot-wide gullies on the main creek's tributaries. • Photo by Will Stackwin

Critical Steps to Success

AFTER 20 YEARS OF PARTNERSHIP, THE FEATHER RIVER CRM continues to demonstrate the value of a locally-led, consensus-based process. The CRM's results-oriented focus has resulted in a series of successful projects on an increasingly ambitious scale that are raising the bar for watershed restoration.

VISION: The 1985 Memorandum of Understanding signed by participating CRM organizations and agencies focuses on the goals of optimizing beneficial uses of water; emphasizing education and prevention over regulation; and resolving the concerns of all participants through a consensus-based planning process.

COLLABORATION: The Feather River CRM comprises 23 public, private, local, state, and federal entities, including the US Forest Service (which administers 75% of the watershed), PG&E, Plumas County and the Plumas Corporation, a nonprofit community-development corporation. The Feather River RCD provides an important link between agencies and private landowners involved in the CRM.

RESOURCES: Since its beginning in 1985, more than \$4 million has been raised and spent on 70 projects, using funds and in-kind contributions from private utilities, landowners, government agencies, state and federal grant programs, and private donations.

PLANNING AND IMPLEMENTATION: All affected parties necessary to implement long-term restoration solutions are involved at every step of the project planning process. All project participants agree to achieve shared goals, to assist in securing project permits, and to use monitoring to document the success or failure of a restoration project.

EVALUATION: Monitoring restoration results consists of three basic components including: continuous monitoring of temperature and surface flow at eight continuous recording stations located strategically in the watershed; biannual monitoring of 21 designated reference reaches, including selected physical and biological parameters such as stream morphology, water chemistry, habitat, macro-invertebrates, and fisheries; assessment of the current state of the watershed in order to produce a "snapshot" of baseline watershed condition prior to initiating the monitoring program.

EDUCATION: FRCRM activities have led to the establishment of the first community college watershed management technician program in California at Feather River College in Quincy. Local high-school students are also gaining scientific knowledge and skills through their involvement in replanting restored areas and project monitoring.

LESSONS LEARNED

- Addressing erosion problems system-wide rather than symptomatically results in higher success rates.
- Raising the water table also makes the land more productive by restoring its natural water storage function.

INNOVATIVE CONSERVATION STRATEGIES

- The "plug and pond" technique is used to eliminate gullies. Ponds provide the material to plug the gully. Water is re-routed into existing remnant channels on the surface of the meadow. The effect of the practice raises the water table in surrounding meadows, essentially "re-watering" the meadows and improving plant growth, riparian habitats, and livestock forage.

Written by Will Stockwin.

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FROG FARMING IN ALAMEDA COUNTY

Overcoming Barriers, Creating Opportunities

LIKE MANY RANCHERS IN THE BAY AREA, Tim Koopmann has a few stock ponds on his land that he would like to repair. His biggest problem is the spillway on his largest pond, which has failed and is in serious need of repair. He used to fix such problems by throwing debris into the spillway to help hold the water and soil and act as a makeshift dam—as did his father and grandfather—but Tim has ceased this practice. He considered repairing the spillway with money out of his own pocket, but after reviewing the costs, he realized that it was just too expensive. “The cattle are paying their way,” he says, “but I’m just getting by.”

The deteriorating condition of the stock ponds is more than just an issue for ranchers and their cattle. These ponds provide important habitat for California red-legged frogs and California tiger salamanders, species that are at risk of local extinction. While the species continue to hang on in stream lagoons and natural ponds in California, much of their habitat has been degraded or lost after more than a century of human-caused damage to wetlands and riparian habitats. They now depend in large part on man-made ponds like Tim’s for habitat. Fortunately, the Alameda County Conservation Partnership is creating new opportunities to help Tim and other ranchers repair these failing ponds.

Many of the estimated 650 ponds in existence in Alameda County today were installed between the late 1940s and 1960s. Almost half of these ponds were installed through cost-share and technical assistance programs conducted under the early Agricultural Conservation and Stabilization Service and Soil Conservation Service. Local ranchers installed some without federal assistance. They installed them to increase range productivity and, therefore, cattle herd size and income. Secondly and more importantly, the lagging profitability of ranching

required ranchers to take a second job in town to help support their families and ranch. Ranchers needed a dependable source of water for their animals while they were away.

The ponds, designed to last 10 to 20 years, lasted well into the late 1980s until spillway erosion and sedimentation began to threaten their integrity. By this time, the cost to repair the ponds, along with the cost of environmental permits, became so expensive and time consuming that the ranchers began “letting the ponds go” and turning to spring development and tank and trough installation for cattle water.



Cattle and red-legged frogs co-exist in harmony on the Koopmann Ranch.
Photo courtesy of the Alameda County RCD

“It’s very expensive to repair these ponds,” says Terry Hulf of the Alameda County office of the USDA Natural Resources Conservation Service (NRCS). “Many ranchers don’t even need them anymore since they now use solar power to pump water for cattle and other devices.” So why are ranchers even interested in pond restoration? They still view their ponds as important parts of the landscape, recognizing that they also provide important wetland habitat for a variety of species.

Even though the landowners preferred to keep the ponds, few had the means to address the myriad hurdles to repair them. They would have to work with six different regulatory agencies and comply with an intimidating set of regulations covering endangered species, water quality, water rights, wetlands, public works, and navigable waters. Obtaining a Biological Opinion under the Endangered Species Act can include some very detailed and costly resource inventory and analysis, and take in excess of a year and a half. Some landowners took action by repairing their ponds without permits and with minimal engineering design — as did earlier generations — but soon gave up under threat of fines from the agencies. Now they have another option.

THE ALAMEDA COUNTY PERMIT COORDINATION PROGRAM

Tim Koopmann is one of many ranchers in Alameda County who has already applied for a new pond restoration program with a streamlined permitting process and a unique package of incentives. The Alameda County Permit Coordination Program is a joint project of the Alameda County Resource Conservation District (RCD) and NRCS. Together, the agencies work as the Alameda County Conservation Partnership, which seeks to facilitate small-scale conservation projects.

First developed in 1998 with the Elkhorn Slough Watershed Permit Coordination Program, permit coordination is a genuine "one-stop shopping" process for efficiently obtaining conservation permits. Since then, resource conservation districts and their partners have created similar programs in Morro Bay, the Salinas River watershed, the Navarro River watershed, and Marin County. Four more programs, including Alameda, are near completion, and nine more are being planned.

Karen Sweet, Executive Officer of the RCD, and Terry Huff, NRCS District Conservationist, recognized the Elkhorn program as a model for Alameda County. With support from the RCD board of directors, they are making it happen. The resulting program will have agreements and master permits from six regulatory agencies for a set of 18 specified con-

servation practices and methodologies. The master permits cover eligible projects so long as landowners adhere to the agreements. In addition, the program will offer assistance with conservation planning, cost-share funding, and legal assurances to protect ranchers from increasing their liability under the Endangered Species Act. While most permit coordination programs focus on stream restoration, Alameda's program is the first to include pond restoration.

Tim Koopmann lauds the program. "It's a wonderful project," he says. And he should know. As a Watershed Manager for the San Francisco Water District, Tim worked with NRCS to help shepherd two individual pond restorations before the program was available. He is aware of the time, effort, and cost to permit and restore degrading stock ponds individually.

Tim looks forward to restoring his pond and to the peace of mind it will bring. "If not for the government funds, Environmental Quality Incentive Program (EQIP) and the Conservation Partnership, I would just have to let it deteriorate and come up with a cheaper fix, like tapping the pond into a trough and be done with it." He is also anxious to remove the accumulated debris from the spillway. "Restoration makes sound environmental sense," says Tim. As with other landowners, he feels the squeeze between doing the right thing for his business and the environment, and the costs to meet the needs of both.

CREATING A PACKAGE OF INCENTIVES FOR RANCHER FRIENDLY CONSERVATION *Development of a Conservation Program*

CONSIDERING THE POTENTIAL WORKLOAD OF RESTORING up to 650 ponds in the county, the Conservation Partnership recognized the need to address the challenges identified by the landowners in a coordinated fashion. With six individual permitting authorities taking up to a year and a half to permit an individual project and costing thousands of dollars in permit fees, the first major challenge was clear.

With the RCD board of directors' approval in 2001, the Conservation Partnership met with Alameda County, the California Coastal Conservancy, and Sustainable Conservation, a non-profit environmental organization from San Francisco, to develop a cooperative agreement to fund development

of a local program. The Conservation Partnership hosted stakeholder meetings with the local ranching community to determine its conservation needs and concerns. Aging stock ponds was just one of those issues raised. A grant from Alameda County enabled NRCS in 2002 to hire Ivana Noell as staff biologist, to provide the technical work, review local biological resources, and work with the regulatory agencies that permit local projects. In April 2003, the Partnership invited six regulatory agencies to attend a workshop. "They all showed up, so there was at least some interest," says Karen Sweet. At the meeting, all six agencies agreed to work collaboratively to develop a program that, in theory, would allow every agency's legislative mandates to be met.

MAKING POND RESTORATION WORK FOR PERMITTING AGENCIES

All six regulatory agencies eventually signed on to the Alameda County Permit Coordination Program. These agencies include the United States Fish and Wildlife Service (USFWS); National Marine Fisheries Service (NOAA Fisheries); United States Army Corps of Engineers; California Department of Fish and Game; Regional Water Quality Control Board; and Alameda County Public Works Agency. The Public Works Agency gave regulatory exemptions to the Alameda County RCD, as it will hold the master permits and assume responsibility for the permit program.

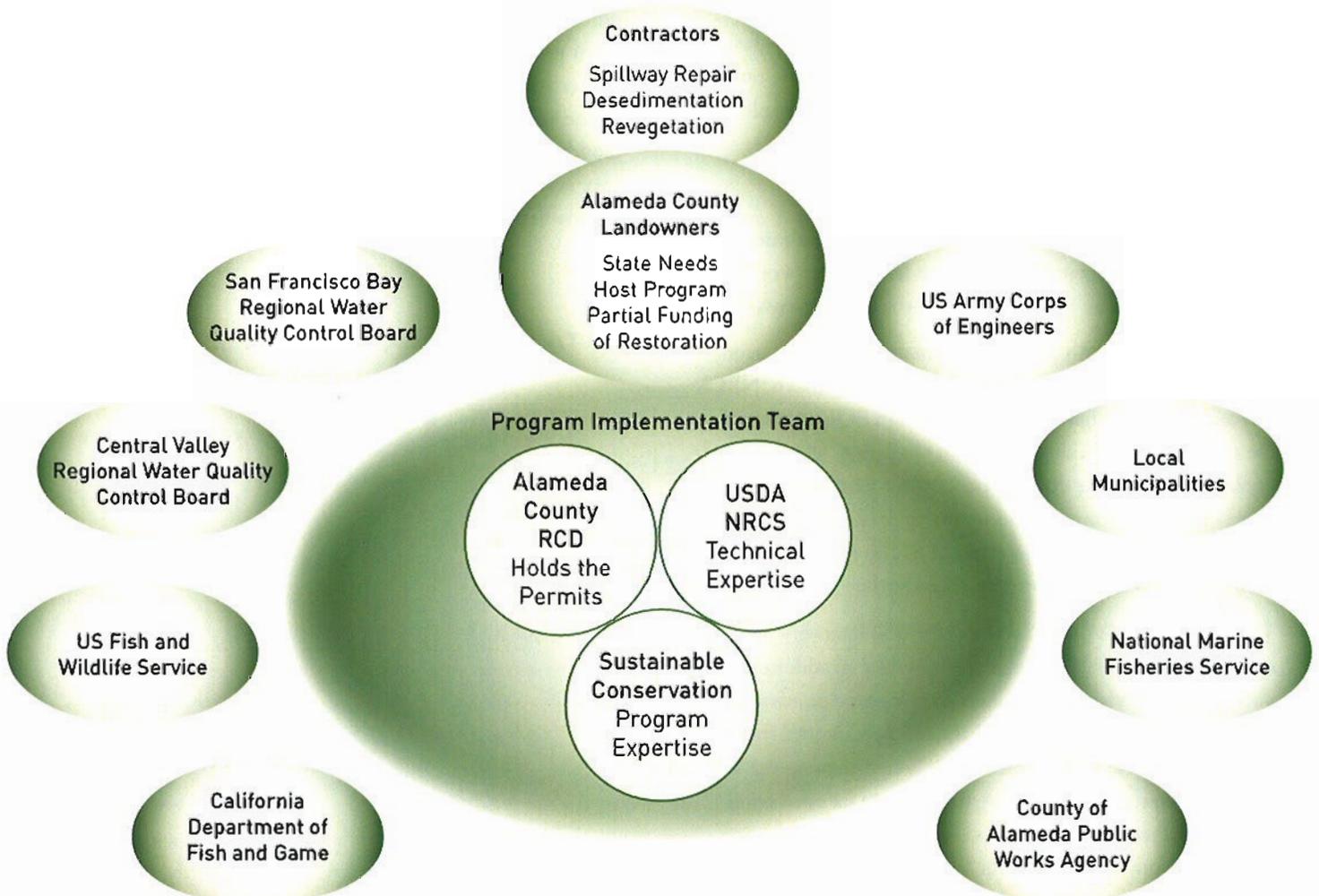
Initially, two of the agencies expressed serious concerns that pond restoration might impact the Alameda Creek Watershed

by causing erosion or the release of unwanted species into the local ecosystem. They raised questions about the effects on both native tiger salamander and the red-legged frog, and the invasive and predatory bullfrog. They were also concerned about the possible impact on the steelhead trout and its continued repopulation back into the watershed.

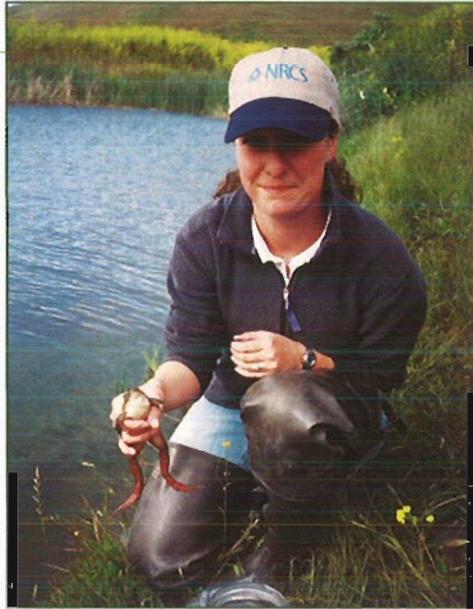
In response, the Partnership agreed to take greater care in planning the restoration and management of ponds near creeks and agreed to conduct pond restoration only upstream of existing steelhead trout barriers. In essence, when restoring stock ponds near steelhead-bearing streams, the Partnership agreed to act as if barriers had already been removed and the trout already repopulated.

ALAMEDA COUNTY PERMIT COORDINATION PROGRAM

Local Partnerships



NRCS' trusted relationship with local ranchers enables Jackie Charbonneau to evaluate frog populations on private land.
Photo by Keith Proctor



Once the program is fully in place, application time for pond restoration and other conservation projects will be approximately 30 days, not 1–2 years or more as under the existing permitting system. The program takes a huge load off of the regulatory agencies' staff and budgets and streamlines the process for landowners.

The pond restoration program can be used only for existing ponds. The California Department of Fish and Game requires that each landowner have a water-rights permit or application on file for the pond.

ENCOURAGING LANDOWNERS TO RESTORE PONDS

Not only does the program promise permit streamlining, it offers additional incentives that many landowners won't do without—cost-share funds and safe harbor agreements.

Each pond restoration project is estimated to cost on average \$25,000. When the program was first announced, NRCS offered 50% cost-share assistance through EQIP. Although the program reduces the permitting challenge, few ranchers applied because their out-of-pocket share was too high. Realizing the need for more enticements to draw landowners into the program, the Partnership sought additional cost-share funds to reduce the landowners' share further.

The US Fish and Wildlife Service (USFWS) Recovery Branch and the Partners for Wildlife offered to cover an additional 40% of the cost-share for ranchers who restored ponds and took extra measures to enhance habitat for red-legged frogs and tiger salamanders. With a potential 90% cost-share, program applicants now will pay no more than \$3,000 for each pond. "When we announced a 90% cost-share for pond restoration, our applications went from three to twenty in one month," says

Huff. NRCS is seeking additional funding to pay landowners \$1,000 per year per pond to maintain them for 10 years, at which time full maintenance costs revert to the rancher. For now, a 90% cost-share program with technical assistance and a 30-day application and permit process is hard to pass up.

The final challenge was landowners' concerns that, by preserving their habitat and attracting species, they would become subject to additional liability under the Endangered Species Act. To address this, the Conservation Partnership forged a partnership with Environmental Defense, a national environmental organization, and negotiated with USFWS to develop a wildlife-friendly pond design and to include safe harbor-like legal assurances into the Biological Opinion for the permit coordination process.

The Biological Opinion provides incidental "take" authority covering red-legged frogs and tiger salamanders during restoration and management of the ponds, as well as during routine ranching activities. This provides assurances that if a landowner improves his land in a way that attracts listed species, the landowner will not incur any new regulation. Additionally, if the landowner satisfies the conditions of the agreement with the Partnership and at the end of the agreement needs to use the land for another purpose, the landowner will not incur any new regulation as a result of the loss of the species habitat (the "reversibility clause"). In light of landowners' historical distrust of the environmental regulatory system, this important program component provides the landowner with peace of mind.

TIMELINE TO IMPLEMENTATION OF THE ALAMEDA COUNTY

JUNE 2001	JANUARY 2002	JULY 2002
Partnership began discussions with Alameda County Public Works Agency on the need for a coordinated environmental permitting program following the lead of the Elkhorn Slough Partners in Restoration Program.	Applied to the California Coastal Conservancy for a \$50,000 grant to support staffing for the permit coordination program. Grant approved and received in September 2002.	Dev co-c agreement with Alameda County for the Coor Pr \$125,0

"It's a win-win solution to repair ponds within the ESA and CEQA [California Environmental Quality Act] regulations," Karen Sweet observes. "A repaired or enhanced pond has more value when selling an easement or a parcel in fee title for habitat mitigation. At the very least, landowners have the satisfaction that they are doing the right thing for their land's resources for the long term and for their heirs. They are demonstrating their stewardship ethic. Landowners deserve recognition for their conservation commitment and investment." Karen envisions future service agreements or mitigation fees will pay ranchers to manage endangered species habitat.

The program thus created a comprehensive package of innovative solutions and incentives. To participate, the first step for ranchers is to develop a resource management plan with NRCS. This free assistance creates a detailed plan that addresses all the issues concerning soil, water, air, plants and animals, and the people who manage the land. The plan may cover the entire ranch or only the portion that the conservation project will affect. It enables landowners to manage literally hundreds of resource problems from eroding stream banks to failing ponds to loss of raptor habitat.

In summary, the Alameda County Permit Coordination Program offers a one-stop process for landowners interested in restoring and enhancing pond habitat including:

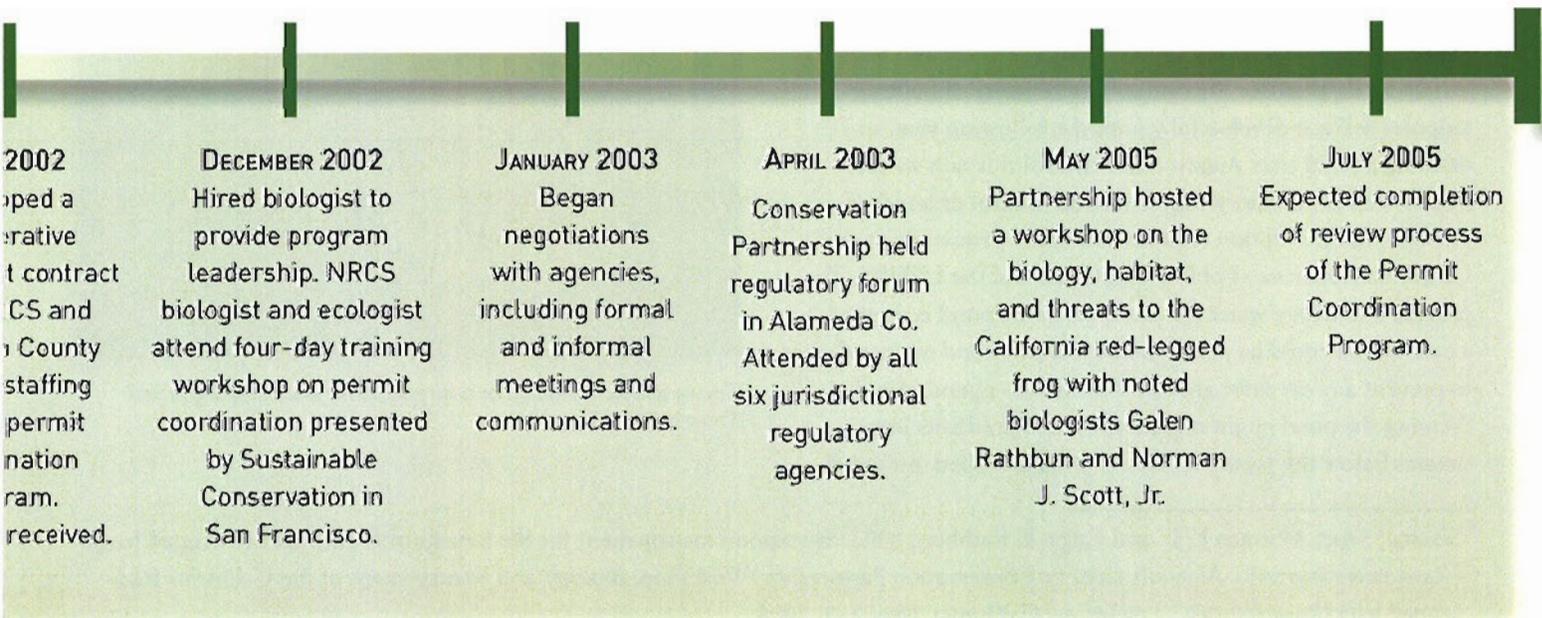
- A detailed resource management plan
- EQIP cost-share assistance
- USFWS cost-share assistance for pond restoration
- A coordinated permit for all agencies with limited costs
- Built in legal assurances for endangered species liability

A serious set of challenges has been addressed head-on, benefiting the landowners, agencies, and endangered species. Twenty ponds have been slated for restoration in 2005–2006 in the new program.



Karen Sweet, Executive Officer of Alameda County RCD, and her husband Darrel, former president of the California Cattleman's Association, also have stock ponds on their ranch in Alameda County. • Photo courtesy of Alameda County RCD

PERMIT COORDINATION PROGRAM



RESTORING STOCK PONDS TO CREATE HABITAT FOR RED-LEGGED FROGS*

OUTSIDE OF STREAM LAGOONS AND NATURAL PONDS that still exist, man-made stock ponds on rangeland provide important supplementary habitat for the California red-legged frog. The little amphibian is very adaptable to its environment, provided it does not have to worry about predators or early-drying ponds. However, either of these conditions can lead the disappearance of entire populations. The Mediterranean climate of Central California is characterized by wet, rainy winters that flush waters clean, and long, dry summers that often break the life cycle of some of the red-legged frog's greatest predators.

The red-legged frog breeds in winter, between December and April. At any one location, breeding takes place during a short period of 2–3 weeks. Depending on water temperature (the warmer, the better), eggs will hatch within a few days or a few weeks. Tadpoles will develop through spring, and should complete their metamorphosis to juvenile by late August. Some tadpoles will over-winter in certain instances, but this is rare. In summer, frogs prefer water deeper than one meter to escape predators. Warm, dry summers can cause water to be scarce, so the frog might find refuge in well boxes, deep water holes of a drying stream, squirrel holes, near small springs and seeps, and under damp leaf litter.

Carefully timing the drainage of stock ponds can also help the red-legged frog survive, while dealing an additional blow to predators. Draining and drying stock ponds is not necessary each year; every three or four years will also have an impact on predator life cycles. The majority of bullfrog tadpoles will not develop fully until the following year, so draining a pond after August helps control this non-native frog as well as predatory fish. Chemical control of ponds is possible, but this option requires additional permits from the California Department of Fish and Game and the USFWS. To provide alternative water for cattle when the pond is drained, a catch basin could be placed below the pond and managed to prevent any predator growth. This is also a good idea if draining the pond might release unwanted predators into streams below the pond. When the pond is refilled, provided

it has both deep and shallow sections and partial vegetation, the red-legged frog should return in its own time.

If a pond is suitable habitat, the frogs will come, though they might not do so right away. They are looking for two main conditions: deep water for cover and shallow water for rearing and growth. They do prefer some vegetation in and around the pond, but too much can cool the water beyond the frog's comfort level.

Cattle grazing can help control predators by keeping shallow areas free of vegetation. Controlling the number of cattle visiting a stock pond at any one time, perhaps by fencing a part of the pond, may help maintain good habitat while allowing continued cattle access. Maintaining a nearby dense terrestrial habitat for short-term frog refuge when the pond dries is helpful.

POND REPAIR

The Permit Coordination Program in partnership with Environmental Defense and USFWS has established a wildlife-friendly pond design, specifying pond depths, loafing areas, vegetation, and management measures for the surrounding landscape. For example, maintaining ground squirrel habitat



Fencing controls livestock access to the pond during sensitive breeding periods. Photo by Keith Proctor

* Source: Scott, Norman J., Jr. and Galen B. Rathbun. 2002. Stockpond management for the benefit of California Red-legged frogs (*Rana aurora draytonii*), Alameda County Conservation Partnership. Workshop. Biology and Management of the California Red-legged frog (*Rana draytonii*). Livermore, California. May 2–3, 2005.

during the restoration process is important to support aestivation habitat for the frogs and salamanders.

Pond restoration begins after the environmental review process is done and master permits are issued. Contractors are hired to carry out spillway repair, desedimentation, revegetation and drain installation. "The contractors that tend to work on the ponds and other agricultural projects are usually local contractors that either are ranchers themselves or who work primarily on agricultural lands," explains NRCS Ecologist Jackie Charbonneau. "Many of the local, licensed contractors are second or third generation ranchers. Usually it is better to have somebody that has a ranching background work on these types of projects because some ponds may be situated in difficult terrain. Contractors with ranching experience generally know how to deal with these conditions."

Robert Nielsen is that someone who knows how to deal with these conditions. A third generation rancher as well as a licensed contractor, Robert notes that spillway erosion is a major cause of pond failure. "Spillways should be used for emergency flow, not continuous flow," he says. "The greater the slope of the spillway, the greater the chance that it will erode much quicker. Less slope, less erosion." Robert admits there are some situations where it might be better, cheaper, and faster to just build a new pond. Although he doesn't work directly with the various regulatory agencies, he operates under the watchful eye of biologists on site. During the project, he must be able to recognize various listed species immediately when he sees them, and then proceed according to strict protocols.

In the past, landowners threw debris into broken spillways. Today, there are other armaments with which to reconstruct a spillway, including a geoweb (honeycombed cell with backfill dirt), riprap (rocks crushed to a certain dimension for the project), or cabled cinderblocks. Hearty compaction of earth around the armament coupled with strong vegetation growth complete the new spillway's strength.

EDUCATIONAL WORKSHOPS

In May 2005, the Conservation Partnership hosted a workshop on the biology, habitat, and threats to the California red-legged frog with noted biologists Norman J. Scott, Jr. and Galen B. Rathbun. Both biologists have studied the red-legged frog for more than 10 years. The workshop, entitled *Biology and Management of the California Red-legged Frog (Rana draytonii)*, focused on the threatened amphibian and its life cycle as well as habitat management. It provided extensive

background on its history, identification, causes for population decline, and various studies, anecdotes, and resources.

The workshop complemented the Permit Coordination Program by educating local landowners, private businesses, and regional regulatory staff about the threatened species and the relative ease of providing good habitat for these species.



Workshop field tour. • Photo by Keith Proctor

SUMMARY

Management of land for both agricultural and environmental benefits is creating a cultural shift in America, as both policy makers and the general public develop effective programs such as this one. This shift is well underway in Alameda County, thanks to the leadership and innovativeness of the Conservation Partnership and the collaboration of organizations such as Environmental Defense and government agencies. Ranchers are deliberately enhancing habitat for endangered species in man-made stock ponds, thereby supplementing the broader public effort to recover endangered species populations in their natural environment. Regulatory agencies are learning to value the resources and knowledge of local landowners whose hands-on experience and long-term commitment to the land they manage is essential to making "best land-use practices" work effectively.

In short, challenges are opportunities—you just need a vision and dedication like the Conservation Partnership to develop the tools, provide leadership, and facilitate innovation and voluntary conservation. The overall goal is to provide financial, technical and regulatory incentives to encourage landowners to strategically manage their lands for specific species habitat in the belief that once developed, this habitat will support species recovery for many years to come.

CRITICAL STEPS TO SUCCESS

THE ALAMEDA COUNTY PERMIT COORDINATION PROGRAM is built on the three pillars of local leadership, participation incentives and partnership. The key ingredients for local conservation projects are in evidence here.

Vision: The Alameda County Conservation Partnership is pursuing a clear vision—facilitating voluntary programs that manage regulations for the benefit of the whole working landscape. They recognize that problems (eroding stock ponds) are really opportunities (habitat enhancement sites for endangered species).

COLLABORATION: The program is built upon a high level of trust developed during sixty years of partnership with private landowners. Likewise, by understanding the heavy workload of coordination with regulatory agencies and by providing practical solutions, the Partnership has built important mutual understanding and respect with the agencies and other organizations.

RESOURCES/RESOURCEFULNESS: Focusing on the common interests of all stakeholders, the Partnership has leveraged both funding and in-kind resources from a wide variety of sources including Alameda County, US Fish and Wildlife Service, the California Coastal Conservancy, and Environmental Defense.

Planning: Faced with up to 650 failing ponds in the county, the Partnership recognized that a project-by-project approach wouldn't work. Working with a team of organizations and regulatory agencies, they created a systematic approach to handling multiple issues, including permitting and legal assurances.

IMPLEMENTATION: The landowners will hire contractors from the ranching community to repair the ponds, leveraging local knowledge and skills to meet new conservation goals.

EDUCATION: The Partnership conducted workshops to provide training in the biology and management of red-legged frog habitat. In addition, the Partnership is conducting media outreach, presentations, and field tours for the public, government agencies and legislators to showcase landowners' voluntary commitment to natural resources enhancement.

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Comparing male and female frogs. • Photo by Keith Proctor

SUMMARY OF THE PROGRAM'S

INNOVATIVE CONSERVATION STRATEGIES

- Stock pond repair for frog habitat benefits ranchers, endangered species, and the watershed as a whole.
- Permit coordination facilitates and streamlines conservation.
- Legal assurances under the Endangered Species Act are important for landowners who voluntarily enhance habitat for endangered species on their land.
- Increased cost-share assistance provides a significant incentive to participate in pond repair.

RECOMMENDATIONS/LESSONS LEARNED

- Work first with the ranching community's leaders; others will follow.
- Develop goodwill, mutual understanding and respect to improve relationships with landowners, government agencies, organizations and the general public alike.
- The CEQA process is not as difficult as anticipated, but it is advantageous to have a CEQA advisor work with your board and staff.

Case Study written by Keith Proctor, with assistance from Terry Huff, Karen Sweet, and Ivana Noell.

