

GATES AND BARRIERS IN THE DELTA

A Report to the State Water Resources Control Board
and
the Delta Stewardship Council

April 23, 2013

Item # 3



Craig Wilson
Delta Watermaster

Water Code Section 85230(d)

(d) The Delta Watermaster shall submit regular reports to the board and the council including, but not limited to, reports on water rights administration, water quality issues, and conveyance operations.

Delta Hydrodynamics

- The Tides
- River Flows into the Delta
- Exports From the Delta



Issues created by Conveyance Project Operations & Exports

- Water Quality (salinity)
- Fish in Water Supply Corridors



Purpose of Gates and Barriers

- Improve Water Quality
- Keep fish out of Water Supply Corridors

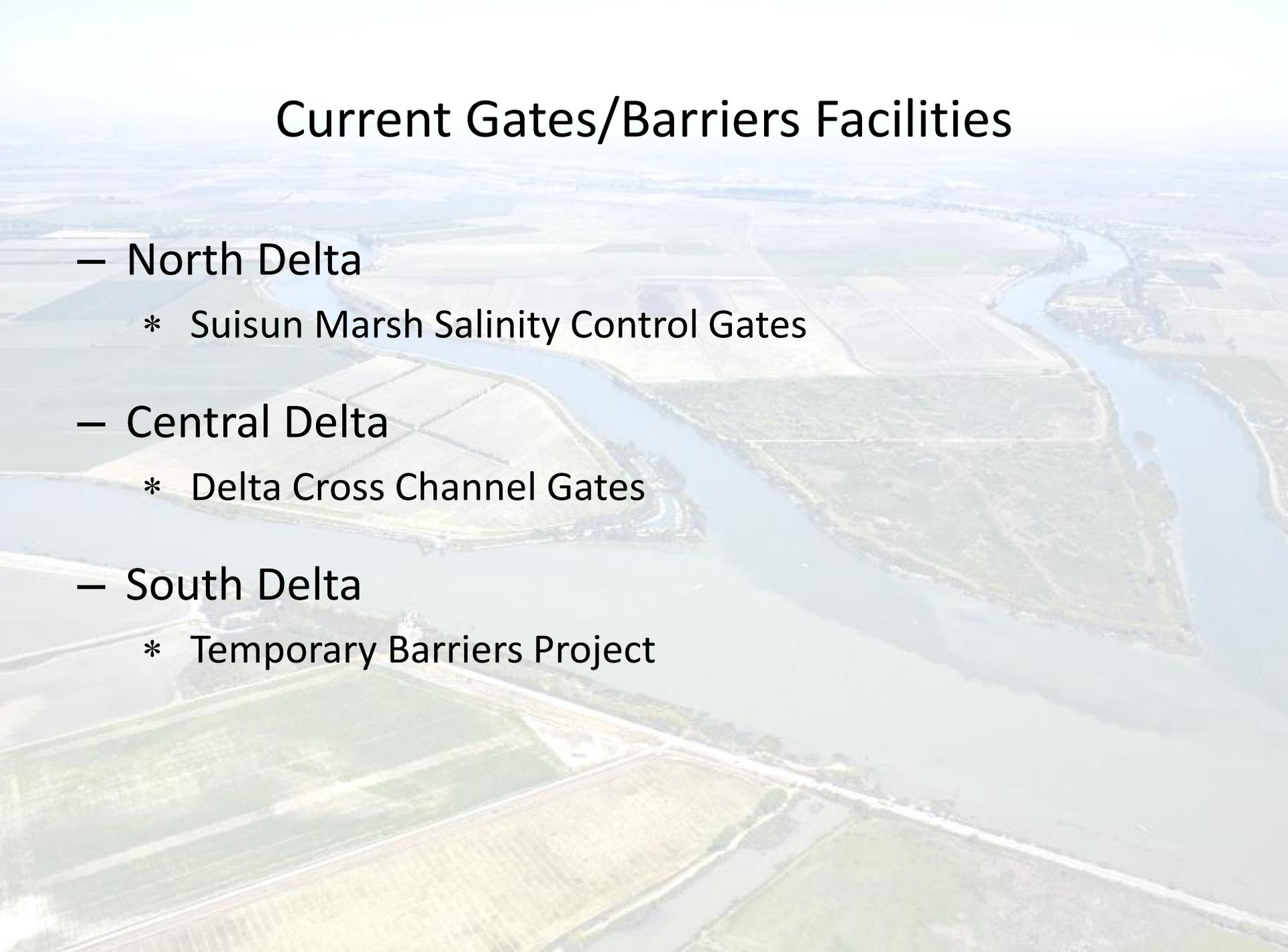


Use of Gates and Barriers in the Delta

- Present Structures
- Reoperation / Improvements to Existing Structures
- Future Projects



Current Gates/Barriers Facilities

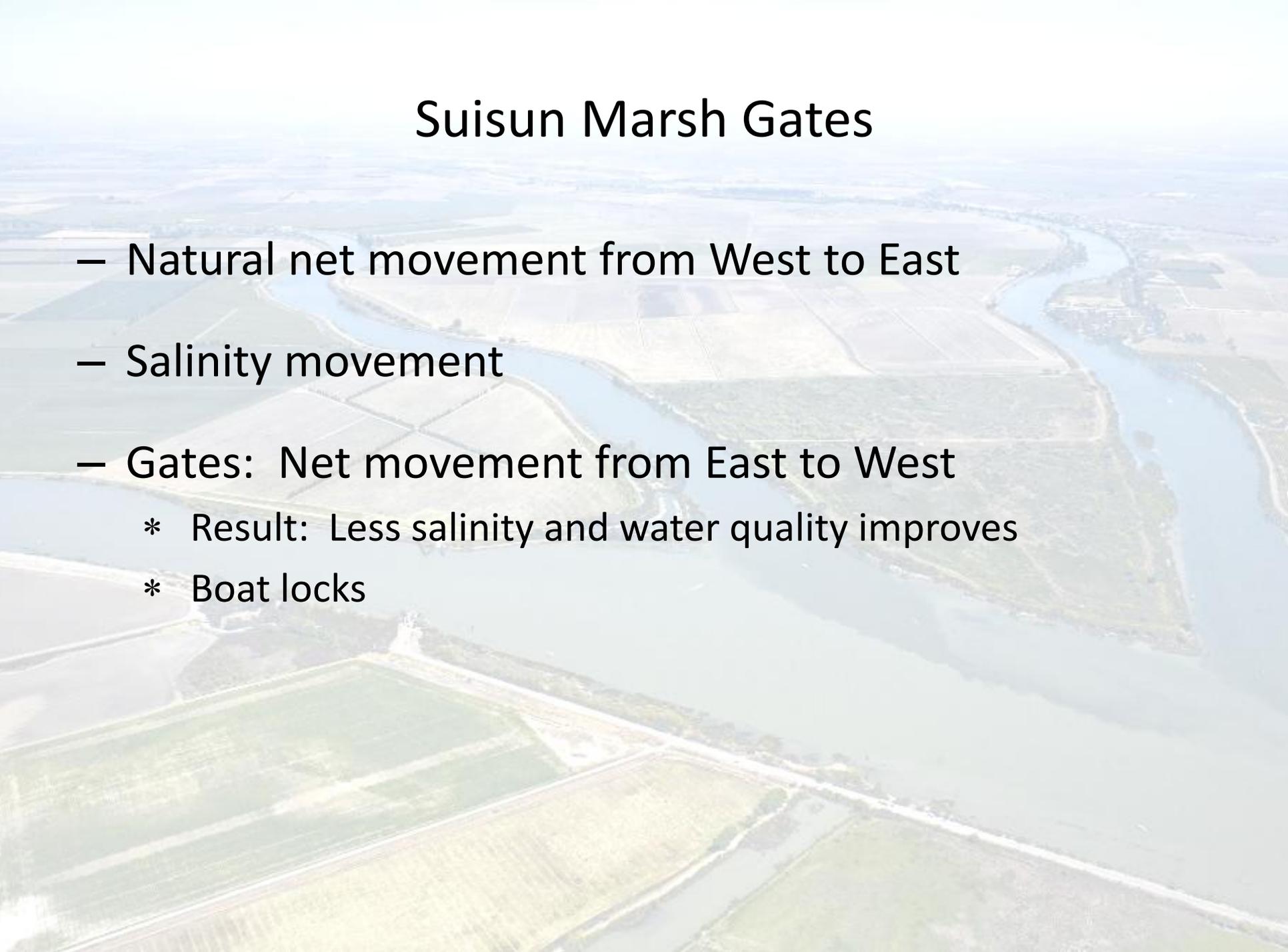
An aerial photograph of a river delta system, likely the Sacramento-San Joaquin River Delta. The image shows a complex network of waterways, including a large central channel and several smaller distributaries. The surrounding land is primarily agricultural, with rectangular fields in various shades of green and yellow. The sky is overcast and hazy, providing a soft, diffused light over the scene.

- North Delta
 - * Suisun Marsh Salinity Control Gates
- Central Delta
 - * Delta Cross Channel Gates
- South Delta
 - * Temporary Barriers Project

North Delta: Suisun Marsh Gates



Suisun Marsh Gates

An aerial photograph of the Suisun Marsh area, showing a large river system winding through a landscape of agricultural fields and marshland. The water is a light blue-grey color, and the surrounding land is divided into various sized plots, some green and some yellowish-brown. The sky is a pale, hazy blue.

- Natural net movement from West to East
- Salinity movement
- Gates: Net movement from East to West
 - * Result: Less salinity and water quality improves
 - * Boat locks

Central Delta: Delta Cross Channel Gates



Delta Cross Channel Gates

- Main Purpose: A water supply corridor to the Export Pumps
- Unintended Consequence: Fish drawn toward to the Export Pumps
- Closing Gates can keep fish out of Water Supply Corridors

South Delta Barrier Projects

— ORT



— HORB



South Delta Barriers Projects

- Temporary Rock Barriers
- Main Purpose: Increase Water Levels
- Ancillary Purposes
 - * Improve water quality and circulation
- Operation
 - * Height of Barriers: Circulation
 - * Opening tide flaps/culverts



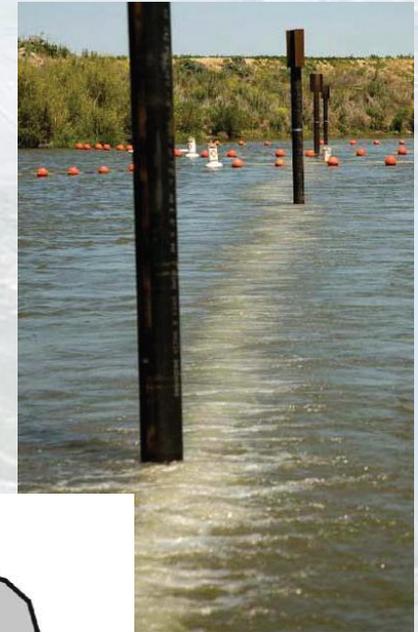
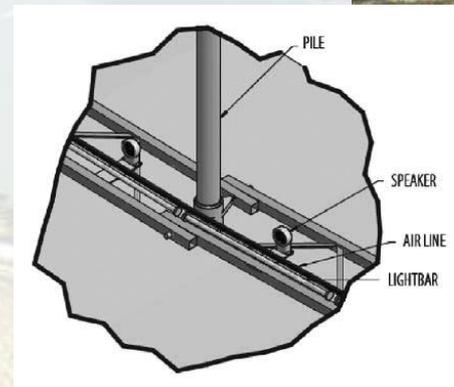
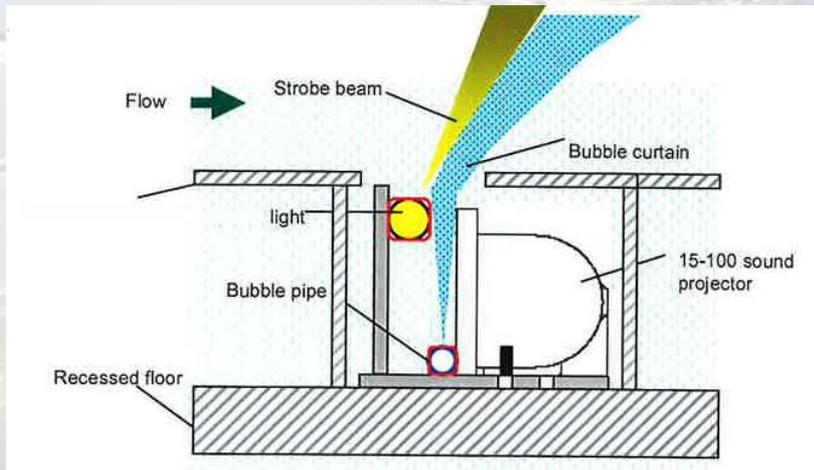
Reoperation/Improvements to Existing Facilities

- Delta Cross Channel Gates Improvements
 - * Operable and Larger
- South Delta Temporary Barriers
 - * Permanent and Operable?
- Predator Concerns



Non-Physical Barriers

- Use of Light, Sound, and Bubbles
- Pilot Projects and Studies
- Predator Concerns



Possible Future Projects

- Franks Tract
 - * Water quality and fish corridor
- 2 - Gates Project
- Through Delta Alternatives
- Western Tidal Gates



Franks Tract

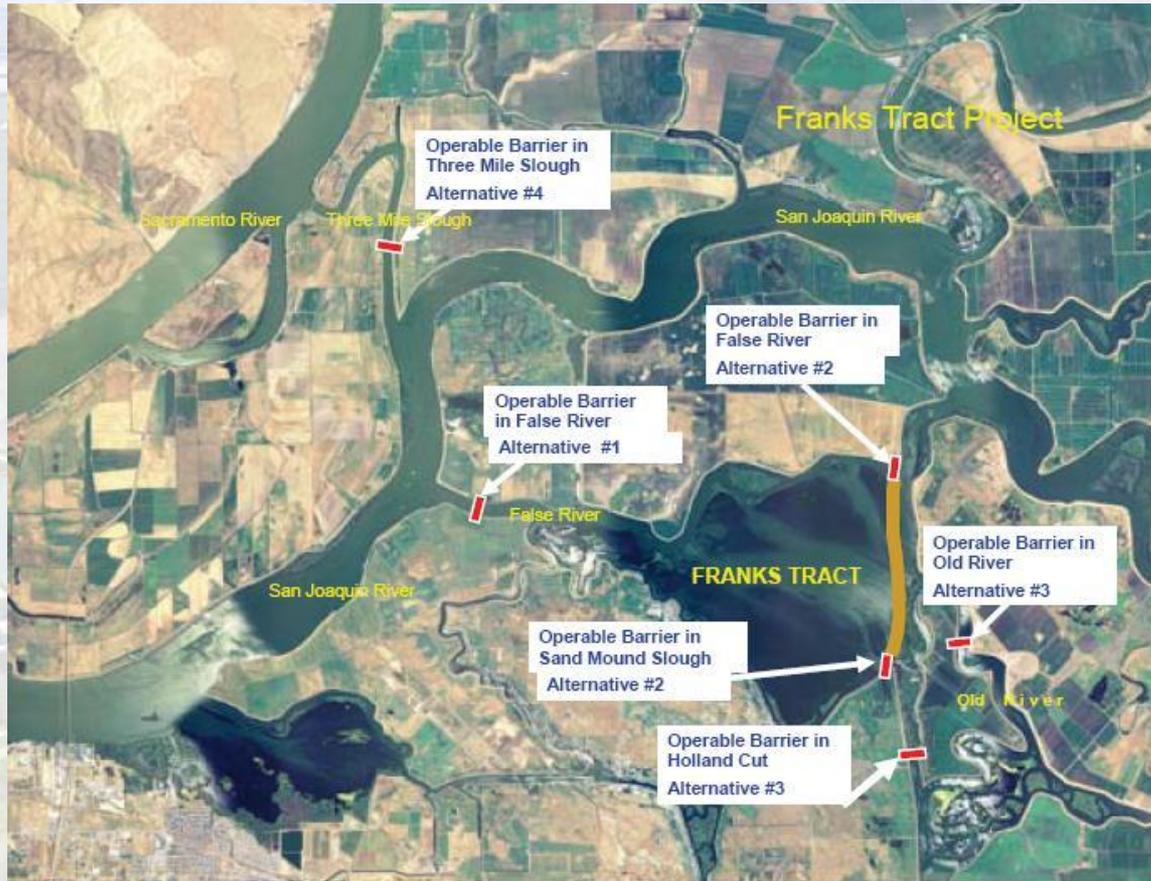


Figure 1. Franks Tract Project Alternatives

Western Tidal Gates

– Maeslant

– Chipps Island



Quest for a low-salt Delta

Levee breaks and the frequent export of fresh water from the Delta cause salt water from San Francisco Bay to flow unseasonably far inland. To reduce this salt pollution, one water district is exploring a solution that has been used to control floods in the Netherlands: a mechanical barrier that could be closed to block an incursion of salt water.

Chipps Island area
Waterway narrows around Chipps Island, making the area a possible location for a water barrier that could protect waterways to the east from salt incursions.

Maeslant
Salty Bay water is pulled inland when Delta works are low.

San Francisco Bay
Fresh water from the Delta is pushed south for agriculture and drinking water. This causes water levels to drop, drawing salt water all the way in from San Francisco Bay and the ocean. Delta levee breaks can cause the same phenomenon.

Perkings
Salt water can travel far into the Delta, polluting freshwater habitat and harming plants and animals.

Antioch

Here is how the Netherlands-style gates could work if built in the Delta:

OPEN	CLOSED
<p>Fresh and salt water naturally flow with Delta tides.</p>	<p>Salt water blocked.</p> <p>Arms swing shut and retaining walls lower into water, creating a dam.</p>

Source: International Ministry of Transport, Public Works and Water Management (IOW) Bay Area Authority, California Department of Water Resources

Illustration: Andrew Tan/Reuters

Western Tidal Gates

- Old Proposal: Rock Barrier
- New Ideas: Operable Gates
- Purpose: Insurance against a catastrophic event
 - * Levee Failure (earthquake, flood)
 - * Tidal Surge (climate change)
 - * Major Flooding
- Only close if needed



Recommendations

- Gates and Barriers have useful purposes
 - * Improve water quality
 - * Protect fisheries
- Can help regardless of which conveyance options are implemented
- Additional Projects can help
 - * Physical
 - * Non-physical

Recommendations

- Predation Issue
- Study Western Tidal Gates
- Location Considerations
 - * Look for dual purpose projects:
water quality and fish protection
 - * Locations that minimize boating concerns