Emergency Drought Barriers

Information Sheet

Delta Science Program

DELTA STEWARDSHIP COUNCIL

- California experiences periodic severe droughts that limit statewide water supplies and will become more common with climate change.
- In periods of severe drought, reservoir supply may not be sufficient to prevent saltwater from intruding into the Sacramento-San Joaquin Delta during the hot, dry summer.
- In 1977, 2015, and 2021, the Department of Water Resources (DWR) took emergency action to prevent salinity intrusion by constructing rock emergency drought barriers.

Background

Emergency Drought Barriers were first constructed in the Delta to address saltwater intrusion in 1977, with six total barriers constructed during the 1976-1977 drought. A single Barrier was constructed again in 2015 and 2021 to block tidal flows, successfully preventing saltwater from intruding into Franks Tract. These strategically placed barriers prevented the degradation of water quality for Delta beneficial uses, including drinking water and agricultural water supplies. However, barrier installation may also lead to unintended consequences such as blocking migratory corridors for fish such as salmon and increasing harmful algal blooms and submerged aquatic vegetation.

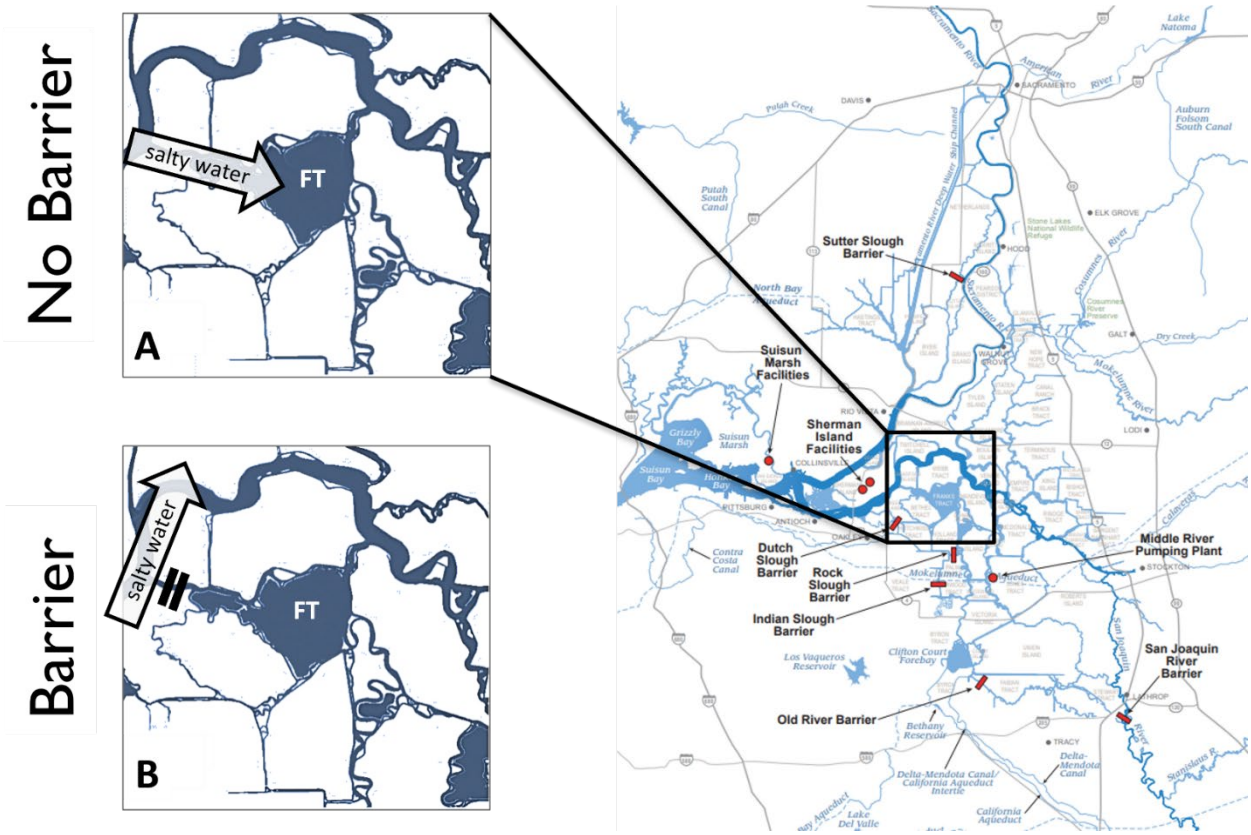

Figure 1. Map (right) of Delta with lines depicting Barriers placed in 1977. Focus area of Franks Tract (left) showing saltwater movement on flood tide (A) without Barrier and (B) with Barrier placed in False River in 2015 and 2021

Ecological Effects

In response to the installation of the 2015 Barrier, Kimmerer et al. 2019 evaluated a wide range of ecological effects resulting from the Barrier. Some effects were intended and anticipated – such as reduced water exchange and salt transport across the Barrier. However, other undesirable effects, such as the increase in submerged aquatic vegetation (SAV) in Franks Tract and the increase of invasive clams, were harmful, and the study provided managers with data for evaluating tradeoffs associated with Barrier placement.

As a condition of the Temporary Urgency Change Petition (TUCP), filed by DWR in conjunction with the construction of the 2021 Barrier, a special study of harmful algal bloom (HAB) development and SAV growth in Franks Tract was required by the State Water Board (See Regulatory Fact Sheet for more information about TUCPs). A December 2021 report from the DWR detailed preliminary results suggesting:

- drought and increased water temperature led to the development of HABs across the estuary, including in Franks Tract, in 2021 despite no HAB development in Franks Tract with the 2015 Barrier construction.
- no direct link can be made between the Barrier and SAV growth as the prevalence of SAV has increased over the last 15 years, possibly due to frequent droughts and increased temperatures.

A more extensive report will be published in spring 2022.

Salmon Migration

The 2015 Barrier was removed in the fall of 2015 to allow for salmon migration. In 2021, due to the severity of drought conditions, instead of full Barrier removal, a notch was made in the top of the barrier to allow fish movement in January 2022. The notch was filled in April 2022.

Figure 2. The 2021 Barrier with notch removed to allow fish passage

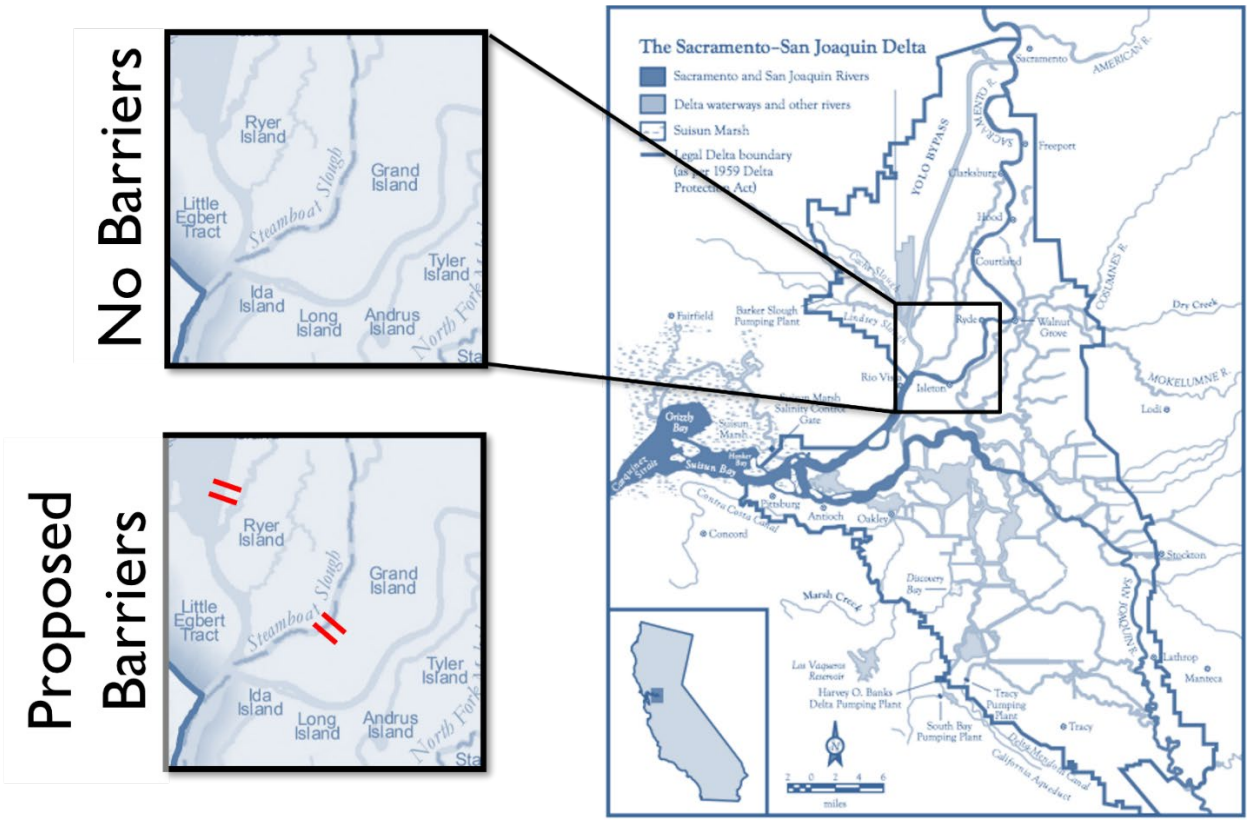

Figure 3. Map (right) of Delta showing with focus area (left) of approximated future proposed Barriers (not exact locations)

Potential Future Barriers

To slow further salinity intrusion upstream, DWR has also considered drought barriers in Miner Slough and Steamboat Slough as further salinity management options if the drought continues, approximate locations of which are depicted in Figure 3.

A Notice of Preparation for an Environmental Impact Report (EIR) was released by DWR on February 23, 2022, for a 30-day public comment period. The proposed project consists of a temporary barrier in the West False River that may be installed up to two times between 2023 and 2032 for a period of up to 20 months if water storage in SWP and CVP were reduced to critical levels and release from reservoirs could not control salinity intrusion. The comment period closed March 25, 2022.

Learn more

Find out more about the Emergency Drought Barriers and ongoing activities related to Barriers at https://water.ca.gov/Water-Basics/Drought/Emergency-Drought-Salinity-Barrier.

References

Department of Water Resources (DWR). 2019. 2015 Emergency Drought Barrier Water Quality Monitoring Report.

Hartman, R., E. Ateljavich, M. Berg, K. Bouma-Gregson, D. Bosworth, N. Rasmussen, T. Flynn, and T. Pennington. 2021. Report on the Impact of the Emergency Drought Barrier on Harmful Algal Blooms and Aquatic Weeds in the Delta. Sacramento: California Department of Water Resources. 86 pp. + appendix.

Kimmerer W, Wilkerson F, Downing B, Dugdale R, Gross ES, Kayfetz K, Khanna S, Parker AE, Thompson J. 2019. Effects of drought and the emergency drought barrier on the ecosystem of the California Delta. San Francisco Estuary and Watershed Science, 17(3). https://doi.org/10.15447/sfews.2019v17iss3art2