

FISH FRIENDLY WATER FOR AGRICULTURAL, URBAN
AND ENVIRONMENTAL NEEDS:
A CALIFORNIA CASE STUDY

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ABSTRACT

A project was developed to provide "fish friendly" water for approximately 8,000 acres of wetlands, 8,000 acres of agricultural land, urban water users, and millions of migrating waterfowl. The confluence of Big Chico Creek, and the Sacramento River, is north of the San Francisco Bay/Sacramento-San Joaquin River Delta area. Big Chico Creek once supported healthy runs of chinook salmon and steelhead trout. In the early 1900s, five large pumps were installed on Big Chico Creek, with a combined capacity to divert, for irrigation purposes, about 135 cubic feet per second (CFS) of water. Later, these same pumps were also used to provide water for about 8,000 acres of refuge wetlands on State and Federal wildlife areas. When the pumps were in operation during low flow periods, the unscreened diversion caused stream flow reversals during out migration periods, resulting in a substantial loss of downstream migrants. Due to the loss of winter run salmon, the California Department of Fish and Game and the U.S. Fish and Wildlife Service elected not to exercise their legal right to use the pump station, thus limiting their ability to manage and maintain the critical wetlands. For many years, biologists have called for the removal of the pumps, however, the private landowners did not have \$4.5 million necessary to move and screen the pumps. Identifying mutual areas of interest and the multiple benefits associated with this project led to the formation of a partnership consisting of stakeholders that more often than not, were polarized and against one another, i.e., environmental, agricultural and urban water interests. Because of the partnership, the following benefits were achieved: \$4.5 million was raised to move the pumps; agricultural operations will continue, fisheries will not be affected, and wetlands will again provide critical habitat for other threatened and endangered species and millions of migrating waterfowl.

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INTRODUCTION

California agriculture is considered one of the most diversified industries in the world with an abundance of land resources, fertile soils and temperate climate zones. Coupled with sophisticated technology, California has been the top-ranking agricultural state in the United States. In 1995, cash farm receipts approached almost \$20 billion and generated more than \$70 billion in related economic activities (American Farmland Trust 1995).

Within California, the Central Valley is the nation's most important agricultural area, with eleven of its 21 counties producing 250 different commodities with a market value of \$13.3 billion a year (American Farmland Trust 1995). From crops as diversified as nuts, stone fruits and cereal grains, this level of production occurs on approximately 6.7 million acres (2.7 million ha) of irrigated cropland.

While the abundance of land resources, fertile soils and temperate climate zones produce an environment that is conducive to high yields and high farm cash receipts, it also provides for some of the most diverse and abundant wildlife in the nation. The Central Valley wetlands and agricultural areas support the largest single concentration of wintering waterfowl (approximately 3-4 million birds) and are considered one of the most important wintering areas for waterfowl in North America (Bellrose 1980, Heitmeyer 1989a).

California's great Central Valley supports approximately 60 percent of the ducks and geese wintering in the Pacific Flyway. However, nearly 95 percent of the Central Valley's historic wetlands have been lost (Gilmer et al. 1982). Of the remaining 300,000 acres (121,410 ha) of wetlands, two-thirds are privately owned and managed for the purpose of providing wintering waterfowl habitat and duck hunting opportunities (Heitmeyer 1989a). The remaining one-third consists of State Wildlife Areas and National Fish and Wildlife Refuges (Central Valley Habitat Joint Venture 1990).

Located within the heart of the Central Valley is the Bay-Delta. The Bay-Delta is the largest estuary on the West Coast. The Bay-Delta is a beautiful, lush, and varied ecosystem including a maze of tributaries, sloughs, and islands encompassing 738,000 acres (298,668 ha). Lying at the confluence of California's two largest rivers, the Sacramento and San Joaquin, it is a haven for plants and wildlife, including 70,000 acres (28,329 ha) of wetlands and supporting 120 different fish and wildlife species. The Bay-Delta is also critical to California's economy, supplying drinking water for about 22 million Californians and nearly half of the entire state's irrigation water for

200 different crops, including 45 percent of the nation's produce (CALFED Bay-Delta).

The economical and ecological significance of the Bay-Delta cannot be understated and for centuries has been the focus of debate and competing interests ranging from economic and ecological to urban and agricultural. While the debate surrounding the use of these natural resources continued, the quality of the Bay-Delta ecosystem continued to suffer and decline. Wetland, riparian and associated upland habitat continued to suffer, and native species continued to decline. For the urban water user, the Bay-Delta no longer served as a reliable source of high quality water and agricultural interests were faced with an increased shortage of water necessary to maintain California's strong agricultural industry.

In this paper, we present the methodology and processes used to develop a project that will contribute toward protecting the economic viability of critical Central Valley agricultural land and enhance wetlands in Butte County, California. In addition, the project will contribute toward enhancing the Bay-Delta ecosystem. By implementing a conjunctive use project that accomplishes both agricultural, fish and wildlife objectives, the project has been widely supported by wildlife interests, farmers and the local community.

ABSENT FISH FRIENDLY WATER

Big Chico Creek, a tributary to the Sacramento River, once supported healthy runs of spring, fall and late-fall runs of chinook salmon and steelhead trout. In 1958, spring-run chinook salmon populations were estimated at 1,000 adults and steelhead populations are thought to have averaged 150 returning adults. Recent estimates indicate that a low steelhead population, a highly variable spawning population of fall and late-fall chinook salmon and only a remnant of spring-run chinook salmon remain in Big Chico Creek.

One obstacle to restoring the spring-run chinook salmon and steelhead in Big Chico Creek system is water exported from the lower reaches of the creek during the critical emigration/immigration period of juvenile and adult fish. Water diversions from the M&T/Parrott Pumping Station significantly contributed to the fish mortality on Big Chico Creek.

In the early 1900s, the M&T/ Parrott Pump Station was installed. This pump station, comprising five large pumps, had a combined capacity to divert more than 135 cfs of water. Further complicating the situation, the bank of pumps were not screened. During peak demands in the irrigation system, these

pumps caused stream flow reversals during the critical emigration period, resulting in a substantial loss of downstream migrants during stream flow reversal in Big Chico Creek.

The water diverted by the M&T/Parrott Pumping Station was used on approximately 8,000 acres (3,237 ha) of privately owned and very productive agricultural land. The water was used to irrigate crops such as rice, sugar beets, almonds, other cereal crops, and irrigated pasture. The pump station was also used by the California State Department of Fish and Game (CDFG), the United States Fish and Wildlife Service (USFWS), and a private landowner to irrigate approximately 8,000 acres (3,237 ha) of seasonal and permanent wetlands that are adjacent to the agricultural lands.

The CDFG and USFWS manage the state and federal wildlife and refuge areas to benefit many species of threatened and endangered species. In addition, the areas support millions of migrating waterfowl that are dependent upon this area during their winter migration through the Central Valley. Specifically, ducks, geese, swans and hundreds of other wetland species are dependent upon Central Valley wetlands for their winter food supplies.

The CDFG and USFWS were dependent upon the M&T/Parrott Pump Station to properly manage the wetland areas. In recent years, both the State and Federal agencies elected not to exercise their legal right to this water because of the negative impact the pumping had on the winter run salmon (a federally listed species). Absent a "fish-friendly" water pumping and diversion alternative, the state and federal agencies were unable to utilize their riparian water rights.

Electing not to exercise their riparian water rights resulted in a limited opportunity to pump water without drastically impacting winter run salmon and steelhead populations. As such, because of the unreliable and limited water supply, approximately 80 percent of the wetland areas were functioning at 60 percent efficiency. Stated differently, the habitat needed to support the millions of migrating ducks, geese, swans and other wetland dependent species, was not functioning at its maximum potential because of an inadequate and unreliable water supply at critical times of the year.

DEVELOPING A CONJUNCTIVE USE SOLUTION

Increasing demands on the use of water in California, coupled with the competing and conflicting interests of agriculture, urban and environmental groups, has created a polarized and often confrontational situation regarding

the allocation of water. Balancing the needs of diverse interests has forced stakeholders to seek new ways to achieve long-term, reliable sources of water that is environmentally responsible, affordable and of sufficient quality for all interests.

By relocating the M&T/Parrott Pump Station and screening the diversion, a "fish-friendly" water supply could be made available to the agricultural land, as well as the state and federal wildlife areas and refuges. In addition, by removing one of the barriers associated with the number of spring, fall and late-fall runs of chinook salmon reaching the Bay-Delta, the fisheries associated with the Bay-Delta ecosystem would be improved. However, to relocate and screen the new diversion, \$4.5 million was needed. Because the M&T/Parrott Pump Station was privately owned, the landowners did not have \$4.5 million needed to complete this project.

Recognizing the multitude of public and private benefits associated with relocating and screening the pump station, a Joint Management Committee was developed. This committee consisted of representatives from the agricultural landowners, the CDFG, and the USFWS. The purpose of this ongoing committee is collectively to manage the various issues affecting the private agricultural operations and public wildlife areas. In addition, the Joint Management Committee was responsible for identifying a new location and design for the new pump station. Working through the public/private, Joint Management Committee, the location and design of the new pump station was planned that met the divergent needs of agriculture, fishery and wetland/waterfowl interests.

THE CONJUNCTIVE USE SOLUTION

The M&T/Parrott Pump Station and Fish Screen is at MP 192.8 on the right bank of the Sacramento River. This location is about one half mile below the mouth of Big Chico Creek. The pump station consists of four vertical propeller pumps driven by four 240-horsepower natural gas engines. The intake for the pumps is in the Sacramento River. The positive barrier fish screens consist of four cylindrical wedge wire screens 54-inch in diameter and 15 feet in length. These screens meet the criteria approach velocity of .3 feet per second and there is sufficient current in the Sacramento River to meet the sweeping flow requirements. The 84-inch intake pipe penetrates the river levee, connecting the fish screens to the pump manifold, with a gate structure in the center of the levee. The four vertical pumps discharge into a 72-inch diameter pipe that conveys the diversion 4,300 feet into the present conveyance system.

The fish screens will be cleaned utilizing high pressure air. The air is supplied by two 75 HP air compressors and a 1,800 cf pressure storage tank. The screen manufacturer provided the volume of air required to "clean" the screen from growths and particles sucked onto the screen or those that would try to permanently attach to the screens. The National Marine Fisheries Service criteria established the five-minute frequency for cleaning each screen. The cleaning system must provide the required volume of air at the specific pressure to be available for each of the four individual screens every five minutes.

Obtaining necessary permits and environmental documentation on construction projects designed to relocate and screen major water diversions, typically takes a year or more to complete. However, in-part because of the tremendous support and collective effort to build this project, all environmental documents were completed and permits were obtained in less than one year from the time this project was approved at the conceptual level. The State Reclamation Board granted permission to place the intake through the levee. The U.S. Army Corps of Engineers granted permits and issued regulations to protect the river bank and navigation in the river. The California Fish and Game Commission granted streambed alteration permits. The Regional Water Quality Control Board granted permits to protect the water quality in the Sacramento River. The National Marine Fisheries Service issued a non-jeopardy biological opinion on the project for the listed winter-run salmon. The State Water Resources Control Board accepted the change in point of diversion from the present pumping plant to the new pumping station on the Sacramento River.

The environmental documentation included a public scoping meeting, a Proposed Finding of No Significant Impact/Mitigated Negative Declaration, and a Draft Environmental Assessment/Initial Study document. In addition, all public comments obtained during the public review period and responses were included as part of the official record. All documents were filed with the respective state and federal authorities before permitting could be completed and construction to proceed.

The state agency of record was the CDFG, while the lead federal agency was the USFWS. The potential impacts due to the construction and relocation of the facilities were examined. There were no negative impacts on endangered or threatened species that required mitigation. The environmental review and documentation also addressed the transfer of 40 cfs of water from Butte Creek to the Sacramento River from October 1 through June 30 of each water year, in perpetuity. This water transfer will provide additional fish flow water in Butte Creek.

FINANCING CONJUNCTIVE USE EFFORTS

While the relocation and design of the pump station was accomplished through the Joint Management Committee, there remained the problem of raising \$4.5 million necessary to build the new pump station. Again, through the process of developing public/private partnerships, and recognizing that the goals and objectives of seemingly divergent interests groups could be met if the pumps were relocated, additional partners were identified to finance the entire project. Specifically, the Wildlife Conservation Board joined the partnership because of the wetland and waterfowl benefits that were to be achieved if "fish-friendly" water were available to the state and federal wildlife and refuge areas. Further, Ducks Unlimited, Inc., a nonprofit conservation organization joined the partnership because of the importance of "fish-friendly" water to the millions of migrating waterfowl dependent upon Central Valley wetlands.

In addition, because of the Bay-Delta ecosystem benefits, the Bay-Delta Accord joined the partnership. The Bay-Delta Accord, an agreement among several federal and state agencies, urban and agricultural water users and environmental and conservation interests established temporary standards for resolving the multitude of issues affecting the Bay-Delta ecosystem. Accompanying the temporary standards was the commitment of fiscal resources to fund improvements to the Bay-Delta ecosystem. As such, the fishery benefits associated with relocating and screening the pump station, attracted Category III, and an additional funding partner to the project.

The project also qualified for funding through the Central Valley Project Improvement Act (CVPIA), Section 3406 (b) (21). These restoration funds, provided through the Bureau of Reclamation represented the commitment from the agricultural community to help the agricultural industry in resolving environmental issues. The money is paid into the CVPIA Restoration Fund by the agricultural users that receive Central Valley Project water supply.

Finally, the private landowners contributed significantly to this effort. Besides actual cash contributions, the landowners have agreed to provide, in perpetuity, 40 cfs of water in Butte Creek, a tributary to the Sacramento River.

The 40 cfs will remain in Butte Creek from the Parrott/Phelan Diversion Dam down to the outfall on the Sacramento River at MP 138. This change provides Butte Creek the additional flow for about 60 miles. This exchange occurs from October 1 through June 30. The CDFG will administer these flows.

BENEFITS OF AN INTEGRATED APPROACH

What started as a project to address a major problem to spring, fall and late-fall runs of chinook salmon and steelhead trout, became an opportunity to carry out a conjunctive use effort that integrated the needs of the agricultural community, wetland and waterfowl interests and urban water users who benefit from the Bay-Delta ecosystem. The public/private partnership that started this project reflects a commitment and recognition by each "partner," that unless "fish-friendly" solutions are developed and implemented, watersheds and ecosystems will not be restored to their healthy states. Further, the partners recognize that unless environmental projects are implemented that make social, environmental and economic sense, the problems facing our wetlands, fisheries and agricultural industries will not be resolved.

This project represented an opportunity for federal, state, and private organizations to carry out a project that far outweighs the direct beneficiary, i.e., the salmon and steelhead populations that once dominated Big Chico Creek, Butte Creek and the Sacramento River. It represents an opportunity for the public and private sector to address a watershed problem that will benefit not only the fisheries and millions of waterfowl and other wetland dependent species, but also the economic viability of an agricultural industry that is critical to Butte County and the citizens of California. In addition, this project demonstrates that Bay-Delta ecosystem benefits can be achieved by eliminating upstream impacts and ultimately the availability of drinking water to almost 22 million Californians.

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