

# Planning for Riparian Vegetation Management on the Sacramento River, California<sup>1</sup>

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Natural resource values of the Sacramento River are being threatened by agricultural encroachment, and flood control, erosion control, and water development projects. Since 1975 the Resources Agency has been developing a resource management plan for the Sacramento River that includes preservation of native, riparian vegetation. The methods for preserving riparian vegetation that have been explored include zoning, modifying flood and erosion control construction and maintenance practices, regulating timber harvest, mitigating losses, acquiring land, developing a resource atlas to guide future planning, developing public awareness, and developing a waterways management plan for the river.

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California has lost much of its riparian deciduous forests to urban development, agriculture, and flood control projects. Most of the recent concern over the demise of riparian forests in California has focused on the Sacramento River and its delta where the remnants of the once extensive gallery forests that lined the great river valleys of California are threatened. Before discussing our strategies for riparian vegetation protection, I think it is essential that I describe the land and water use and natural resource values of the Sacramento River so that you will understand the nature of the resource management conflicts.

The Sacramento River is California's largest river and it drains an area of about 27,000 square miles in northern California. Its annual runoff totals about 22 million acre-feet -- about one-third the total runoff from all of California's streams. The River begins near the slopes

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of the extinct volcano, Mount Shasta, and flows southward through the long, flat Sacramento Valley. The river meanders over a 300-mile course to the Sacramento-San Joaquin Delta and then drains into San Francisco Bay and the Pacific Ocean.

Dams have been built for water storage, flood control, and hydroelectric power on most of the Sacramento River's major tributaries. Shasta Dam, located on the main river near its headwaters, is the principal dam of the U. S. Bureau of Reclamation's California Central Valley Project. Shasta went into operation in 1943 and stores about 4.5 million acre-feet of water. About six million acre-feet are released each year from the dam to downstream areas. Not all of this water stays in the river, however. Several million acre-feet are diverted for agricultural, domestic, and industrial uses along the way. An extensive irrigation system has been developed in California to supply the needs of agriculture, and water from the Sacramento River is stored and conveyed to water deficient areas in central and southern California through this system.

Agriculture is big business in California, and within the Sacramento River Basin there are over 1.5 million acres of irrigated cropland. About 70 percent of this land is irrigated with Sacramento River water. These lands produce rice, cereals, fruits, nuts, and row crops that have an annual value of over \$1 billion.

The Sacramento River Basin also produces 1.6 billion board feet of timber (32 percent of all of California's timber products) each year and over 10.5 million tons of sand and gravel are mined from the basin each year. Most of the timber comes from conifers (douglas fir, true firs, pines, and incense cedar) that grow in the higher elevations of the basin. The trees that grow along the Sacramento River and its delta are predominantly cottonwood, willow, sycamore, valley oak, alder, ash, box elder, and black walnut. Some of these are harvested commercially for wood chips and lumber, but they make up only a small percentage of the annual timber harvest in the basin. Except for a few major urban areas, the Sacramento River Basin is sparsely populated. The Basin constitutes 17 percent of the State's land mass, but it contains only 7 percent (1.5 million people) of California's population.

The Sacramento River is important as a recreational resource. Its delta with its numerous channels and sloughs is rich in fish and wildlife and provides about 700 miles of boating water. The upper river is also popular for boating, fishing, hunting, and nature study.

The Sacramento River and its tributaries support important sport fisheries for king salmon, steelhead, and striped bass. Annually, 300,000 king salmon and 40,000 steelhead enter the Sacramento River to spawn. There are over 1.5 million striped bass inhabiting the Sacramento-San Joaquin Delta and Sacramento River. King salmon originating from the Sacramento River also support an important commercial fishery in the ocean. About 500,000 Sacramento River king salmon are landed each year in the commercial fishery. The average value of these salmon to the commercial fishermen is about \$10 million.

The wetlands of the Sacramento River Basin are important to the over five million waterfowl that use this part of the Pacific Flyway each year. The river's riparian habitat supports numerous other wildlife species -- bald eagle, song birds, blacktail deer, beaver, and river otter to name a few.

The floor of the Sacramento Valley was once a vast wilderness with riparian forests and other wetland vegetation along its river banks, in overflow channels and flood basins. Today, only remnants of this wilderness setting survive, mainly as narrow bands of vegetation along a few river channels. Based on historical accounts, there were nearly 775,000 acres of riparian forests

along the Sacramento River and its tributary streams in 1850. Today, probably less than 20,000 acres of the formerly extensive riparian forests remain.

Construction of flood control works and dams along the Sacramento River and its tributaries in the past 50 years have contributed significantly to the loss of the riparian forests. After the floodworks and dams were constructed, landowners responded to the belief that flood and erosion dangers on low-lying alluvial soils were reduced dramatically over historic conditions. They moved down into the flood plains, removed native vegetation, and converted the riparian jungles to croplands and orchards. This land conversion is still going on.

In 1975, we compared aerial photographs from 1952 to 1972 to determine the extent of land use changes that had occurred along the Sacramento River during the past 20 years. We were startled to find that 53 percent of the mature riparian forests that existed in 1952 had been removed and the land converted to agricultural uses. Riparian forests weren't the only natural resource that was threatened, however. The number of king salmon spawning in the upper river had declined by more than 50 percent. In addition, new water development projects were being planned for damming additional Sacramento River tributaries, new bank riprapping projects were before Congress for authorization, a recreational boating trail was in the offing that could put campgrounds in key wildlife habitat areas, farmers were accelerating the rate at which they were ripping out riparian forests and leveling land for agricultural uses, and the market for hardwood chips had increased to a point where it had become profitable to cut riparian hardwood forests.

Some of these actions were the creation of, or were supported by, departments and boards under the jurisdiction of the State of California's Resources Agency. Still other departments -- such as Fish and Game -- were responsible for protecting the resources that were in danger.

It was obvious that it was time to take corrective actions and to coordinate the activities of the state agencies involved in the problems. Consequently, the Secretary for Resources established the Upper Sacramento River Task Force in the Fall of 1975 to solve the acute resource problems that were centered primarily along a 170-mile section of the river below Shasta Dam.

The initial Task Force was made up of the state agencies within the Resources Agency that have jurisdiction over activities that affect fish, wildlife, recreation, and aesthetic values of the Sacramento River. These agencies include Fish and Game, Water Resources, Parks and Recreation, Navigation and Ocean Development, Wildlife Conservation Board, Reclamation Board, Water Resources Control Board, and State Lands Division.

Soon the Task Force was enlarged to include federal and local agencies since their programs are tied closely to those of the state. The federal members include the Bureau of Reclamation, Corps of Engineers, Bureau of Land Management, Fish and Wildlife Service, and Heritage Conservation and Recreation Service. Local representatives include members of the boards of supervisors from the five counties bordering the upper river -- Shasta, Tehama, Glenn, Colusa, and Butte. Later, the Task Force was enlarged to include special interest groups -- the Sacramento Valley Landowners' Association and conservation groups (Audubon Society, Riverlands Council, Sierra Club, and Nature Conservancy).

The objectives of the Task Force are to coordinate intergovernmental activities and to take actions to ensure the protection of the fish, wildlife, recreation, and aesthetic values of the river while considering the other beneficial uses of the river and adjacent lands, for such uses as water conveyance and agriculture.

The Task Force has become a forum -- a place for the members to learn about and debate the values of projects, studies, and philosophies proposed by the various members. In addition, it acts as a catalyst for agencies and individuals to take actions to protect the environmental values of the Sacramento River.

The Task Force's first effort was to identify the problems and resource conflicts along the river. After identifying the problems, we developed a list of alternative actions which could be taken to decrease and possibly reverse the loss of riparian vegetation and the decline of king salmon populations.

The state members felt that riparian vegetation could be protected by making local governments aware of the problem and seeking their assistance in controlling the removal of riparian forests. We drafted a model, county general plan element, and ordinance that would bring the removal of riparian vegetation under a permit process.

Under this ordinance, anyone wishing to remove vegetation within 150 feet of the river would first have to obtain a permit from the county planning commission. Permits could only be issued when the proposed activity was found to be compatible with the policy of the county ordinance and general plan. In issuing permits, the commission could place modifying conditions upon the activity in order to protect as much riparian vegetation as possible. We gave copies of these models to the five county boards of supervisors and asked them to adopt similar regulations, or to review and comment on the models. Unfortunately, only the northern-most county adopted a riparian vegetation protection ordinance. Three of the counties flatly rejected the idea of any type of regulation and another established a committee to evaluate the ordinance -- that was over two years ago, so it's unlikely that any of the other counties will pass an ordinance, unless future state legislation mandates it. The reason most commonly cited by county officials for not adopting an ordinance was that it would infringe upon the riverside landowners' property rights. Instead, the county officials said they favored a program of acquiring riparian parcels in fee title, easement, or lease, but only from willing landowners.

Next we asked the U. S. Army Corps of Engineers to evaluate its bank protection and levee maintenance projects to accommodate vegetation protection and to mitigate the loss of vegetation caused by their projects. Corps' regulations up to that time required that vegetation be stripped from banks and levees to facilitate inspection for erosion. Several meetings were held to discuss levee maintenance procedures and alternative methods of bank protection. Some progress has been made in this regard and I will discuss it later. Unfortunately, the Congressional authorizations for the Corps' bank protection projects do not include provisions for mitigating the project-caused damage to riparian vegetation and wildlife. Consequently, no federal money has been available for this purpose. Earlier this year, the Corps asked Congress to authorize mitigation for the Sacramento River Bank Protection Project. For that project, the U.S. Fish and Wildlife Service and the State of California proposed acquisition of riparian lands in fee title or environmental easements and the revegetation and management of the lands acquired. The mitigation costs would be shared -- one third paid by the state and two thirds paid by the Corps. At this stage, I don't know how successful we will be, since there is some disagreement with the Corps over the amount of mitigation

that should be provided. We want the loss of all the vegetation destroyed by the project to be mitigated; conversely, the Corps says that some of the vegetation would have been lost anyway through bank erosion or would have been removed if proper maintenance had been enforced by the state. Their opinion is that this vegetation should not be included in the mitigation.

The Corps has initiated a Sacramento River and Tributaries Bank Protection and Erosion Control Investigation. The purposes of the Corps' study are to: "(1) determine the federal interest in, and responsibility for, providing bank protection and erosion control; (2) study alternative means and the feasibility of providing a comprehensive program to stabilize the streams, protect the levees and banks, preserve riparian vegetation, wildlife habitat, and aesthetic values, and provide outdoor recreation opportunities along the river, considering intangible environmental values as well as economic benefits; and (3) select and recommend the best and most balanced plan of improvement, provided that such a plan is found feasible." The study was authorized in 1970, however, funds were not appropriated until 1977. The total study will cost a little over \$1 million and it is to be completed in 1982. We have asked the Corps to include the following elements in their investigation:

(1) Evaluate the results of past bank protection efforts. (Some engineers suspect that riprapping banks does not dissipate the erosion power of the river and that the rock work simply directs the flow across the river to erode the opposite bank. Under this theory erosion doesn't end until the whole river is rock lined.)

(2) Determine the relationship between releases from Shasta Dam and erosion, and the probability of reducing erosion by altering releases from the dam. (Landowners claim that the operations of Shasta Dam for water supply and hydroelectric power have resulted in higher spring and summer river flows and greater fluctuations in river stages. This, they claim, is accelerating erosion by alternately wetting, drying, and undercutting the banks.)

(3) Predict future erosion patterns along the river.

(4) Evaluate nonstructural alternatives. (Would it be feasible to acquire easements along the river and allow the river to meander freely within a given width and apply bank protection only when the river reached a certain point?)

(5) Develop bank protection techniques and mitigation measures that minimize detrimental impacts on water quality, fish, wildlife, and scenery. (Would setback levees be a feasible technique?)

(6) Develop specific criteria for determining where bank protection should be applied and how priorities should be established.

In some recent bank protection work by the Corps under the Chico Landing to Red Bluff Bank Protection Project, the state established mitigation as a precedent-setting element of the project. The State Reclamation Board required the landowners to grant free conservation easements in return for bank protection. For areas already in agriculture a 30-foot easement width was required wherein native vegetation would be re-established, and for areas still supporting native riparian vegetation an easement width of up to 150 feet was required. The conservation easements will assure that no future development will encroach onto the top of the banks that receive rock revetment. Additionally, the Corps agreed to amend its bank protection maintenance manual to allow some native vegetation to grow in the rock revetment.

The State Reclamation Board -- the state agency having jurisdiction over land use within the Sacramento River's designated floodway -- recently signed an agreement with the Corps giving the state a more direct role in selecting and treating future bank protection sites. This should insure that only those sites that fully warrant bank protection will be treated. The members of the State Reclamation Board have made some other advances in riparian vegetation protection. Prior to 1975, few of the Board members showed concern for riparian vegetation. They saw it as a hindrance to flood control and they did not recognize its environmental values. The new Board has adopted the policy "that all activities carried out under its authority and under its permits give recognition to the value of riparian vegetation to the general welfare of California and that all practicable steps, consistent with the primary flood control purpose of these activities, be taken to preserve and encourage riparian growth". Along these lines, the Reclamation Board recently identified 38 sites, encompassing 4,100 acres, along an 81-mile stretch of the Sacramento River for retention of riparian vegetation. The vegetation is to be retained because of its value for stabilizing the river channel,

protecting levees from wind driven wave wash, reducing bank erosion, assisting in maintaining hydraulic control of the river, and protecting the banks from high velocity flows.

The State Secretary for Resources, State Reclamation Board, and State Water Commission have all asked the Corps and California Congressmen to have site specific environmental impact statements prepared for any future bank protection work on the Sacramento River. In the past, the adequacy and timeliness of the Corps' statements have been questioned. These new statements would not only have to be site-specific but would also have to address accumulative impacts of the bank protection work. The Secretary for Resources has also urged Congress to authorize mitigation as an element of the Chico Landing to Red Bluff Bank Protection Project and any other future bank protection projects. The cost of such mitigation would be borne by the bank protection projects.

Our next effort was to ask the State Board of Forestry to regulate timber harvest in the riparian lands of the Sacramento Valley. At present, a landowner can remove an entire hardwood forest in the Sacramento Valley without obtaining any permits other than a land leveling permit that may, or may not, be required by the County. Land conversion and timber harvest are regulated by the State Board of Forestry in other timberlands of the state and vegetation in stream environment zones is protected by the Board's regulations. The Board of Forestry should designate the riparian lands of the Sacramento Valley as "timberlands" and designate riparian tree species as "commercial species" so that the state can review plans and set standards for such activities. A proposal to the Board of Forestry is under review by the Department of Forestry, and I hope we can make a proposal to the Board in the near future. Our major hold-up has been that the Department and Board see this as an effort to preserve trees rather than to regulate timber harvest for sustained yield. The Board is primarily concerned with the harvest of coniferous trees and the Department of Forestry feels that its efforts should be centered on the species that make up the bulk of California's timber products. We are now gathering further evidence to show the Board that our concern is not only for the preservation of riparian vegetation and wildlife habitat, but also for fire prevention, erosion control, water quality maintenance, and sustained forest productivity, all of which are responsibilities of the Department and Board when associated with commercial timber operations.

Our State Department of Parks and Recreation and the State Lands Commission are cooperating with the U. S. Bureau of Land Management to determine state and federal ownerships along two 15-mile stretches of the upper Sacramento River. We have evidence that some of the land which has been converted to farmland may actually be state or federal land. Identification of public lands will improve public access to the river and will eventually result in the re-establishment of some native riparian vegetation.

Some key parcels of riparian vegetation have been purchased by the State Wildlife Conservation Board and numerous other parcels have been acquired by the State Reclamation Board as mitigation for flood control and erosion control projects. Funds to purchase additional interior wetlands and riparian habitat are still available from various State Bond Acts since some of the money allocated for these acquisitions remains unspent. In addition, state funds for acquiring riparian habitat can be requested from the state's Environmental Protection Program Fund that receives revenues from the sale of personalized auto license plates.

Unfortunately, having funds for acquisition doesn't ensure that such acquisitions will be completed. For example, the Wildlife Conservation Board has been unsuccessful in acquiring fee title or easements to some key riparian parcels along the river. The Department of Parks and Recreation also has had difficulty in trying to acquire development rights to certain riparian lands in the Sacramento-San Joaquin Delta. Most of our state departments and boards have a policy against using their powers of condemnation. Fortunately, some private conservation groups, such as the Nature Conservancy, are also interested in acquiring land along the river and landowners appear to prefer selling to them rather than to the state -- primarily because the landowners fear that public ownership will allow public access with trespassing, littering, and vandalism on their adjacent private lands.

Earlier this year the Task Force completed an Upper Sacramento River Environmental Atlas. It delineates areas of native vegetation, prime agricultural soils, recreation facilities, public lands, fish and wildlife habitat, commercial gravel operations, county zoning areas, bank erosion protection sites, diversions, designated floodways, areas subject to flooding, gaging stations, etc. With this atlas of resources and land use as a base, we plan to develop a waterways

management program for the Sacramento River. The Sacramento River plan probably will be similar to the waterway management plans that are developed for the state's wild and scenic rivers. The plan will set state policy for the Sacramento River and make recommendations to local governments, state agencies, and the state legislature on actions necessary to protect the river and its resources.

The Task Force is also publishing a series of issue papers that will be used as the base for developing recommendations for the state plan. One of the issue papers is titled "Diminishing Riparian Vegetation". Recommendations in that issue paper include: acquisition of riparian lands in fee title or easement, legislation to mandate county zoning to protect riparian vegetation, regulation of riparian logging in the Sacramento Valley by the State Board of Forestry, development of a waterways management plan, and reforestation.

The reforestation program is the most exciting recommendation and one that needs to be explored more fully. I'm hoping it can be tied into a program of developing biomass as an alternative source of energy for California. A future market could develop for hardwood fuels, and tax incentives could be used to encourage landowners to plant native trees. The new forests would probably have a harvest cycle of 20-or-more years and the harvest could provide habitat for wildlife if managed properly. Under this management, I would expect a provision for the protection of stream environment zones and, thus, we would increase the abundance of trees next to the river. Careful implementation of this program would be essential because there could be an immediate, short-term demand for the wood that would result in the cutting of existing hardwood forests without proper protection of the riparian zone and without provisions for restocking. This threat may be a good selling point to the Board of Forestry on why the logging of riparian forests should be placed under the regulatory provisions of the State Forest Practices Act.

Under the leadership of conservationists, a bill was developed and passed this year in the state legislature that appropriates funds to the Department of Fish and Game to: (1) determine the status of riparian vegetation in the central valley and desert areas of the state, (2) compare the historical and current status of riparian vegetation, and (3) make recommendations to the legislature on how this resource should be managed.

County supervisors and timber, agriculture, and grazing interests opposed the bill. They fear that once that status of the native riparian vegetation is known, legislative action will be taken to regulate landowners' activities along stream courses. I see the bill as the vehicle to request legislation to protect the remaining riparian vegetation areas in the state.

A major obstacle in our efforts to protect the natural values of the Sacramento River has been the riparian landowner. Agriculture has clout in local, state, and national government. Flooding and erosion of agricultural lands, and protection of private property rights are issues that command an instant response from many government officials -- especially in California. Some congressmen are quick to introduce public works projects to protect agricultural lands from flooding and erosion, and supervisors and some legislators are quick to agree that the land must be protected by structural means. Little or no consideration is given to the impacts such projects have on fish, wildlife, and recreation. The nonstructural alternatives of floodplain management, such as strong local zoning, are ignored as is the question of whether it is proper to spend public funds to underwrite unwise uses of the flood plain by private interests. When an effort is made by a government agency to acquire property for mitigating the impacts of such flood and erosion control projects, the issue of private property rights is raised by the landowner. Because of political pressures, most public agencies submit to a compromise that does little to protect the fish, wildlife, and other natural values that are adversely impacted by the project. Consequently, an additional loss occurs to riparian vegetation and to the wildlife, fish, and recreation dependent upon that vegetation.

We are hopeful that our efforts will be successful, but public awareness and political activists are needed to convince legislators, county supervisors, and the U. S. Army Corps of Engineers that riparian vegetation must be restored and protected. Symposia, news articles, and television specials have focused on the problems of the Sacramento River and these are helping build public awareness and support in California. However, we still need to develop further a broad public support for the protection and management of riparian vegetation. Only then will we have the political clout to achieve our goals.