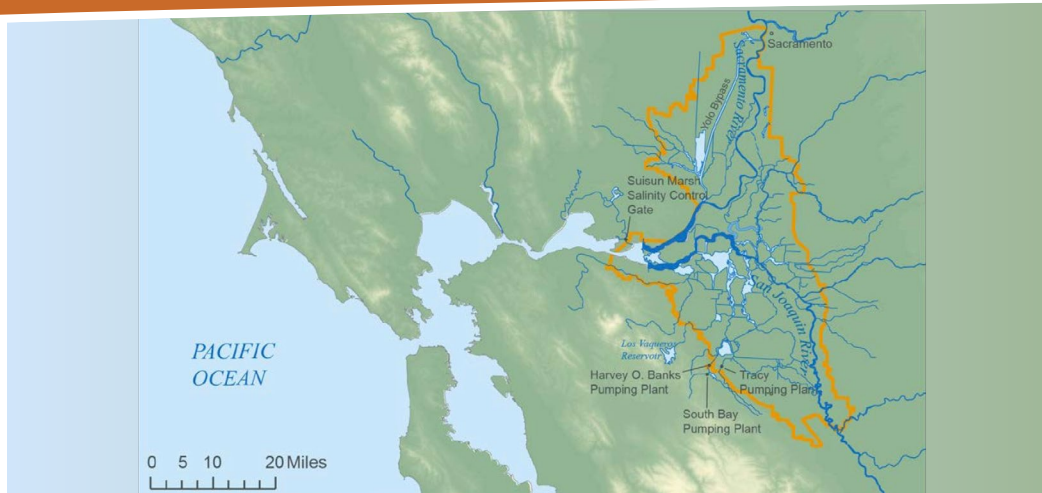


# MANAGING SALINITY ON THE DELTA IN A CHANGING CLIMATE



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The California Delta (orange outline) is formed by the confluence of the Sacramento and San Joaquin Rivers | Fig 2 from [PPIC 2017](#)

## SUMMARY

- The California Delta is a major hub in California's water infrastructure.
- The Delta supplies freshwater to two thirds of all Californians, a \$50 billion agricultural industry, and critical habitat for many protected species.
- Water managers rely on a number of strategies to keep salinity levels in the Delta low.
- Increasing drought and sea level rise is making it more challenging for water managers to meet the freshwater needs of all who rely on the Delta.

## MANAGING SALINITY IN THE CALIFORNIA DELTA

The Delta is home to more than half a million people and more than 700 species of plants and animals. The Delta is also the major hub of several major water projects that collectively provide freshwater to two-thirds of all Californians and a \$50 billion agricultural industry. Many of those dependent on the Delta rely on relatively freshwater to thrive.

However, the Sacramento-San Joaquin Delta is also an estuary where half of California's freshwater runoff mingles with Pacific Ocean saltwater. Freshwater flows out of the Delta to the ocean and to water projects. Salty water flows into the Delta from the ocean and runoff from agricultural lands. The balance of tides, streamflows, and water operations affects the salinity levels of water within the Delta.

Water flows through the Delta are carefully controlled by water managers to meet regulated salinity levels. Climate change, including increasing drought and sea level rise, is expected to make meeting the freshwater needs of Delta end-users more challenging.

## CONTRIBUTORS TO SALINITY

SOURCES & EVENTS THAT BRING SALT INTO THE DELTA

**DAILY TIDES:** Tides reverse the direction of water flows in the Delta twice a day and push ocean salt water inland towards the Delta.

**LEVEE FAILURES:** Many Delta islands are below sea level. If an event such as an earthquake were to cause massive levee failure, then ocean saltwater would get pulled into the Delta as water rushes in to flood the islands.

**AGRICULTURAL RUNOFF:** Runoff from agricultural fields, particularly in the San Joaquin Valley, concentrates salts from the land and carries them into the Delta.

**SEA LEVEL RISE:** Sea level rise will push more salt water into the Delta and increase the risk of catastrophic levee failure.

**DROUGHT:** During drought there is less freshwater available to maintain sufficient flows to the ocean to flush salty water out of the Delta and away from the many intake pumps.



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SCIENCE & TECHNOLOGY

### About the CCST Disaster Resilience Initiative:

Ongoing, complex, and intersecting disasters—including climate change, extreme heat, power outages, and the COVID-19 pandemic—are radically disrupting the ways in which Californians live and work. CCST is committed to delivering science and technology advice to improve our resilience to disasters, reduce harm, and improve the lives of all Californians.

### SELECT EXPERTS

The following experts can advise on salinity in the California Delta:

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## EXAMPLES OF STRATEGIES:

### MANAGING SALINITY LEVELS IN THE DELTA

#### IN-DELTA



**Example:** The Emergency Drought Salinity Barrier was erected to help deter the tidal push of saltwater from the SF Bay into the central Delta. (DWR)

#### PHYSICAL BARRIERS

Managers can erect and operate physical barriers to modify in-Delta flows and direct saltier water away from critical habitats or water pumps. Examples include the Suisun Marsh salinity control gates, the Cross-Delta Channel control gates near Walnut Grove, or the Emergency Drought Salinity Barrier near Oakley.

#### UPSTREAM OF DELTA



**Example:** Oroville Dam in Butte County controls flows of the Feather River into the Delta as part of the California State Water Project. (DWR)

#### RESERVOIR RELEASES

Water managers can change the timing and size of freshwater releases from upstream reservoirs such as Shasta and Oroville to control the flow of freshwater into the Delta.

#### IN-DELTA



**Example:** Proposed Franks Track project would restore tidal marshes (green) that would help impede the flow of saltier water into the central Delta. (CDFW)

#### MARSH RESTORATION

Restoration of marsh habitat within the Delta such as at Sherman Island or the proposed Franks Track project can reduce the risk of catastrophic levee failures and modify in-Delta flows to direct salt water away from critical areas.

#### DELTA EXPORT



**Example:** The Harvey O. Banks Delta Pumping Plant lifts water out of the south Delta and into the California Aqueduct for export south. (DWR)

#### PUMPING SCHEDULES

Water managers can change the timing and rate of pumps that are operated to export freshwater out of the Delta to Bay Area and southern California water uses.



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