

Looking At a New Strategy to Save the Sacramento-San Joaquin Delta

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Abstract

Water supply, flood control, and environmental management are fundamental challenges for the western United States. California's unique development patterns, with nearly 20 million of its residents living in water starved southern California, has resulted in a system of water transfers and aqueduct systems that rely on water being pumped, collected and transferred from Northern California through an extensive and damaging pumping and aqueduct system.

The Sacramento – San Joaquin Delta (the Delta) is the heart of California's water source and the center of the transfer system. The Delta is an 837,594 acres area where the Sacramento and San Joaquin River join before entering the San Francisco Bay and then the Pacific Ocean. Water is pumped from the Delta through a system of aqueducts to agricultural users in the San Joaquin Valley and urban centers of the San Francisco Bay, Los Angeles and other communities throughout southern California. Unsustainable pumping of vast amounts of water yearly from the Delta has caused the collapse of several fish populations and has forced a rethinking of the federal and state water policies.

United States federal and state river and water policies for the past 150 years have relied on maximizing conversions of wetlands for agricultural uses while placing a high priority on flood control on major rivers like the Mississippi, Missouri and Sacramento. As we move well into the 21st century the historic water policies of flood control and water exports have left the Delta facing an imminent collapse that threatens the massive California water transfers and the delta fisheries if immediate action is not taken. The effect of the collapse is potentially the loss of water to the 20 million California residences and the agricultural economy of the California San Joaquin Valley.

Fortunately, the Delta provides a new laboratory for water policies and improved habitat and water quality while addressing the need for flood control.

Images of the Delta will help to illustrate the multiplicity of interests that form the heart of the debate over California's water future.

Author's Note

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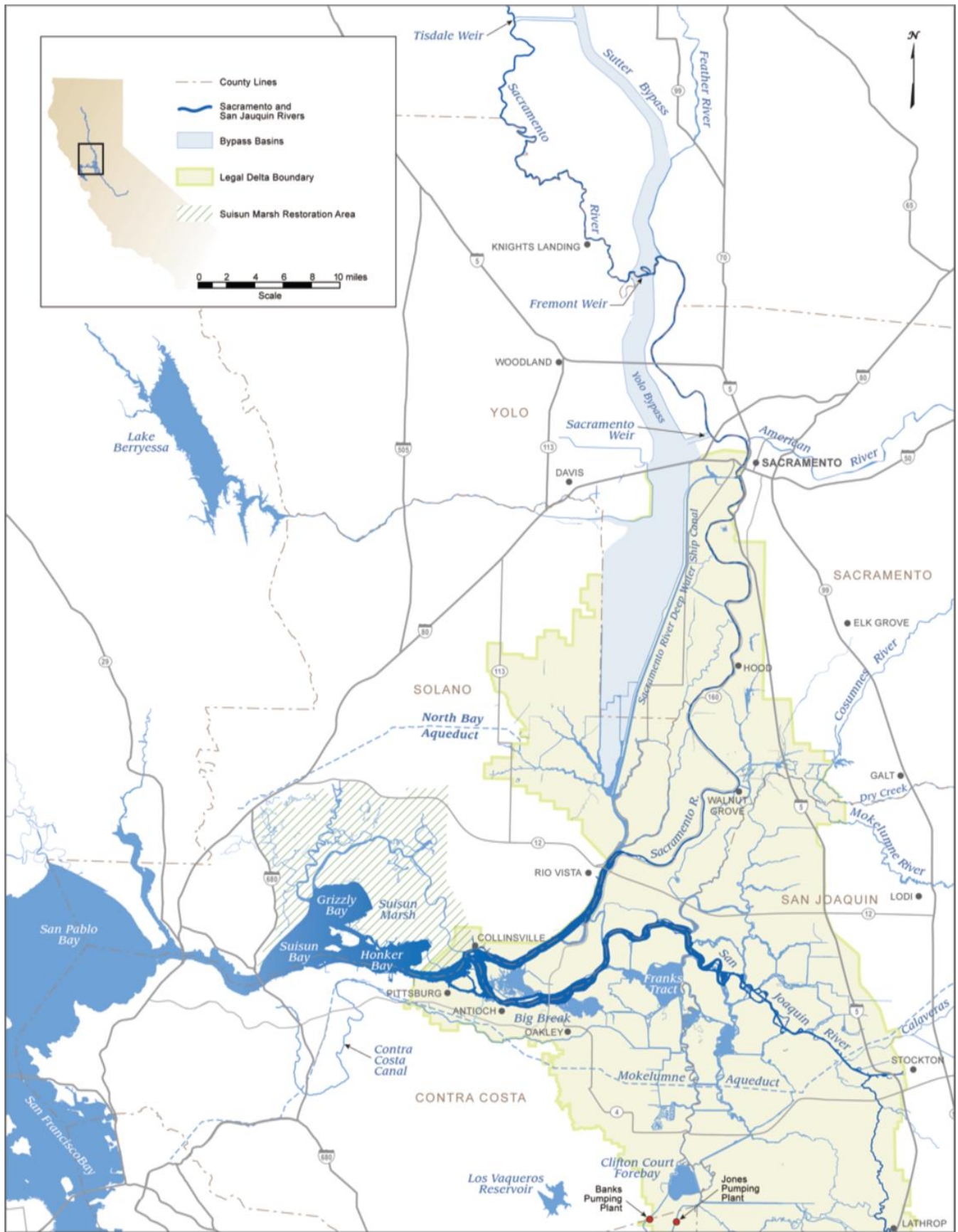
Keywords: Sacramento – San Joaquin River Delta, flood control, sustainable water management; California; Yolo Bypass, salmon; delta smelt.



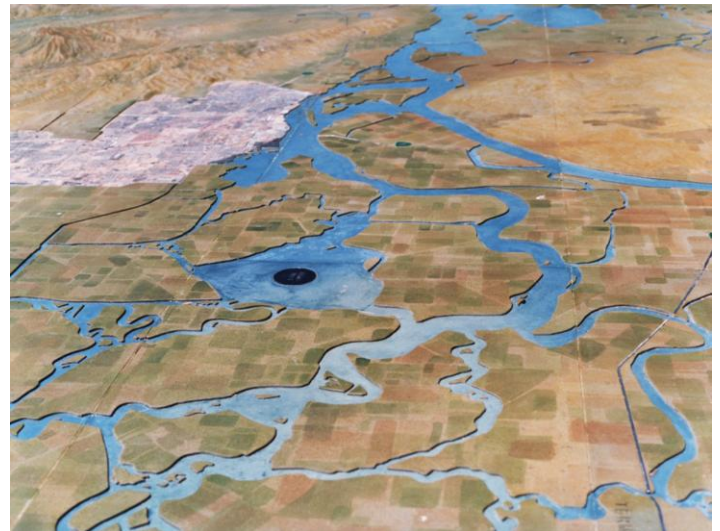
1. Exploring The Sacramento – San Joaquin Delta System

The Sacramento – San Joaquin Delta is the heart of California’s water source, an 837,594-acre area where the Sacramento and San Joaquin Rivers join before entering the San Francisco Bay and then the Pacific Ocean at the Golden Gate Bridge. It is a region where two of California’s largest rivers meet to create a vast mazelike system of islands, marshes, and small farming communities. Freshwater from the rivers combine with saltwater from the Pacific Ocean, creating the West Coast’s largest estuary. Composed of 57-leveed island tracts and 700 miles of sloughs and winding channels, the Delta is an impressive and intricate water system.

Photographs, clockwise from top left: Crawdad, Sacramento – San Joaquin Delta Waterway, Fishing in Delta, Tule Grass.



California Department of Water Resources, Map of Sacramento - San Joaquin Delta Waterway



2. Development of the Delta

The development of today's Delta was shaped in the late 1850's when the Federal Swamp and Overflow Land Act gave the State of California ownership of all swamp and overflow land, including Delta marshes. The public support for land reclamation encouraged the drying of wetlands for agricultural purposes. When flood control efforts later relied on channelized flood control systems, the structure of the Delta was set. Later initiatives to deliver water to the drier Southern California from the Delta, worked further to alter the structure of the waterway.

Photographs, clockwise from top left: Sacramento – San Joaquin Delta Waterway, Historic Ryde Hotel in the Delta, Concrete Scale Model of Delta, Antioch Bridge over Delta.



3. Water's Journey

The demand for water from the southern reaches of the state has left the Delta with a system that relies on pumped, collected, and transferred water through an extensive and damaging transfer system. Water is pumped and delivered through a series of channels from the Delta to agricultural users in the San Joaquin Valley and cities in the San Francisco Bay area and Southern California.

The risk to long-term sustainability for the Delta is tied to the likely failure of the complex physical infrastructure with land subsidence, sea level rise, and credible earthquake effects. Beyond infrastructure risk, the effects of increased water pumping have left the salmon, delta smelt, and Sacramento Splittail in precipitous declines.

Without new policies and corrective actions, the water pumping will stop and nearly 6 million acre-feet of water per year to urban and agricultural users will end.



4. Water Pumping

The Delta is the major collection point for water that serves more than 25 million people, two-thirds of California's population. During an average rainfall year, 6.3 million acre-feet of water is exported from the Delta. This export of water represents an ever-increasing diversion of water from the historic river flows to residential, industrial and agricultural uses. Due to water exports from the Delta, outflows to the ocean have decreased from 81% to 48% of total Delta flows since 1930.



5. Delta Resources and Fish Populations

The reduction in water flowing from the Delta to the ocean causes many problems for current fish populations. The pumping of an estimated 6 million acre feet of water yearly from the Delta has been linked to the collapse of the fish populations with the near complete loss of delta smelt. Additionally, alterations to annual salmon migrations have forced a rethinking of the federal and state water policies. Sustainable practices will require state and federal water managers to no longer rely on heavily engineered levee systems for flood control and maximizing the flow of water destined for pumping facilities.

Photographs, clockwise from top left: Agricultural Canal in Grimes CA, New Housing Development near Yolo Bypass, Agricultural Area in Delta, Water Pollution in Delta.



6. Damaging Results

The natural operation of the Delta is in jeopardy of collapse as a result of the state's increasing population, demand for water, changing environmental conditions, and historic use patterns. Water pumping causes many problems throughout the Delta, but is not the only source of concern.

Housing demands propel the use of inflexible solutions, like levees, to create more developable land. Property that was once flood-prone has been made profitable through waterway engineering which channels water in order to reduce the threat of floods. Rigid water channels are not the singular tool being implemented in the Delta. Through the Yolo Bypass, we can see a more sustainable solution to flood management.



7. Positive Management: Yolo Bypass

Fortunately, the Yolo Bypass, one of the seasonal floodplains in California, offers an example of sustainable management and flood control within the Delta. The unique systems of weirs and bypasses allow the American and Sacramento rivers to flow into 59,000 acres of low lying agricultural land when there is danger of flooding. This encourages responsible flood control that allows for natural migrations of fish species. The Bypass provides a unique habitat to native fish species, agricultural production and flood protection to the City of Sacramento. Increased flows provide critical habitat to native fish species, in particular Chinook salmon and Sacramento Splittail. This longstanding flood control measure has been linked to restoring Delta fisheries and reducing damage done by increased water diversions.

Photographs, clockwise from top left: Agricultural Canal in Yolo Bypass, Field in Yolo Bypass, Agricultural Canal in Yolo Bypass, Dry Field in Yolo Bypass.



The Yolo Bypass has received increasing attention as a potential solution to fishery failures in the Delta. Appropriately managed floodplains provide multiple benefits to society in a synergistic way. More flooding of the Yolo Bypass increases benefits to native fish species, in particular juvenile Chinook salmon that use the floodplain as a nursery habitat. The Yolo Bypass is a successful example of a flood risk management strategy that achieves multiple benefits for the Delta. There are opportunities to expand this type of scenario and increase the benefits to provide a more sustainable Delta system.

Photographs, clockwise from top left: Sacramento Weir, Yolo Bypass, Water Storage, Sacramento River.



8. California and the Delta's Future

The future of the Delta and all of California, will be linked to its water supply. Emerging environmental science is fundamental to a future water system that protects and improves the Delta. A new Delta system will need to recognize the multiple uses and users of the Delta. Urban areas in northern and southern California, west coast iconic salmons, in-delta agriculture and tourism activities are all being placed in jeopardy by historic practices and policies.

Finding new habitat, restoring past damaged wetlands and allowing rivers more room to spread in response to flooding are all new management tools that hold promise for the Delta.

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All Photographs by Julia Fredenburg, 2006-2011

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