RIVERS

BRINGING LIFE TO THE LAND

Stanislaus River, 1980

"ALL of the rivers run into the sea, yet the sea is never full; unto the place from whence the rivers come thither they return again."

From the beginning, we have put rivers to work: as religious symbols, as the source of drinking supplies, and as highways for transportation.

California has a reputation as a land of milk and honey. Rivers have helped shape this land, and give it life.

Yet no other natural resource has been so damaged. Most rivers are dangerously polluted, or so drawn down by consumption as to become trickles during the dry season. Sound management of rivers ranks among the most difficult environmental challenges of the 1980's.

THERE are twenty-five large rivers in California and thousands of streams. These waterways carry a third of the rain and snowfall; the rest evaporates.

Beginning in the high country, where rain and snowfall exceed the plants' need for moisture, rivers flow downhill, following the course of least resistance, carving canyons and valleys.

Formed during the winter in the mountains, the snowpack serves as a natural reservoir: as it melts from late spring through fall, rivers keep flowing.

The vegetation along waterways supports more wildlife than any other environment. Animals need a reliable source of water, and in the West, with a long dry season, there is no substitute for waterways. Eight out of ten species of birds nest near them.

UNTIL the Spanish immigration, Indians lived in elemental simplicity by rivers. Totalling a half-million people, the densest native settlement in North America, these Californian tribes gathered food from rivers and in the surrounding environment. The mortar holes where they ground acorns, their drawings on stone, and their arrowheads are mostly found near rivers. And some rivers are named in their languages, such as the Tuolumne, meaning "stone huts".

Introducing European management of rivers in the 1770's, the Mission San Diego and the Pueblo de los Angeles built dams to guarantee a supply of water. Spanish missions established the legal principle that an individual can own an exclusive right to water.

Rivers were damaged for the first time during the Gold Rush. In its heyday, miners could make a fortune just by using pans; later they used more destructive techniques. By 1860, hundreds of small dams and five thousand miles of canals supplied water under pressure to forcefully wash the gold from gravel and soil.

Hydraulic mining prolonged the Gold Rush, but also brought about its end. This gouging of canyons created a constant flow of debris, flooding downstream farms. In 1884, in issuing a ban against hydraulic mining, a Federal Court concluded that certain uses of a river compete with others, and determined that farming was a "higher" use than mining.

Until 1900, California was a cattle and wheat kingdom. Since the farmers relied on rain, droughts eventually ruined these monopolies.

Irrigation was seen as the only way to make the desert bloom. The State Legislature authorized the formation of irrigation districts. As a result, nearly 50,000 farmsteads were founded in just the first two decades of this century.

Hydraulic mining, Malakoff Diggins, Sierra foothills, by C.E. Watkins, 1871. Courtesy, Bancroft Library.

Hydroelectric generation accelerated urban growth. In 1895, Oakland began to use electricity from a dam on the Yuba River, 125 miles away, the first long-distance transmission. Since then, new hydroelectric dams have been built at a rate of two a year.

Although most electricity is generated by private utilities, government has assumed principal responsibility for managing rivers and supplying water since the Gold Rush. Starting after the Civil War, the Army Corps of Engineers has built dams and dredged channels to control floods and improve navigation. From 1900 through 1940, the cities of San Francisco and Los Angeles built water-supply systems on rivers located hundreds of miles away. Just before World War II, Congress authorized the Central Valley Project, a complex of fourteen dams, the largest water supplier in California and, in fact, the whole West. Later, the State Legislature authorized the State Water Project, consisting of nineteen dams, the second largest supplier.

In each instance, government subsidized damming, because private agencies could not pay the tremendous costs of accommodating population growth.

THERE are several principles underlying California's plumbing. Most of the rain falls where most people don't live. (Over three-quarters of the rain falls north of Sacramento, while three-quarters of its use is south of the capital.) Rain falls mostly during the winter, when people least need it. Finally, rainfall varies extremely from year to year—from feast to famine. So dams are used to store water to correct natural patterns; water is then transported by pipes and canals, as needed. Water flows to the sea, as in the Bible — but also uphill, towards money.

Today, California's rivers and streams are regulated by several thousand dams.

The average Californian uses 1800 gallons of water in a day: 150 from the tap, and 1650 in the production of his food and manufactured goods. That's the same as using 70 bathtubs of water each day.

Farming uses 85% of the State's water supply. Irrigation allows farmers to take advantage of California's nearly perfect summers and rich soil. Typically, water is diverted from a canal, then pumped onto a field, flooding it through furrows. Few fields are irrigated through sprinklers or drip pipes, which allow precise application of water relative to the crop's needs.

California ranks first in the country in

production of forty crops, such as grapes, peaches, carrots, lettuce, and almonds. The principal crops are worth $15 billion annually; processing and transportation add an equal amount to the economy. Irrigation invests our rivers in food: 3000 pounds of water are used to grow one pound of cherries.

The rest of the state's water supply is used in homes, industries, and offices. More water is used on lawns than in industries. Use in toilets and baths also exceeds industrial use, which is for processing food, for manufacturing, and for cooling.

Our water-supply system ranks among the great engineering accomplishments in history. Most of our drinking water is diverted from watersheds at least 150 miles away from the consumers. No construction on earth can be seen from the moon, except the Great Wall of China, and California's biggest aqueduct.

Rain or shine, food is in the supermarket. That food is subsidized by taxes paid for dams. By charging the farmer a fraction of the cost of irrigation water from its dams, the Federal Government provides a subsidy exceeding $500,000 for the typical farm. The consumer pays for food at the supermarket and through taxes.

Electricity is there, at the flick of a switch. And the state's rivers are put to work to provide 30% of that electricity supply. Dams are particularly useful for providing electricity during peak demand; their turbines can be turned on and off instantly, to accommodate fluctuations in demand. The largest single use of electricity is pumping water nearly a mile straight up a mountain range on its way to Southern California's cities.

Dams provide security: water supply during a drought, electricity during an oil embargo. Conversely, they, and other alterations of rivers, such as channelization, are taxes on the environment and economy.

Dams systematically deplete rivers. Nearly 40% of their natural flow is diverted. Salty pollution which has drained off irrigated fields is the only flow in many riverbeds, during the summer and fall. Some industries shut down periodically, because their filters cannot clean the water.

Because of diversions and pollution, the fisheries of the state are in pathetic shape. 10% of the native species are extinct; others, like the golden trout, are rare. Since 1940, the populations of bass, salmon, and steelhead trout have declined by as much as 80%.

Dams damage fisheries more than their advocates expect or admit. For example, in proposing Trinity Dam, the Federal Government promised that the downstream salmon and trout fisheries would "remain about the same"; yet since the dam's completion, these fisheries have been decimated. The Trinity County Supervisors have flatly concluded "we were deceived."

O'Shaughnessy Dam, Tuolumne River, 1981. This dam supplies water to San Francisco, but in doing so, damages downstream trout fisheries.

Dams harm commercial and recreational fishing on rivers and streams. Commercial fishermen on inland waterways can no longer catch at least fifteen species of fish, such as the striped bass and white catfish. Fishermen claim "it isn't like it used to be"; this fish story is true. Fishing is now worth $500 million a year; with better management of rivers it could be worth much more.

Sightseeing, swimming, and boating, the average Californian spends between five and ten days a year on inland waterways. This is big business, between $2 and $4 billion a year. It would be a bigger business, if our rivers were in better shape. The few stretches accessible or suitable for boating are jammed during the summer.

Fishing and river recreation are limited by the use of rivers for irrigation and industry. Too, our drinking water is threatened. In a recent survey of twenty-seven rivers in California, nineteen had elevated levels of at least one toxic chemical. In another survey, 20% of the water-supply systems were found to violate the maximum safe level of contamination by various chemicals. Although no one knows how safe our drinking water is, it clearly is far from safe.

Under Federal and State law, a few thousand miles of river in this state are now protected. The remaining 95% are fair game for further development, and the stretches in the Wild and Scenic River Systems could be removed. Preservation is legally inferior to development. With most rivers damaged, some to the point of biological unproductivity, how much more development can rivers bear?

The future of rivers can be like their past, or different. Certainly the problems which rivers might be tapped to solve are greater now than in the past.

By the year 2000, California's population may exceed 29 million, up from its present 22 million. How can this new population be supplied with water?

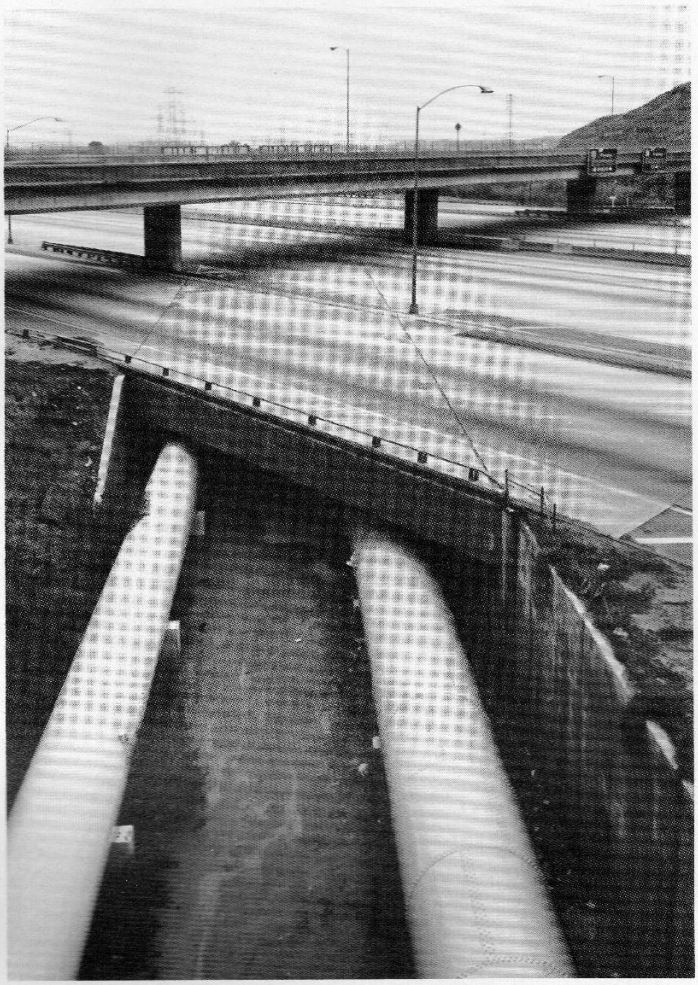
Already, more water is being pumped from wells, from the groundwater tables, than naturally seeps into them from rivers. Providing 40% of the water supply, this underground reservoir is quickly receding; pumping will soon be uneconomical in many areas. How can the overdraft of groundwater be corrected?

Finally, given the instability of the Middle East, how can our electricity supply be made less dependent on oil? (Oil fuels 40% of all electrical generation.).

An answer: build more dams.

Private and governmental agencies have proposed several dozen dams and associated facilities for California in the 1980's, at a cost exceeding $30 billion.

Stanislaus River and Canyon, 1980



Los Angeles Aqueduct System, delivering water from Owens Valley and Mono Lake, 1980.

Several engineering firms have even suggested more grandiose schemes for supplying California and the West, such as tapping the Columbia River in Oregon at a cost of $11 billion, or Alaska's Yukon River at a cost of $200 billion.

Further damming is too much of a good thing. The economical sites have already been chosen.

As part of a growing coalition of farmers and businessmen, Friends of the River Foundation proposes a better future: more efficient use of present supplies of energy and water, and environmentally sensitive production of new supplies, which we call conservation. Every drop of water or jolt of energy which is conserved is then available for new use. This future makes good sense.

It costs less to the consumer. Building new dams to supply more water costs two to twenty times more than conservation. For example, better scheduling of irrigation can save water at a cost of $10 per acre-foot; new water costs $100 to $200 per acre-foot.

It costs less to the taxpayer. Because efficiency in the use and production of supplies pays for itself promptly, the Federal Government doesn't need to subsidize such measures to the same extent as building dams. (The farmer receiving Federal water pays 5 to 10% of its cost; the consumer of electricity, 33%. The taxpayer pays the rest of both bills, which in California will exceed $10 billion at the turn of the century.)

It generates more jobs. Most of the cost of dams is for materials; most of the cost of conservation is for labor.

It works. The Federal Irrigation Management Service has helped farmers cut their use of water by 15% just by scheduling irrigation when the soil and crop most need it; as a result, the crop yield is increased by 15%, because the soil is less water-logged or eroded. 30,000 industries in California today use the same amount of water that 27,000 used in 1958, because they now recycle water; as an added benefit, pollution is reduced. Today's homeowners use less energy than in 1970; more homes are insulated now, and heating and cooling waste has been cut. The California Power and Light Company is building large power plants to be fueled by grape skins and sawdust, not coal, gas, uranium, or rivers.

Increased efficiency in producing and using water supplies would give us the opportunity to protect the last wild rivers, and even restore some damaged ones.

The West was settled by people with get-up-and-go. They made the desert bloom. We now face a new frontier: preserving our irreplaceable heritage of rivers, and at the same time, supplying new population and fueling economic growth.

Friends of the River Foundation conducts research and distributes educational materials about rivers. Call or write us for information.

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