Sustainability Conference Honors River Partners

At the 5th annual This Way to Sustainability Conference held at CSU Chico, River Partners was named as a “Greenie Award” winner. The award acknowledged River Partners’ contribution as a nonprofit organization that has advanced the cause of sustainability. Over the past 11 years, River Partners has restored more than 6,000 acres of riverbanks and floodplains, providing critical habitat for wildlife and sustainable solutions for California’s rivers.

Irv Schiffman, River Partners’ board chair, accepted the Greenie award at the Conference’s reception on November 5, 2009. “We hope that this award will increase awareness of the benefits achieved through the restoration of riparian areas. The award is a recognition that River Partners’ efforts have succeeded in contributing to environmental sustainability, in part, by controlling flood flows, providing habitat for indigenous species, and by improving air and water quality.”

The annual Greenie awards are made to a nonprofit organization, a business, and an individual. Nominations are open to faculty, staff, students, and community partners of the This Way to Sustainability Conference.

Aerial views of the first three fields River Partners planted on the San Joaquin River National Wildlife Refuge. Photo by River Partners staff.

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A Tour of a Successful Restoration Project

One of the most satisfying partnerships enjoyed by River Partners has been with the U.S. Fish and Wildlife Service, particularly with the San Joaquin River National Wildlife Refuge. A number of River Partners’ board members visited the Refuge in mid-November to review progress there and to visit with our restoration ecologist, Julie Rentner, and restoration field manager, Stephen Sheppard. We also met with Kim Forrest, Manager of the San Luis National Wildlife Refuge Complex which includes the San Joaquin Refuge.

The San Joaquin Refuge was established in 1987 under the Endangered Species Act and the Migratory Bird Conservation Act, primarily to protect and manage wintering habitat for the Aleutian cackling goose. It is situated where three major rivers (San Joaquin, Tuolumne and Stanislaus) join, providing a key travel corridor for wildlife.

Following the devastating flood of 1997, when dozens of levees failed throughout the San Joaquin River Basin, USFWS purchased and added to the San Joaquin Refuge some 3,100 acres from farmers who decided to sell rather than try to replant the flooded acreage. In 2002, River Partners won the right to initiate the first restoration project on the newly annexed lands.

The abandoned farm fields of the Refuge provide the kind of environment in which River Partners specializes: removing the agricultural remnants and restoring the land with trees, bushes and grasses to recreate a diversified floodplain that provides habitat for indigenous species, a number of which are endangered or threatened.

Our first assignment on the Refuge was to convert 850 acres of agricultural land to their original condition as a seasonal floodplain and we did so by planting over 175,000 native trees and shrubs. In our second major project we installed more than 41,000 plants on a 511-acre site. Since 2002 it is estimated that we have installed over 500,000 plants on 1,700 or more acres within the Refuge.

Our plantings at the Refuge are designed to recreate or enhance specific habitats of targeted wildlife species, including neotropical migrant song birds, the endangered riparian brush rabbit and the threatened valley elderberry longhorn beetle.

In 2005 and 2006, a pair of nesting least Bell's vireo was discovered at the Refuge, an endangered species that hadn't been seen nesting in the Central Valley for more than sixty years. The restoration site that attracted the birds is in a former, non-productive farm field that was designed and planted to match the original valley riparian habitat of willows, blackberry, wild rose thickets and mugwort.

The planting of native herbaceous understory species both prevents invasion of the restoration area by aggressive, non-native weedy species and provides quality habitat for the riparian brush rabbit. The imaginative building of vegetated “bunny mounds” allows the rabbits to reach higher ground and ride out the inevitable valley floods. In addition, River Partners has vegetated 23,000 linear

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Riparian vegetation (trees, shrubs, grasses and other herbs) is not only important as the habitat where most species occur, but riparian vegetation also supports an ecologically healthy migration corridor along the river for all wildlife. This wildlife function of the Central Valley rivers and floodways is especially important, as we move into the unpredictable climate change era. In addition, recent research has revealed that riparian vegetation can help with solving floodway maintenance challenges and reduce costs while also providing quality wildlife habitat.

Some people look at riparian vegetation and think that it is a problem for the effective conveyance of flood waters—the trees and shrubs plug-up the floodway and slow down the flow. This could be a problem as anything that slows the flood flows could cause over-topping of the levee, or worse, cause the levee to fail. However, experience from visiting the floodway immediately after a flood recedes can be instructive. Early in my tenure as the manager of the Cosumnes River Preserve my neighbor informed me that after a flood the apparently impenetrable patch of blackberry can be found lying on the soil surface, being pressed down by the weight of the flood waters. A few weeks later I was standing on the banks of the Sacramento River listening to a landowner explain how the blackberry had caused the observed bank erosion. How could these two disparate interpretations exist in the minds of rational people? Namely, that the same species, blackberry, could be flattened by a flood or it was the cause of bank erosion. River Partners’ own on the ground experience was that narrow-stemmed native plants were flexible and laid down under even shallow flooding. However we did not have the opportunity to test this until the Flume study at UC Davis.

To gain some insight into how native shrubs and vines behave during a flood, River Partners worked with DWR staff, UC Davis engineering professor Lev Kavvas and his team, and the US EPA to develop a study that measured the responses of four riparian shrubs—California blackberry, rose, sandbar willow, and mulefat—to varying flow velocities and depths. We utilized the large flume at the J. Amorocho Hydraulics Laboratory at UC Davis.

The “Flume” is a structure that imitates river flows at various flood stages. It is a rectangular box about 80 feet long, 6 feet deep and 5 feet wide. Large pumps move water down the flume at predetermined velocities and depths. Velocity sensors measure the speed of the flowing water at different depths and locations in the water profile. Large fruit boxes were planted with individuals of the

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Vegetation in the Floodway and the Flume Study

By Tom Griggs, Senior Restoration Ecologist

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feet of levees within the Refuge to provide additional protected flood sites for this endangered species.

There is much more restoration work to be done on the Refuge, including the possibility of levee breaches to provide for the transitory storage of floodwater. This will require working with other partners such as the Army Corps of Engineers and the California Department of Water Resources.

It was obvious to the visiting board members that the Fish and Wildlife Service, in partnership with River Partners, is succeeding in its efforts to restore habitat and species lost in the San Joaquin Valley. We believe that the work completed and the relationships established at the San Joaquin River National Wildlife Refuge can serve as a model for future restoration efforts in California and elsewhere.
River Services: A Snapshot of River Partners' New Science Webpages:

Editor’s Note:
Over the last several years, nonstructural flood management approaches have been tested within the Sacramento-San Joaquin river system. These on-the-ground projects combine innovative habitat restoration components with set-back levees and floodwater storage projects. River Partners’ work on the San Joaquin River National Wildlife Refuge (see Irv Schiffman’s article, A Tour of a Successful Restoration Project, pg. 2) is an example of these projects. In essence, by widening the floodway, they attempt to restore some of the river services explained below. However, the extent to which river services can be enhanced will always be limited by their regulation by dams and levees. (References are listed on our website at www.riverpartners.org.)

Prior to extensive human settlement and development along the floodplains of rivers, rivers were unregulated – free of dams, levees, straightening and armoring. The flows through rivers were determined by climate and precipitation. When flooding occurred, the floodplains received the extra water. Healthy rivers and floodplains sculpted the landscape and nourished the plants and wildlife dependent on riparian ecosystems. These healthy rivers and floodplains also provided many services that were beneficial to people, which encouraged human settlement and development of the floodplains. Regulation of the rivers allowed protection from the effects of floods, and improved use of the rivers for transportation and water supply for agriculture and urban uses. Through regulation, many human services have been developed, but at the same time, countless ecological benefits have been reduced or lost all together.

Services Provided by Unregulated Rivers

Storage of Floodwaters
The floodplain provides the open space along river channels across which high river flows can spread out. Excess water that cannot be held by the river channel after a precipitation event can be stored on the floodplain. These excess flows eventually return to the river channel, either as surface flows or groundwater discharge. The floodplains reduce the magnitude of flooding and potential for flood damage to surrounding areas.

Groundwater Recharge
Water that enters the floodplain may percolate through the soil, or eventually return to the river channel as surface water. The topography of floodplains, and the presence of vegetation, can allow floodwaters to pond, giving the water time to slowly

Vegetation in the Floodway and the Flume Study

Figure 1: Illustration of how flexible stem plants react to flood waters.

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four plant species, and these were placed into the flume. Different flow velocities and predetermined depths were aimed over and through the plants in the fruit boxes and the velocity of the water was measured over the plants, through their canopies, and under the plants at the soil surface.

Results showed that flow velocity of the water behaved in basically the same manner with all four of the plant species. The plant canopies bent over in response to the flowing water, bending more completely under the higher velocities and greater depths. Water flow slowed as it entered the plant canopy, and slowed even more dramatically at the soil surface under the plant. Meanwhile flow velocity increased as it moved over the tops of the plant canopies. Based upon these findings, these four species of native plants could protect the floodway from soil erosion by forming a protective layer while allowing flood water to easily pass over them.

These findings have great meaning for floodway managers. The most important is that flow velocities increased over the tops of the plants, contrary to many people’s speculation. Plants do not “hinder” or “clog” flood waters. This is due to the flexible nature of the plant stems that bend under flowing water, becoming streamline and dampening the turbulence in the water column. In addition, as the plants bend and the water slows under the plants at the soil surface, soil erosion is greatly minimized. [see figure 1, above] These effects of the flexible-stemmed plants can be used to manage flood conveyance and soil erosion. For example, intentionally planting rose on the side of a levee, or sandbar willow at the base of a levee, can protect the surface of the levee from erosion under high flows without slowing the design flow velocity in the floodway.

The Flume study has shown us that these four species of flexible-stemmed riparian plants hold great promise for solving floodway maintenance challenges and reducing costs while also providing quality wildlife habitat.
penetrate the ground and recharge aquifers. Ground water is an important reserve that can replenish the river channel during low flow events, which can help prevent flows from becoming too low to adequately support aquatic ecosystems.

**Water Purification**

Some of the floodwaters that move across the floodplain percolate through the vegetation and soils. This process helps purify the water that eventually makes its way into the aquifer. Ground water is one main supply of municipal drinking water. Vegetation helps filter water and traps sediment from river flows entering the floodplain. The vegetation also filters waters returning to the river channel, and therefore reduces the amount of debris and sediment that is released back into the river.

The ability of floodplains to filter water has significant impacts on the quality of water that enters the river and ground water aquifers. The floodplain acts as a buffer between surface runoff from surrounding land uses and the main river channel. For example, floodplains, especially where vegetated, can improve the quality of water from agricultural runoff by trapping nutrients and impurities.

**Floodplain Building**

River flows are capable of carrying sediment; faster flows can move larger sediment. When water moves across the floodplain and slows, sediment is deposited. This process adds nutrient rich sediments across the floodplain, which increases soil fertility and builds the floodplains.

**Erosion Control**

Riparian vegetation is a critical component of a healthy river ecosystem. In addition to its role in water purification, vegetated floodplains can help stabilize stream banks and floodplain soils during high water events. The roots of plants structurally support soils, acting like sections of rebar used to help bind cement. The above ground plant material also absorbs much of the impact of water, slowing the water that passes over the soil.

**Native Wildlife**

Riparian forests in California support a greater diversity of wildlife than any other habitat type. Riparian vegetation along river channels also functions as primary regional migration routes for most wildlife. Over 225 species of birds, mammals, reptiles and amphibians are dependent on California's riparian habitats. Special status mammals documented using restored riparian habitat in the San Joaquin Valley include the Riparian Brush rabbit, and along the Sacramento River Western mastiff bats, Pallid bats, Western red bats, and Yuma myotis. (Golet et al 2008). Birds are the most diverse and most studied of the wildlife in the riparian zone. The types of species that riparian vegetation supports range from Swainson’s Hawks that nest in tall cottonwood or valley oak trees, to House Wrens that forage on the floor of the forest and inside debris piles.

**Salmon**

Before intensive human settlement of rivers, the creation of dams and mining operations, the Sacramento/San Joaquin river system supported booming salmon (Oncorhynchus spp.) populations, with up to 3 million salmon returning every year. Like the native plants, salmon adapted to the unpredictability of rivers and environmental conditions. Chinook salmon (Oncorhynchus tshawytscha) evolved into different races that divided the river resources temporally. These runs of salmon returned to the rivers in different seasons, thus reducing competition but also increasing the overall life-history diversity of the species.

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On December 5, 2009, at its Del Rio Wildland Preserve, River Partners hosted more than 70 volunteers and community leaders at its first annual “Make ‘Em Sweat” tree planting event. River Partners’ members and area residents—including representatives from Butte College, Chico State, Boys and Girls Club of Paradise, Butte Environmental Council, and Altacal Audubon Society—diligently worked side-by-side with our “Shovel Team” and planted more than 1,000 valley oaks, Oregon ash, and coyote brush on the 259-acre Preserve.

Since November, our “Shovel Team” members have lent their names to the “Make ‘Em Sweat, Cool the Planet” campaign. They offered the community their services to plant a tree for every $15 donation. As a result, 600 trees were “donated” so that the featured volunteers could sweat and work in the dirt at the event. Many trees were donated in honor of a friend or loved one. Some trees went towards offsetting donors’ carbon footprint. Every tree planted at Del Rio will capture one ton of carbon dioxide.

Most of the tree donations came just two or three days before the big planting event. This was due to two energizing offers. First, Alexa Valavanis, CEO of the North Valley Community Foundation, encouraged her colleagues, friends and family to participate in the campaign, using email and social media to spread the word. Second, an anonymous donor pledged to give 167 trees if we could make a grand total of 500. Our supporters rose to the occasion and we surpassed the 600 tree mark just before the start of the event.

The “Cool the Planet, Make ‘Em Sweat” efforts have helped an important conservation site along the Sacramento River Watershed, the Del Rio Wildland Preserve. The 259-acre Preserve is located in northern Glenn County approximately 15 miles southwest of Chico, next to Llano Seco Rancho. In addition to benefiting wildlife, the Del Rio Wildland Preserve is home to a number of scout

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projects and a popular field trip site for Butte County students, including those from Chico County Day, Marigold Elementary, Ponderosa Elementary, Butte College, and Chico State.

Here are just a few of the wildlife species (including some State-listed species) that could benefit from the planting efforts at the Del Rio Wildland Preserve: Swainson’s hawk, yellow-billed cuckoo, willow flycatcher, bald eagle, black-headed grosbeak, lazuli bunting, blue grosbeak, yellow warbler, American kestrel, northern harrier, and spotted towhee.

Thank you Shovel Team Members!

Ann Schwab, Mayor and Tom Nickell, Vice Mayor, City of Chico; Chuck Rough, Manager, & Steve Culleton, Vice Mayor, Town of Paradise; Scott McNall, Director, Institute for Sustainable Development, CSUC; Alexa Valavanis, CEO, North Valley Community Foundation; Mark Roberts and Todd Swagerty, Springboard Biodiesel; Jim Broshears, Trailhead Adventures of Paradise; and Irv Schiffman, John Carlon, Helen Swagerty & Amanda Freeman, River Partners.

Become a River Partner or Make a Special Gift

Join us in our mission to create wildlife habitat for the benefit of people and the environment. Your contribution will support our work to restore and protect the rivers of the Great Central Valley of California. You will receive our quarterly Journal, a River Partners membership decal, and invitations to special tours and events.

- $2,500 Lifetime Partner
- $1,000 River Steward
- $500 Benefactor
- $250 Sponsor
- $100 Investor
- $50 Family
- $35 Individual
- $_____ Special Gift

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In memory of/On behalf of _________________________________
Please notify _____________________________________________

Please send your check made out to: “River Partners” 580 Vallombrosa Ave., Chico, CA 95926.

Thank you for your contribution. River Partners is a 501(c)(3) nonprofit organization.

Online credit card payments can be made at www.RiverPartners.org.

Kainoa and Helen Swagerty (above) and Alexa Valavanis, North Valley Community Foundation (right) help plant trees at the Make ‘Em Sweat Event. Photos by River Partners.

Upcoming Events

2010 Snow Goose Festival
Thursday-Sunday, January 28-31
Chico, CA

Over 50 guided field trips and workshops. River Partners is hosting two!
To learn more, visit: www.snowgoosefestival.org

Turtle Travels
See life from their point of view. An interactive exhibition for children and families
January 23 – April 18, 2009
Turtle Bay Exploration Park
Redding, CA
To learn more, visit: www.turtlebay.org
Such diversity provided Chinook salmon with a buffer against their often changing environment. Certain years favored the life-histories of the different runs. Even among runs there was a high degree of genetic variability, which further increased chances of survival amidst the ever changing conditions.

Salmon were able to diversify in part because of the variation in spawning and rearing habitats that the tributaries and main stems of the Sacramento/San Joaquin system provided. High elevation and low elevation streams, rapidly moving waters and pools, cool water temperatures and warmer rearing grounds, in-stream and floodplain habitats were accessible to the salmon. Also present in the varied habitats was the appropriate spawning gravel substrate, which is not muddled by finer sediments like sand. Unregulated rivers are able to carry and sort sediment, depositing clean gravel that can be used for spawning.

Native Pollinators

Due to the variety of native plants in riparian areas, there is a great diversity of pollinating insects. Native pollinators are valuable resources to agricultural areas, especially organic farms adjacent to riparian plant communities (Kremen and others 2002). With the decline of honey bee populations, native pollinators are increasingly considered viable alternatives to meet the pollination demands of agriculture.

Carbon Sequestration

Carbon sequestration occurs when plants absorb carbon dioxide from the atmosphere for photosynthesis, store the carbon and release the oxygen. Carbon can be stored in above and below ground biomass of plants, in dead plant material and in soil. In general, the rate of carbon sequestration increases as the plants age (Giese and others 2003), but eventually mature plants will slow their rate of sequestration (EPA site). Riparian plant communities sequester carbon at higher rates than many other plant community types. Due to the dynamic nature of river systems, which are constantly eroding established forests and rebuilding point bars where young forests rapidly develop, there are multiple ages of plant communities that continue to grow and sequester carbon at a faster rate.

Recreation and Aesthetics

Healthy rivers and floodplains contain a variety of native vegetation, multiple wildlife habitats, and clean water. This formula creates excellent outdoor recreation such as hunting, fishing, hiking, camping, swimming, and boating.