



*To promote the economic, social and environmental viability of Northern California by enhancing and preserving the water rights, supplies and water quality of our members.*

## **Status of Fishery Programs in the Sacramento Valley**

An impressive array of ecosystem restoration activities has been undertaken in the Sacramento Valley over the past decade to improve the health of the San Francisco Bay/Sacramento-San Joaquin Rivers Delta (Bay-Delta) ecosystem. Most of these actions have been implemented to benefit and ultimately recover anadromous fish species, including salmon and steelhead.

It is important to recognize that water use within the Sacramento Valley does not contribute, in any meaningful way, to the Bay-Delta problem that was targeted by the State Water Resources Control Board (SWRCB) in its Bay-Delta water rights proceedings and is now being addressed by the consortium of federal and state agencies known as CALFED. Because of its location upstream from the Bay-Delta, all water not consumptively used within the Sacramento Valley returns to the system for subsequent diversion by others or for Bay-Delta outflow.

As a result, Sacramento Valley environmental mitigation, protection and enhancement have been properly focused on issues such as fish screens and related fish passage and upstream-related fishery habitat issues. Sacramento Valley water users for the past decade have been implementing projects to provide upstream solutions. The Sacramento Valley's initiative and effort to help protect salmon and other aquatic species is unprecedented and is now recognized as one of the most exciting and progressive voluntary salmon restoration efforts in the United States. The use of water within the Sacramento Valley itself contributes to habitat improvement, including the creation and enhancement of habitat for waterfowl.

The Northern California Water Association (NCWA) was formed to promote the economic, social and environmental viability of Northern California by enhancing and preserving the water rights, supplies and water quality of our members. NCWA and the Northern California water users have now embarked on an integrated water management program that has broad support from water suppliers and local governments throughout the Sacramento Valley. This integrated program includes fish passage improvements (fish screens, ladders, and siphons), groundwater management, evaluation of the Sites off-stream reservoir, flood protection, water quality improvements, water use efficiency programs, potential expanded storage in Lake Shasta, intra-regional water transfers and exchanges, and watershed management. A significant part of this integrated program is a sustained, long-term commitment to fish passage and other ecosystem improvements throughout the Sacramento Valley.

## **Fishery Programs in the Sacramento Valley**

### **Antelope Creek**

Antelope Creek supports spring-run chinook salmon and steelhead trout. Local landowners and the California Department of Fish and Game (DFG) are pursuing a partnership with the U.S. Fish and Wildlife Service (USFWS) to implement a fish passage improvement to Antelope Dam. A fish ladder has been operating at the dam since 1981. Flood waters have now damaged the ladder and a new, more technologically advanced ladder needs to be installed and improvements need to be made to the face of the dam to promote use of the ladder. If funding is available, the project will be completed in Spring 2005.

### **Battle Creek**

Battle creek supports four runs of chinook salmon (winter, spring, fall, and late-fall). It also hosts a number of small hydroelectric facilities operated by Pacific Gas & Electric Company (PG&E). In 1999, a Memorandum of Understanding (MOU) was established between PG&E, U.S. Bureau of Reclamation (BOR), USFWS, National Marine Fisheries Service (NMFS), and DFG that outlines activities to be undertaken on the creek to promote anadromous fish passage, including the removal of dams, construction of fish screens and ladders, acquisition of in-stream flows to increase salmonid habitat, and the creation and implementation of an adaptive management plan. Restoration activities will include dam removal and fish ladder construction. The project has received \$28 million in Proposition 204 funding.

### **Butte Creek**

Efforts are being made on Butte Creek to restore spring-run chinook salmon and steelhead populations through a comprehensive program consisting of improving fish passage, increasing and improving streamflow during certain periods, consolidating and screening diversions, and protecting and restoring the riparian corridor. Since 1992, five dams on upper Butte Creek have been removed and the four remaining dams now have either state-of-the-art fish ladders or screens. The removal of four of the five dams was facilitated through the construction of a siphon under Butte Creek two years ago to deliver water to Western Canal Water District's (WCWD) Main Canal without impacting migrating salmon, including the spring-run chinook salmon. As a direct result of this work, several miles of new spring-run habitat have been opened up to migrating fish.

The Lower Butte Project in the Sutter Bypass, a partnership of local water users, resource agencies, and environmental organizations, is currently involved in the design and implementation of fish passage and water delivery alternatives for the remaining structures and diversions impairing migrating fish passage on the reach of Butte Creek downstream from Butte Sink. Specifically, the partnership is attempting to improve fish passage over 30 water control

structures, which is expected to bolster the long-term sustainability of production of anadromous fish populations, in particular spring-run chinook salmon and steelhead trout.

The M&T Ranch led the way for fish screen efforts on Butte Creek with the construction of their project in 1994. Additionally, fish screens and ladders were constructed during 1998 and 1999 at the diversion dams operated by Durham-Mutual, Rancho Esquon (Adams Diversion Dam), and Gorrill Land Company (Gorrill Diversion Dam).

The PG&E, which operates a number of small hydroelectric facilities on upper Butte Creek, is also studying the effect flow timing will have on improving water temperature to further promote spawning fish survivability in the upper reaches of the creek.

### **Clear Creek**

Since 1995, the Clear Creek Coordinated Resource Management Planning Group, which consists of stakeholders and local landowners and the Clear Creek Technical Team, has been involved in planning, implementation and monitoring of multi-disciplinary restoration projects to promote anadromous salmonids. Activities on Clear Creek to benefit the salmon populations that have been performed or that are in the process of being implemented include increased water releases from Whiskeytown Dam, improving upstream passage for migrating chinook salmon and steelhead to historical habitat, spawning gravel augmentation, restoration of sediment transport, and reducing sediment input from upland erosion. One of the more visible fish passage improvement activities on Clear Creek was the removal of the McCormick-Saeltzer Dam in November 2000, which opened six miles of upstream habitat for salmon

### **Deer Creek**

The Deer Creek Watershed Conservancy, a group of stakeholders, landowners, and local government representatives, is involved in a collaborative stakeholder effort to foster conservation, restoration and sound resource management in the Deer Creek watershed. Fish passage improvements being implemented on Deer Creek include a water exchange program to augment fish transportation flows, monitoring and maintenance of existing fish screens and ladders, and protection of anadromous fish spawning, rearing and holding habitat. In addition, the conservancy will be involved in a project to determine the need to upgrade existing ladders and screens at three water diversions that are currently using perforated flat screens developed in the 1950s.

## **Mill Creek**

Fish restoration activities on Mill Creek center around the development and implementation of the Clough Dam Siphon and Screen Project. The privately owned Clough diversion dam was damaged by high flows in 1997. A preliminary engineering investigation for a new diversion system at the site has been completed. The investigation details a proposal to remove Clough Dam and replace it with an inverted siphon to allow unimpeded fish passage while maintaining water deliveries. New water deliveries to the Clough ditch will be diverted through the Los Molinos Mutual Water Company diversion ditch, and then siphoned under Mill Creek through the new facility. DFG is also planning to remove Ward Dam on Mill Creek. This 5-foot dam, which was rebuilt in 1997, was partially washed-out by flood waters that same year. Removal of the structure would promote fish passage in dry water years.

## **Sacramento River**

Numerous programs have been undertaken or are now underway to promote fish passage and survivability on the Sacramento River.

Temperature Control Device – The temperature control device at Shasta Dam, which was completed in March 1997, was constructed to enhance fish habitat by releasing colder water into the upper reaches of the Sacramento River without losing power revenue. The temperature control device and associated low-level intake structure are intended to help mitigate the declines in population of threatened winter-run chinook salmon. It was determined that one of the major causes of the decline is the high loss of eggs and fry during the later summer and fall spawning season in the upper Sacramento River due to elevated water temperatures.

The 250-foot-wide by 300-foot-high steel facility consists of a shutter structure and a 130-foot-wide by 170-foot-high low-level intake structure attached to the upstream face of Shasta Dam, which encloses all five existing power penstock intakes and regulates water temperature through selective level withdrawal of reservoir water.

Spawning Gravel – In 2000, 32,000 tons of gravel were placed in the Sacramento River as part of a spawning gravel program authorized through the Central Valley Improvement Act (CVPIA) of 1992. In 2002, an additional 15,000 tons of gravel was placed in the upper Sacramento River and 8,800 tons more in 2003. The gravel was added to the river in an effort to restore riparian habitat. It is expected that the gravel will erode downstream and become future salmon spawning habitat. Sonic tags were placed in selected pieces of gravel to track the downstream movement.

Glenn-Colusa Irrigation District (GCID) – GCID now operates a state-of-the-art fish screening facility – the largest of its kind in the world. GCID diverts a maximum of 3,000 cubic feet per second from the Sacramento River, with the peak demand occurring during spring months at the

same time as the peak out-migration of juvenile salmon. Key components of GCID's fish screen facility include a 600-foot extension to GCID's pre-existing fish screen, and a stabilizing gradient facility in the mainstem of the Sacramento River. This project is designed and operated to minimize losses of all fish in the vicinity of the pumping plant diversion, including endangered winter-run chinook salmon, while maximizing GCID's capability to divert the full quantity of water it is entitled to utilize to meet its water supply delivery obligations. The total capital cost of GCID's fish screening project is estimated to be approximately \$76 million.

M&T Chico Ranch (M&T) – M&T environmental restoration activities included relocating the M&T Pumping Station from the mouth of Big Chico Creek to the Sacramento River and screening the new diversion. M&T intends to complete this project by installing a remaining pump behind the screens. This project ensures a guaranteed water supply to over 8,000 acres of permanent wetlands and over 1,500 acres of seasonal wetlands. Additionally, it also protects habitat for migrating spring-run chinook salmon. One other important benefit of this project is M&T's agreement to provide fish flows in the amount of 40 cfs in Butte Creek, one of the most important and last remaining spawning areas for spring-run salmon.

Maxwell Irrigation District (MID) – MID now operates a state-of-the-art positive barrier fish screen, one of the first of its kind installed on the Sacramento River. Completed in 1994, the new pumping plant and screen facility protects threatened steelhead and spring-run chinook salmon, and endangered winter-run chinook salmon. In 2002, MID incorporated a neighboring diversion into the existing project, thereby eliminating another unscreened diversion on the Sacramento River.

Natomas Mutual Water Company (Natomas) – Natomas has completed the feasibility, preliminary design and environmental evaluation work associated with consolidation of five Sacramento River diversions into two screened facilities. The project will remove pumping from an area ("Natomas Cross Canal Channel") that can be preserved for both fish passage as well as provide new protections for terrestrial species by preserving and enhancing important habitat. The consolidation of diversions and upgrading of associated infrastructure will allow the Natomas project to also assist neighboring communities in achieving regional water management improvements by connecting the Sacramento and American Rivers for the first time, thus making regional groundwater recharge and banking possible while reducing diversion impacts on the American River.

Pelger Mutual Water Company (Pelger) – In 1994, Pelger completed construction of its new pumping station and positive barrier fish screen in the Sacramento River near Knight's Landing. This facility includes pumps with a discharge capacity of 60 cfs. The screen protects spring and winter runs of chinook salmon as well as steelhead trout.

Princeton-Codora-Glenn Irrigation District (PCGID) and Provident Irrigation District (PID) – recently completed the fourth largest fish screen on the Sacramento River. The completed facility replaces three major diversions on the Sacramento River with a consolidated, screened pumping plant. In addition to the fishery benefits, the project also provides reliable water supplies for nearly 30,000 acres of farmland and thousands of acres of seasonal wetlands for migrating waterfowl in PCGID and PID. The districts conducted a dedication ceremony for the screen on November 8, 2001.

Reclamation District 108 (RD 108) – In 2000, RD 108 completed construction of a positive barrier fish screen on the Sacramento River. The project, located at the district's Wilkins Slough diversion, protects migrating endangered winter-run chinook salmon, as well as the spring-run chinook and steelhead trout. The design for the new screen facility was chosen after several years were spent examining the performance of alternate screen technologies.

RD 108 is currently developing a new fish screen project that will consolidate its three largest unscreened river diversions into one pumping plant with a new fish protection screen facility. This project is scheduled to enter its construction phase in 2005, if it receives adequate funding.

Reclamation District 1004 (RD 1004) – RD 1004 completed construction on its screen in 1998. In addition to construction of a positive barrier fish screen, this project relocated the Princeton Pumping Plant and necessary conveyance facilities to a more stable location along the Sacramento River. This project eliminates significant adverse impacts to fish inhabiting the Sacramento River, including juvenile winter-run chinook salmon and steelhead.

Richter Brothers – The Richter Brothers diversion on the Sacramento River near Knights Landing is located along a reach of the river that hosts several species of salmon, steelhead trout and the Sacramento splittail minnow. Richter Brothers have received CALFED funding for feasibility studies and preliminary design for an improved diversion that will provide an important protective role for fish in this critical stretch of the river.

Sutter Mutual Water Company (Sutter Mutual) – Sutter Mutual has completed the design work on the fish screen project for its diversion on the Sacramento River just downstream from the Tisdale Weir. The Tisdale Pumping Plant is the largest remaining unscreened diversion on the Sacramento River. Sutter Mutual is scheduled to begin construction on the screen in 2005, if adequate funding is secured.

Tehama-Colusa Canal Authority (TCCA) – The water users that make up the TCCA and the BOR have addressed fish passage problems at Red Bluff Diversion Dam since 1985 by modifying dam operations. The installation of rotary drum screens in 1990 and the research pumping plant in 1995 furthered these efforts. The TCCA, with assistance from the CALFED Bay-Delta Program, is also exploring plans for improving fish passage at Red Bluff. The TCCA

investigated the feasibility of a number of different alternatives to the current diversion dam gravity intake system, including installing a state-of-the-art screening and pumping facility at Red Bluff, altering the operation schedule for the diversion dam, constructing a fish bypass facility, or a mixture of new facilities construction and altered dam operation. The water users have selected a preferred alternative that involves the construction of an improved positive barrier fish screen and pumping facility. The BOR has yet to agree to a preferred alternative.

The Red Bluff Diversion Dam is located approximately 60 miles downstream from Shasta and Keswick dams. The reach of the Sacramento River upstream of RBDD is the primary spawning habitat for the endangered winter-run chinook and the fall and late-fall chinook salmon.

### **Stony Creek**

The BOR has just completed the third and final year of a monitoring program on Stony Creek in Glenn and Tehama counties. The purpose of the monitoring program was primarily to determine if steelhead trout were present in the creek. During the three-year program, no steelhead trout were found in Stony Creek. This information should allow the State and federal fishery agencies to concentrate their steelhead restoration activities to other rivers and streams on the east side of the Sacramento Valley where steelhead are present.

### **Yuba River**

Local agencies on the Yuba River have been implementing a number of projects and activities to benefit the passage and survivability of anadromous and other fish species.

Browns Valley Irrigation District (BVID) – BVID in late 1999 completed construction of its Yuba River Diversion Fish Screen. This project protects salmon in the Yuba River, and, because BVID relied heavily on local and in-house construction services, came in below budget. The final project was funded with BVID's own funds and assistance provided by the Yuba County Water Agency (YCWA), Yuba River PG&E Mitigation Account, Category III, CVPIA Restoration Fund, and Tracy Pumps Mitigation Fund.

Cordua Irrigation District (Cordua), Hallwood Irrigation District (Hallwood) and Ramirez Water District (Ramirez) – Prior to the 2001 irrigation season, work was completed on a 600 cfs fish screen for the diversion on the north side of the Yuba River at Daguerre, which serves Cordua, Hallwood and Ramirez. This screen was constructed in cooperation with the NMFS, DFG and USFWS and replaced an obsolete screen that was owned and operated by DFG. The DFG screen was not operated on a continuous basis and about \$1 million juvenile fish were estimated to be entrained in the diversion each year. Funding for the screen came from the irrigation districts and the YCWA.

Yuba County Water Agency – YCWA has performed a number of activities promoting Yuba River fish recovery, including: partnering with the fishery agencies and other stakeholders in reviewing studies and making decisions on the lower Yuba River; conducting an annual chinook salmon escapement survey after DFG discontinued the survey in 1990 due to a lack of funding; including fishery conditions into water management decisions; scheduling water transfers in a fish friendly manner; and, improving the reliability of its Narrows 2 powerhouse to be less susceptible to PG&E transmission line outages that can result in flow reductions out of Englebright Reservoir.

YCWA has also been actively partnering with CALFED to develop additional fishery improvements on the Yuba River. The agency has received CALFED funding for two ongoing steelhead studies and one study to further enhance the Yuba fishery. YCWA is currently working to help several small diverters screen their pump facilities and has applied for a CALFED grant to install a full flow bypass to further reduce the possibility for flow reductions on the lower Yuba River. In addition, YCWA applied for a CALFED grant to install an intake extension on its Narrows 2 powerhouse to further reduce temperatures on the Yuba by up to 6 degrees Fahrenheit.

The YCWA is working with the USFWS and the U.S. Army Corps of Engineers (Corps) to evaluate options to improve fish passage upstream and downstream of Daguerre Point Dam on the Yuba River. While the existing fish ladders appear to be working properly, a study will assess whether the facilities can be further improved. YCWA has also received funding from CALFED and the Central Valley Project (CVP) Restoration Fund to study the life history and stock composition of steelhead trout on the Yuba River. YCWA is also planning to install a new turbine shutoff valve and a new flow bypass valve that would be synchronized to maintain constant flow to the Yuba River to permit a smooth transfer of flow.

### **Water Acquisitions**

Water acquisitions in the Sacramento Valley for many years have provided benefits to the Bay-Delta and anadromous fish species. Many of the recent acquisitions have been targeted primarily for the benefit of fisheries in the Bay-Delta watershed. In 2001, 80,000 acre-feet (af) of water was acquired in the Sacramento Valley for the Environmental Water Account (EWA). This exceeded the 35,000 af called for in the CALFED Record of Decision (ROD). In 2002 and 2003, 142,000 af and 70,000 af respectively were acquired upstream of the Delta for the EWA. Additionally, water from the Sacramento Valley has been utilized to meet the numerous commitments in the CVPIA, including the 800,000 af dedicated to fish and wildlife purposes and the Anadromous Fish Restoration Program (AFRP). Northern California water users are also committed to the acquisitions called for in the CALFED ROD to “improve salmon spawning and juvenile survival in upstream tributaries.”