American Rivers
Thriving By Nature

America's Most Endangered Rivers of 2009

#1 Sacramento – San Joaquin River System

California

Threat: Outdated water and flood management

SUMMARY

The largest watershed in California is on the verge of collapse, threatening the water supply for 25 million people, placing the capital of the nation's most populous state at high risk of flooding, and damaging a once productive and healthy ecosystem that supported the nation's most diverse salmon runs. Climate change, population growth, water supply demands, and endangered species listings have brought this outmoded water and flood management system to the brink. The California Department of Water Resources, and their federal partners, the Bureau of Reclamation and Army Corps of Engineers, are undertaking an overhaul of water management in the basin. Rather than repeating the mistakes of the past, such as building more and larger levees and dams, they need to invest in sustainable options that protect water supply, farms, and cities, while restoring the health of these great rivers and their estuary.

THE RIVERS

The Sacramento-San Joaquin River system stretches from the eastern slopes of the Coastal Ranges to the western slopes of the Sierra Nevada, collecting water from 45 percent of the state's surface area. The Sacramento originates near Mount Shasta and flows south for roughly 440 miles, while the San Joaquin rises on the southern Sierra's high western slope and flows north 330 miles. The Sacramento and San Joaquin funnel flows through the 1,000 square mile Delta, a web of channels and islands that forms the hub of California's water system, and into the San Francisco Bay.

The city of Sacramento, the capital of California, is located along the Sacramento River's banks. The Sacramento and San Joaquin provide water for 25 million people and more than 5 million acres of farmland in California. The rivers and their tributaries are harnessed by more than 100 large dams and produce the majority of California's hydropower.

Roughly three million wild salmon once returned to the Sacramento-San Joaquin system each year, but today only around 500,000 hatchery salmon and 50,000 wild salmon return in a good year. The Delta provides habitat for more than 50 species of fish, including 75 percent of the state's commercial salmon catch, and is the center of important components of California's civil infrastructure, including electricity and gas lines, transportation, shipping and water supply.

THE THREAT

Outdated flood management

Prior to the construction of large flood control projects in the 20th Century, the Sacramento and San Joaquin rivers flowed into the Central Valley and fed what was known as the "inland sea". Flooding occurred almost every year, and in some years transformed much of the Central Valley into a shallow lake covering more than 8,000 square miles.

In the early 1900's, the Army Corps of Engineers, along with the California State Department of Water Resources and local agencies, developed the Sacramento-San Joaquin Flood Control Project to reduce flooding and foster navigation on Valley rivers. This project led to the construction of more than 1600 miles of levees along the rivers' banks. Cutting off rivers from historic floodplains and confining flows to narrow channels had the unwanted effect of increasing flood heights and severely damaging the health of the rivers. Moreover, the project created a false sense of security which fostered rapid development in locations at risk of flooding throughout the Valley.

Approximately two million people in the Valley rely on levees for flood protection. The city of Sacramento, among the fastest growing in the US, is the nation's most at-risk major metropolitan area for flooding, with protection below the inadequate, minimal federal standards. Conservative estimates of potential direct flood damages in the Sacramento area alone exceed $25 billion. A significant levee failure could also cripple the water supply system for the entire state because salt water would be sucked into the Delta by waters rushing through the breach, thereby making it too salty for municipal or agricultural use.

The basin's aging, outdated flood infrastructure is in need of a complete overhaul. This imperative is made more urgent and complicated by the steady decline of key river fish and wildlife, as well as the fact that local cities continue to allow developers to promote urban growth behind inadequate levees, threatening public safety. Additionally, California's changing climate appears to have increased the frequency and magnitude of large floods, and all projections suggest this trend will be worse in the future.

Following the wake-up call of Hurricane Katrina, California voters approved $5 billion in bonds to be used to update and upgrade flood protections in the Central Valley. The bond legislation requires the California Department of Water Resources to develop a Central Valley Flood Plan that will guide the prioritization and implementation of flood projects.

The real threat to the rivers of the Central Valley is that business-as-usual will dominate the flood planning process. Proposals are already being considered to simply make the levees bigger, at extraordinary costs to the public and the environment and with little assurance of long-term effectiveness. History has shown that this approach only increases flood risk by promoting more floodplain development behind levees.

A comprehensive approach to flood management is needed, rather than simply recycling the failed engineering efforts of the past. This approach involves non-structural or natural flood protection solutions, such as setting levees further back to provide room for rivers to move and, where possible, storing water on the floodplain and letting it seep slowly back into the ground. This approach also requires floodplain managers to reduce floodplain development or redirect it out of harm's way. Natural flood protection solutions restore the vital services that rivers provide, including clean and reliable water supply, fish and wildlife, and reduction in flood risk. These strategies have been shown repeatedly to be more effective than outdated 19th century approaches, in terms of cost and performance.

Outdated water management

The Delta serves as the hub of California's water distribution system that supplies water to millions of Californians. The pumps that feed the south-bound state and federal aqueducts are located at the southern edge of the Delta. When in operation, the pumps pull water south from across the Delta and reverse the direction of the natural flows in the San Joaquin River and other waterways. In an average year, the pumps export more than 6 million acre-feet of water from the Sacramento and San Joaquin river basins through the Delta.

The recent plunge in population of several key Delta fish species indicates what many believe is the near-collapse of the Delta ecosystem. Major factors contributing to the ecosystem collapse include the pumps themselves, which can kill fish that get stuck inside them, the reduction of total outflow through the Delta to the ocean, and the disruption of natural flow patterns in the complex network of channels in the Delta. As a result of the precipitous fish declines, courts have imposed 30 percent reductions on the amount of water that can be exported from the Delta by the state and federal water projects, throwing the water supply of much of the state into uncertainty.

The emergency in the Delta led to several strategies to better understand the causes and potential solutions. One effort is the Bay Delta Conservation Plan (BDCP) process, which involves all the major water users in federal and state agencies and conservation groups (including American Rivers). The aim of the BDCP is to develop a long-term plan for the recovery of the collapsed Sacramento-San Joaquin Delta ecosystem and provide more reliable water supplies. If successful, it would be among the most important agreements in California's water history. Although the BDCP shows promise for developing a durable solution, the threat is that stakeholders will be unable to agree on how to balance ecological recovery with water supply goals.

One alternative that has emerged in the BDCP process, as well as others, is the construction of what is known as the "peripheral canal," which would deliver Sacramento River water along the Delta's eastern edge to the pumps, circumventing the Delta. The canal would protect water exports from the vulnerabilities of levee failure and reduce the alteration of water flows created by the current configuration of the pumps. A more comprehensive and lasting solution would be to wean municipal and agricultural water interests from their reliance on the Sacramento and San Joaquin rivers. The state must also invest significantly in ecosystem restoration projects and alternative water storage initiatives.

The peripheral canal proposal was defeated in a state referendum in 1982, and remains controversial today. Residents along the eastern edge of the Delta are concerned about the effects of a 40 mile long canal with a 1000 foot wide foot print. The purpose and design of the current canal proposal are improved from the concept defeated more than 25 years ago, but conservation groups fear that once a canal is built, it will facilitate even more unsustainable levels of water exports to the south. Any consideration of a canal must first begin with a commitment to water conservation and efficiency efforts throughout the state on a scale not yet attempted. A canal must also come with a co-equal purpose of Delta ecosystem recovery and water management. Finally, such a proposal must include an enforceable framework of governance, regulatory and financial mechanisms that ensures the environmental and water supply goals are met and local interests are addressed.

The BDCP and related strategies represent a tremendous opportunity – perhaps the best in a generation – to create a path toward recovery for the Sacramento-San Joaquin system and greater water supply reliability. However, despite the clear stakes for the ecosystem and the state's water supply, many significant challenges stand in the way of success, including institutional inertia, status quo mentalities, and the lack of legal and institutional mechanisms to manage a new conveyance system to meet ecosystem and water supply needs.

Without healthy rivers, California can not have a reliable, long-term clean water supply. Unless the state makes river restoration a priority, Californians will also miss out on all of the fishing, recreation, economic and quality of life benefits that these rivers provide.

WHAT CAN BE DONE

The foundation for the California Flood Plan, which will guide the expenditure of more than $5 billion in state bond funding, is expected to be drafted by the end of 2010. DWR and the Army Corps must act to reform flood management in the Central Valley, and incorporate natural flood protection solutions into the Central Valley flood plan. These solutions include floodplain and wetland protection and restoration, levee setbacks, flood bypasses, changes in land use in flood-prone areas, reoperation of dams in the Sierra, improved zoning rules and building codes, and more.

The target date for a draft Bay Delta Conservation Plan is the end of 2009, and the draft environmental documents are expected by mid-2010. DWR, the Bureau of Reclamation, fish and wildlife agencies, state and federal water contractors, conservation groups and other BDCP participants must seize this opportunity to create a bold plan that achieves what no strategy has in the past – meaningful resolution to California's most vexing water resources problem. The BDCP must produce an enforceable plan of action to restore threatened and endangered species and their habitats, including real-time management of water facilities and adaptability to respond to inevitable changes in our climate.

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