

# ECOLOGICAL EFFECTS ON THE DELTA OF THE 2015 EMERGENCY DROUGHT BARRIER

## WHY DID THE STATE BUILD THE BARRIER?

California's severe drought of 2012 to 2015 limited water supplies statewide. Reservoirs could not supply enough fresh water to prevent salt water from pushing into the Sacramento-San Joaquin Delta during the hot, dry summer. In 2015, the Department of Water Resources (DWR) took emergency action to limit reservoir releases necessary to keep the Delta's water fresh. DWR constructed a 750-foot rock barrier across the False River in the Central Delta, west of Franks Tract. This Emergency Drought Barrier (Barrier) blocked tidal flows, which successfully prevented salt water from intruding into Franks Tract and consequently onward to federal and State Water Project pumps, where it could have contaminated drinking water and agricultural water supplies. The Barrier was removed in the fall of 2015 to allow for salmon migration.

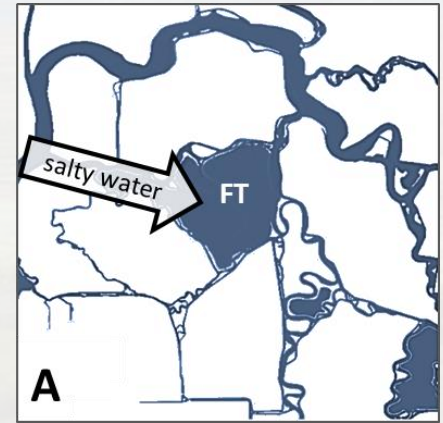
## HOW DID THE STATE STUDY THE BARRIER?

To confirm the Barrier was successful in reducing salt water intrusion, DWR installed 10 additional water quality monitoring stations and performed a detailed water quality study. In order to take advantage of this unique large-scale experiment, the Delta Science Program led collaboration with agency and university scientists to develop theories around how the Barrier might affect the Delta ecosystem, and then funded and synthesized a suite of studies looking into the ecological effects of the Barrier.

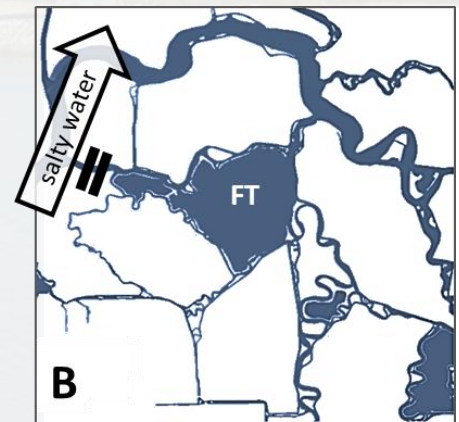
## WHAT DID THE BARRIER DO?

Protect water quality in the Central Delta?	Yes
Reduce reservoir releases?	Yes
Cut off Delta smelt from their food supply?	No
Cause blooms of harmful algae ( <i>Microcystis</i> )?	No
Cause invasive clams to spread?	Yes, temporarily
Facilitate the spread of invasive aquatic weeds?	Yes, persistently

No Barrier



Barrier



Predicted movement of salty water from San Francisco Bay into the Delta (A) without the Barrier and (B) with the Barrier (=). The Barrier reduced salt water transport into Franks Tract (FT) and therefore kept the Central Delta fresh.

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## WHAT WERE THE ECOLOGICAL EFFECTS?

**Less severe than expected.** Research did not support concerns that the Barrier would cause blooms of harmful algae (*Microcystis*), or cut off Delta smelt from their upstream food supply. Most of the ecological changes that were observed returned to normal soon after the Barrier was removed. However, cutting off the intense jet of water that enters Franks Tract from False River **allowed invasive aquatic weeds to colonize** all of Franks Tract, making a formerly clear region inaccessible by boat. Once the vegetation took root, it persisted even after the Barrier was removed, at least through 2018 (see sidebar on the right).

## WHAT WAS LEARNED FOR FUTURE BARRIERS?

**The Barrier worked.** It kept salt water out of the State Water Project, and protected water in the reservoirs. The Barrier mostly did not harm species or water quality. The one exception was the persistent spread of aquatic weeds. For future barriers, **it is important that managers anticipate, proactively manage, and mitigate for increased spread of aquatic weeds.**

## WHAT DID THE BARRIER COST?

Construction and removal of the Barrier were funded by DWR (roughly \$37 million). Ecological studies and synthesis efforts were funded by the Delta Stewardship Council (about \$910,000). Both agencies used a mix of Proposition 50 water bond and general fund dollars.

## LOOKING FOR MORE INFORMATION?

Results and synthesis of the ecological studies were published in the online journal *San Francisco Estuary and Watershed Science* in September 2019. Access it for free online at <https://escholarship.org/uc/item/Ob3731ph>.

