

## San Francisco Baykeeper

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### Position Summary: California WaterFix Threatens the San Francisco Bay-Delta Ecosystem

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#### California WaterFix: How did we get here?

The San Francisco Bay-Delta ecosystem consists of the San Francisco Bay and the Sacramento-San Joaquin Delta. These adjoining water bodies do not operate independently from one another; they form an estuary, where salt water from the Pacific Ocean and San Francisco Bay mix with freshwater from the Sacramento and San Joaquin Rivers. Both rivers originate in the Sierra Nevada and flow westward, where they intersect east of San Francisco Bay and form the Sacramento-San Joaquin Delta. The Delta is the heart of California's water supply and a crucial habitat for hundreds of plants and animals. In addition to fostering California fisheries and serving as a critical juncture for migrating birds along the Pacific Flyway, the Delta provides 25 million people with drinking water and supports a \$54 billion agricultural industry that furnishes produce for much of the United States.

The Delta has been substantially altered over the past 160 years to develop agricultural lands and satisfy water demand. Since 1850, Delta farmers have controlled flows to protect their crops from drowning during wet years or perishing during dry years due to drought and salt intrusion from the Bay. In 1935, the federal Bureau of Reclamation began building dams and levees for farming that still operate today as a part of the Central Valley Project, or CVP. In 1960, construction of dams and aqueducts began through the Statewide Water Project, or SWP, to provide southern California with a reliable water source. The functionality of these two projects rely on complicated conveyance infrastructure that dramatically altered the San Francisco Bay-Delta ecosystem during construction and operation.

Fish population declines were observed soon after completion of the CVP and SWP, reaching a crisis point in the last decade as several species near extinction. These trends can be linked, both directly and indirectly, to water deliveries from the Delta. For example, the pumping facility in the South Delta exerts an immense force that reverses natural Delta flows and prevents fish from completing their migrations. These altered flows are coupled with stagnant conditions and multiple pollution sources that adversely affected both fish and farmers.

To resolve these concerns, the Peripheral Canal was proposed, starting in the early 1960s, as a means to circumvent the polluted east Delta and deliver water from the Sacramento River (north of the Delta) to south Delta pumps. At 43 miles long, 400 feet wide, and 30 feet deep, the Peripheral Canal would have approximated the size of the Panama Canal. With few safeguards for wildlife protection and little consideration for how these diversions would affect the Delta, the proposal was defeated by voters in a ballot initiative in 1982 during Governor Jerry Brown's second term. Since then, the desire to secure 'environmental flows' for ecosystem protection has conflicted with water demands from cities in Southern

California and agriculture in the San Joaquin Valley. These competing interests are currently referred to as the ‘co-equal goals’.

Issues surrounding the reversal of natural Delta flows and worsening water quality have become direr as a rapidly changing climate threatens sea level rise and enduring droughts. Several iconic fish species, including the Chinook salmon and delta smelt, face extinction as a result of California’s on-going water resource management. Yet political interests have precluded revisions to California’s century-old water rights laws and water resource demands, particularly from entrenched industrial agricultural interests, are only expected to increase. Water availability is rapidly depleting for the people and wildlife of California alike, yet the consequences of scarcity has disproportionately impacted fish and wildlife.

Prolonged drought conditions in 2009 provoked Governor Arnold Schwarzenegger to declare a state of emergency and develop an \$11.14 billion bond that allocated \$1.5 billion for the Bay Delta Conservation Plan (BDCP), a project that proposed upgrading pumping facilities and constructing two tunnels 150 feet below ground that would be 40 feet across and 30 miles long. Similar to the Peripheral Canal, the BDCP suggested installing new intake sites along the Sacramento River capable of diverting two-thirds of the flow in the Sacramento River and increasing water deliveries to Southern California by approximately 20%. These modifications intended to satisfy the ‘coequal goals’ of protecting California’s water supply from drought and sea level rise while returning natural flows to the Delta and restoring the San Francisco Bay-Delta ecosystem. However, resistance from California voters concerning the cost resulted in withholding the bond from the 2010 ballot, and its eventual downsizing to a \$7.12 billion bond, referred to as the Water Quality, Supply, and Infrastructure Improvement Act of 2014, or Proposition 1.

The revised measure focused on water storage strategies and prohibited the use of Prop 1 funds on BDCP projects, although allocation of some funds towards Delta habitat restoration was permitted. During this time, while the public expressed concerns over cost, agencies indicated the BDCP would unlikely satisfy the co-equal goals and further ecosystem degradation may follow implementation. The U.S. Environmental Protection Agency suggested the BDCP may violate the Clean Water Act and further endanger threatened Bay-Delta fishes. The U.S. Fish and Wildlife Service also refused to issue the required 50-year permits.

With long-term permit assurances no longer a possibility, BDCP was partitioned into two projects - [1] California EcoRestore would focus on restoring 30,000 acres of habitat, while [2] California WaterFix would center on water delivery infrastructure, including the construction of the two underground tunnels initially proposed in the BDCP. The California WaterFix could cost Californians up to \$67 billion. Its 15+ years of construction and operation could reduce water flows throughout the Delta, potentially devastating the Bay-Delta ecosystem and negatively impacting quality of life and agriculture in the Delta. Recent questions over whether future increased pumping would be possible have caused the major beneficiaries, including San Joaquin Valley agriculture and the Metropolitan Water District, to publicly question whether the cost is worth it.

### **California WaterFix will reduce freshwater flows through the Delta and decrease water quality**

Diverting water north of the Delta prevents freshwater from circulating through the Delta and increases the Delta's water temperature and clarity, while agricultural runoff and treated municipal wastewater introduces nutrients, pesticides and other contaminants into the Delta. Together, these conditions promote the spread of invasive vegetation that displace native flora and fauna, while increasing the frequency and strength of harmful algal blooms and pollutant concentrations.

The Brazilian Waterweed, and more recently, the South American Spongeplant have been introduced to the Delta, displacing native vegetation, including the seagrass *Vallisneria*. These invasive aquatic plants do not provide suitable habitat for local fauna, particularly juvenile fish, which stresses wildlife and reduces fishery productivity. Another invasive plant, the water hyacinth, forms dense mats on the surface of the water and prevents the growth of native vegetation, eventually reducing oxygen availability for fish. Additionally, certain plants, like the giant reed, can clog waterways, which can increase flood risk and the difficulty of boating activities.

Toxins from harmful algal blooms and contaminants from industrial activity are already prevalent in the Bay-Delta. The toxin microcystin (from the bloom-forming algae *Microcystis*) is harmful to both humans and wildlife, and is frequently detected above acceptable levels in the Bay and Delta. Similarly, pesticides from agricultural runoff, and contaminants (e.g., selenium from agricultural runoff and oil refinery wastewater, and legacy mercury from historic old mining activities) are found in high concentrations throughout the Bay-Delta ecosystem. These toxins and contaminants accumulate in Bay-Delta animals and are transferred up the food web. Selenium, for example, predominantly accumulates in clams that are preferred prey for green and white sturgeon. As a result, these ancient and iconic fish are especially vulnerable to selenium poisoning. Further, pollutant-laden, low-quality water that is diverted for farming could contaminate soils and crops, while also driving down overall crop production. Thus, additional reductions in water quality could cause the Bay-Delta food web to collapse further, make the Delta less hospitable for recreation and agriculture, and reduce quality of life.

### **Changes in Delta flow rates will adversely affect threatened fish species**

Delta water diversions have already decimated fish known exclusive to the Delta. Native populations have been reduced by more than half, so that only 12 fish species native to the Delta remain. During the current drought, state and federal agencies have weakened water quality standards and mismanaged water resources, resulting in the near total loss of eggs, hatchlings and juvenile winter-run Chinook salmon in 2014 and 2015. Reduced flows through the Delta following implementation of the California Water Fix would likely place further strain on salmon and other fish species endemic to the Delta.

The success of native fish in the Bay-Delta ecosystem is tightly linked to high water flow rates. Implementation of the California WaterFix will reduce freshwater flow and exacerbate stagnant conditions in the Delta, further endangering fisheries and the ecosystem in general. Freshwater outflow through the Delta regulates salinity throughout the estuary and is managed primarily to ensure freshwater is available to pump from the South Delta to southern farms and cities. To a lesser extent, freshwater outflow is managed

to maintain suitable habitat for species that rely on narrow salinity requirements. In addition to concerns over habitat degradation, Delta farmers are concerned less flow through the Delta, coupled with the placement of intakes further north, will all but ensure saline conditions in the Delta, which could severely limit farming in the region.

### **Reduced Delta flow rates will intensify the effects of climate change**

Climate change is expected to produce more punishing drought conditions, resulting in reduced freshwater flows, degraded water quality and further impacts to ecological conditions. Additionally, approximately one meter of sea level rise is expected by 2100, pushing saline waters further east and decreasing habitat available to species reliant on freshwater. Drought, sea level rise, and salt intrusion could reduce crop production, destabilize levees, contaminate groundwater, and alter already-reduced water deliveries. In addition to direct changes in water availability and infrastructure instability, climate change will also compromise wetlands, increase the vulnerability of the Bay-Delta ecosystem to invasive species, and reduce biodiversity by displacing and eliminating native species.

The cumulative impacts of climate change on the California WaterFix Project and the Delta, in general, are unknown, due in part to incomplete models of outcomes. It is therefore important to clarify how the California WaterFix will impact the rapidly changing San Francisco Bay-Delta ecosystem. In addition, the public must know whether future climate change will render the Delta tunnels inoperable or impermissible in a future where the Delta is saltier and additional freshwater is needed to maintain some semblance of the Delta's ecology and heritage.

### **Conclusion**

The San Francisco Bay and Sacramento-San Joaquin Delta are inextricably linked. Changes in one water body will inevitably affect the other. The Bay-Delta ecosystem has already been severely degraded by past and current water diversions, putting the estuary and the species that depend on it at risk. Plans to further increase water deliveries and reduce freshwater flows via the California WaterFix could be devastating for the Bay-Delta ecosystem, especially combined with the effects of climate change.

San Francisco Baykeeper believes that rather than spending billions of public dollars on a new giant water infrastructure project, there are far simpler and more cost-effective ways to achieve the coequal goals of providing a more reliable water supply and restoring and enhancing the Bay-Delta ecosystem. Such measures include investments in water recycling, water conservation and efficiency, stormwater capture and reuse, and improved groundwater management.

### **Recommended Reading**

[1] Senn D and E Novick. 2014. [Scientific Foundation for the San Francisco Bay Nutrient Management Strategy](#).

[2] Williams JG. 2006. [Central Valley Salmon: A Perspective on Chinook and Steelhead in the Central Valley of California](#). San Francisco Estuary and Watershed Science 4(3).

[3] National Marine Fisheries Service. 2009. [Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project.](#)

[4] Dept. of Water Resources. 2008. [Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water](#)

[5] Chung, F, J Anderson, S Arora, M Ejeta, J Galef, T Kadir, K Kao, A Olson, C Quan, E Reyes, M Roos, S Seneviratne, J Wang, and H Yin. 2009. [Using Future Climate Projections to Support Water Decision Making in California. California Energy Commission publication CEC-500-2009-52-F.](#)

[6] Bay Conservation and Development Commission. 2014. [Staff Recommendation on Comments on the Bay Delta Conservation Plan Environmental Documents.](#)

[7] Pacific Institute and NRDC. 2014. [The Untapped Potential of California's Water Supply: Efficiency, Reuse, and Stormwater.](#)