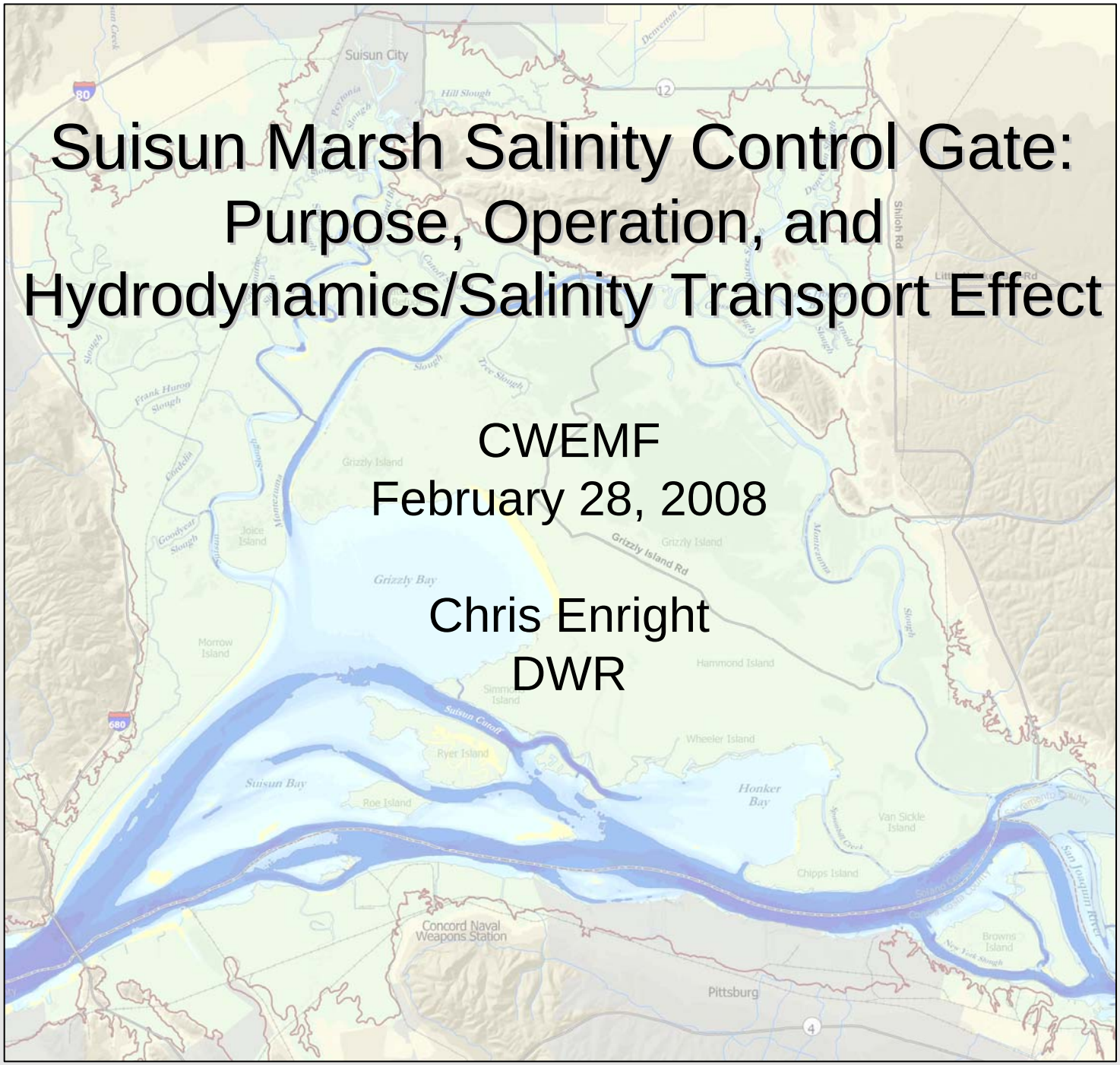


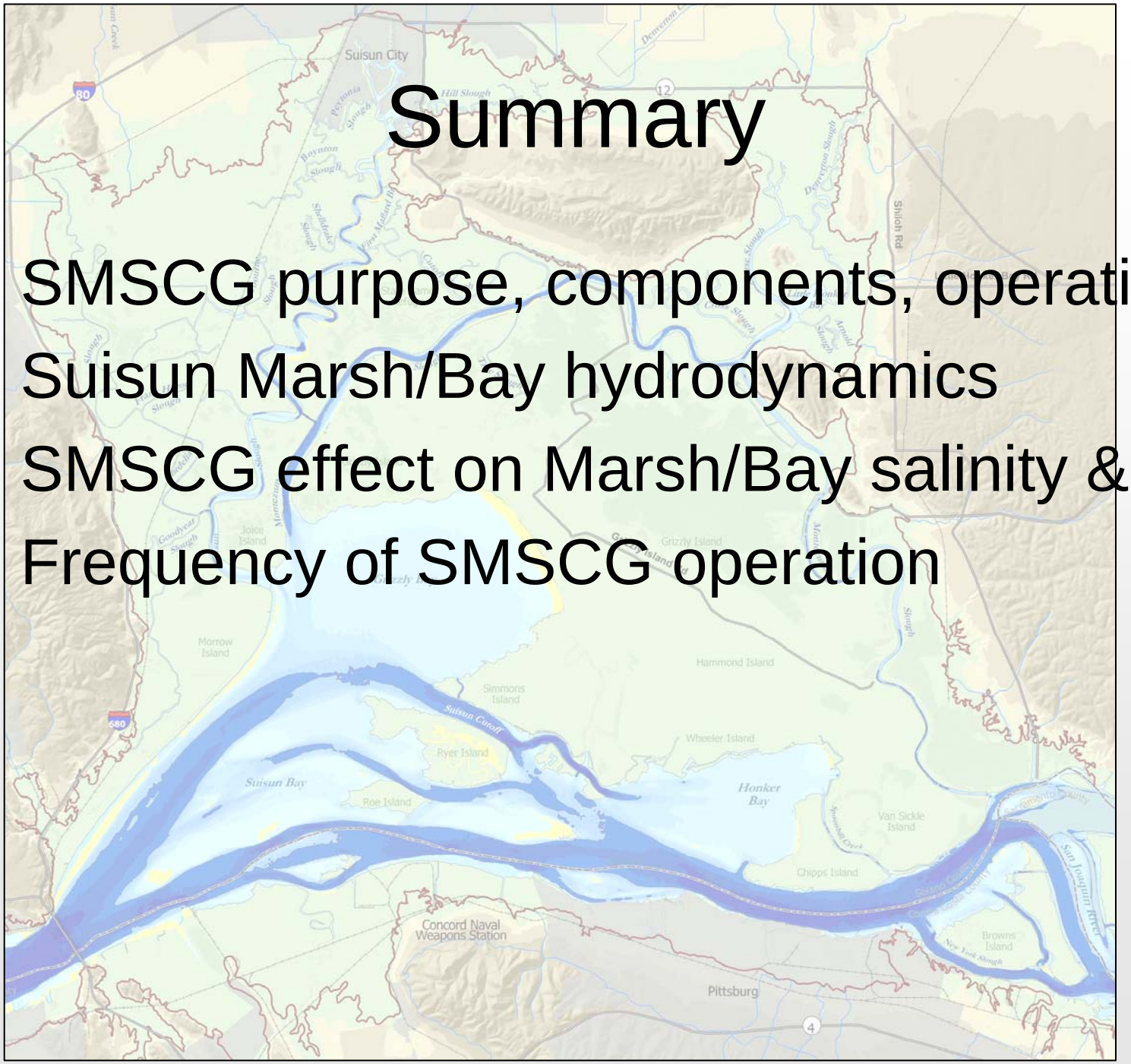
Suisun Marsh Salinity Control Gate: Purpose, Operation, and Hydrodynamics/Salinity Transport Effect

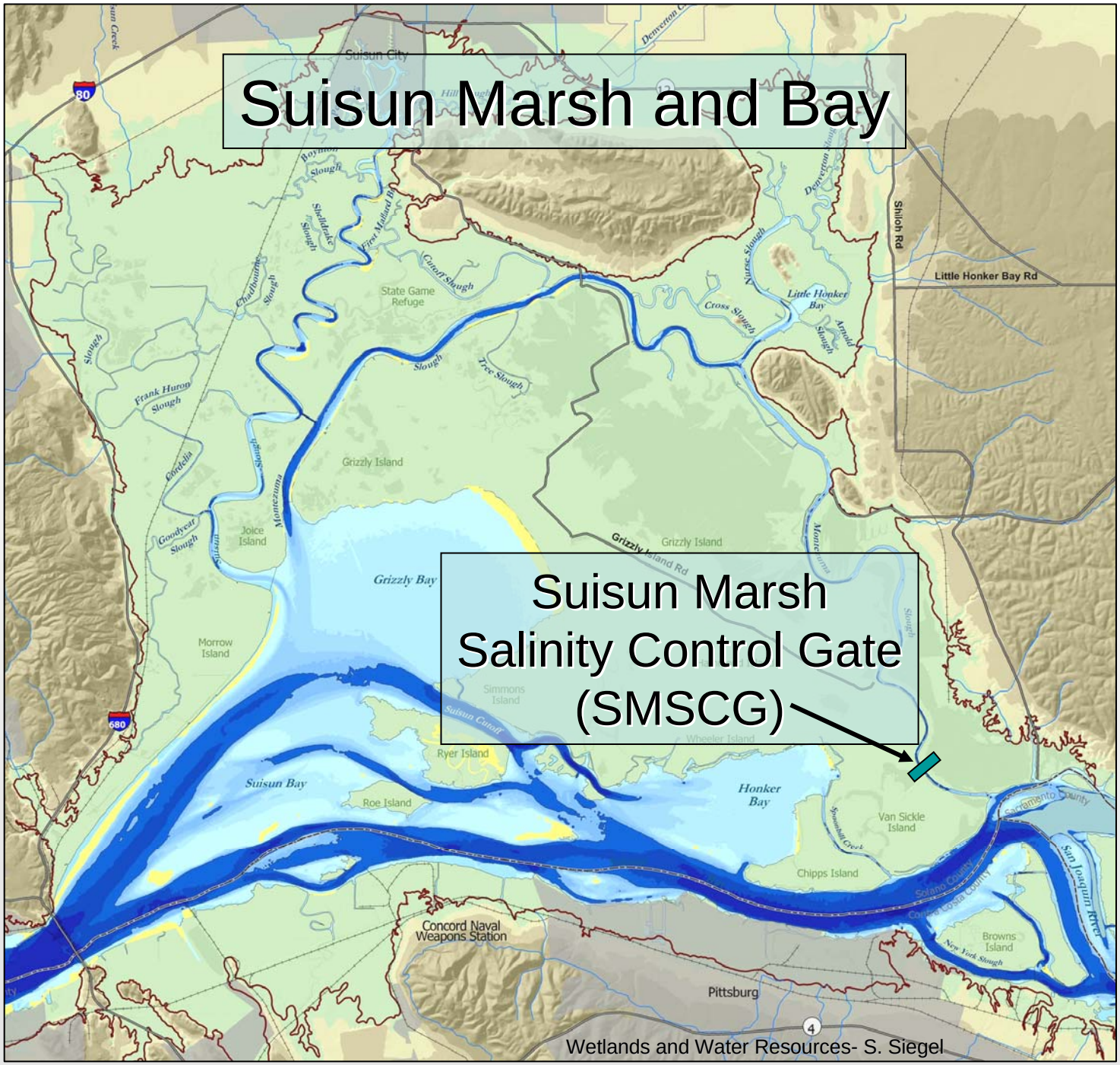
CWEMF
February 28, 2008

Chris Enright
DWR

Summary

- SMSCG purpose, components, operation
- Suisun Marsh/Bay hydrodynamics
- SMSCG effect on Marsh/Bay salinity & X2
- Frequency of SMSCG operation




Suisun Marsh and Bay
Suisun Marsh
Salinity Control Gate
(SMSCG)
Suisun City
Shiloh Rd
Little Honker Bay Rd
State Game
Refuge
Grizzly Island
Grizzly Bay
Joice
Island
Morrow
Island
Simmons
Island
Ryer Island
Suisun Bay
Roe Island
Honker
Bay
Van Sickle
Island
Chipps Island
Concord Naval
Weapons Station
Pittsburg
Browns
Island
Wetlands and Water Resources- S. Siegel

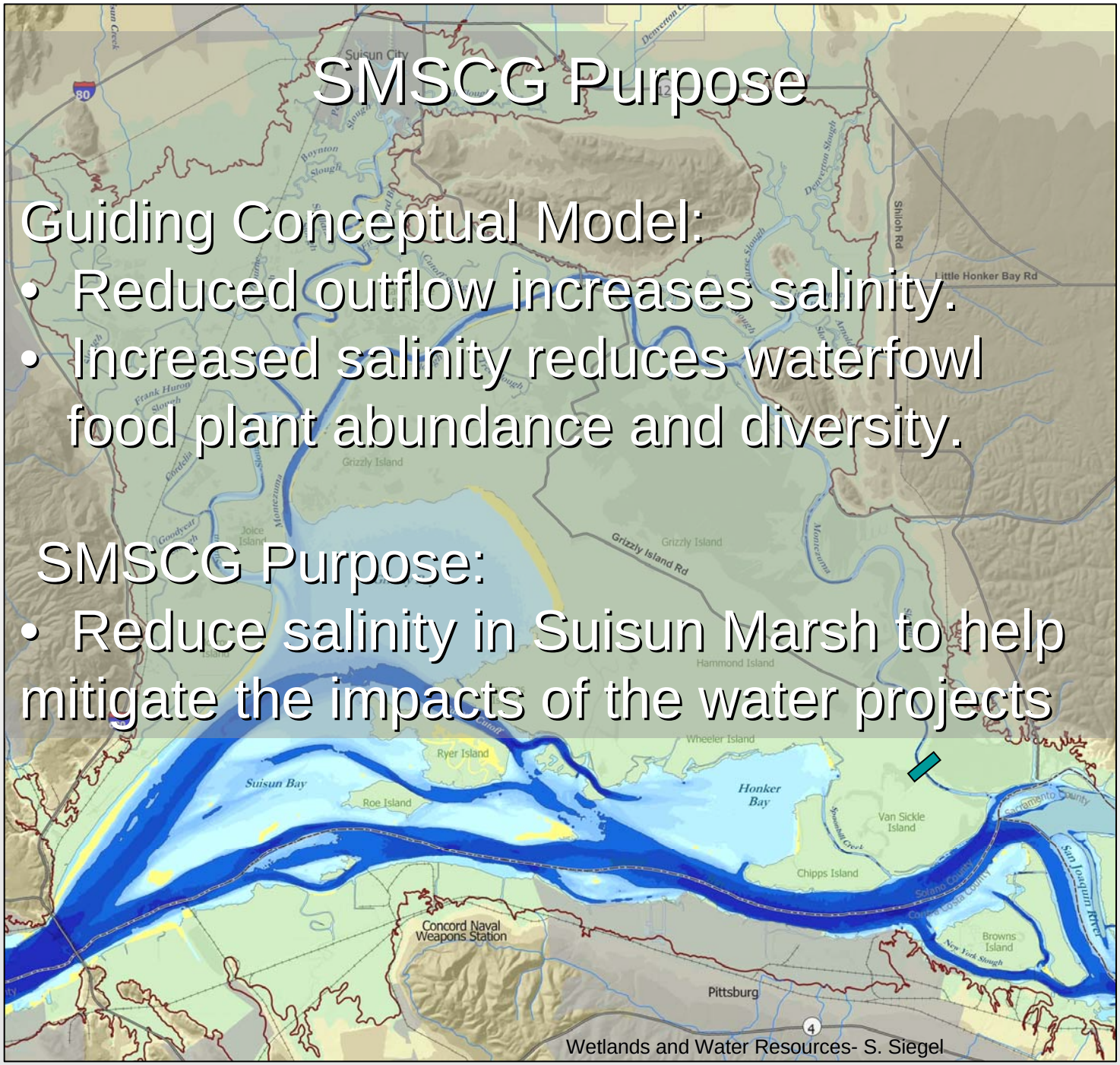
SMSCG Purpose

Guiding Conceptual Model:

- Reduced outflow increases salinity.
- Increased salinity reduces waterfowl food plant abundance and diversity.

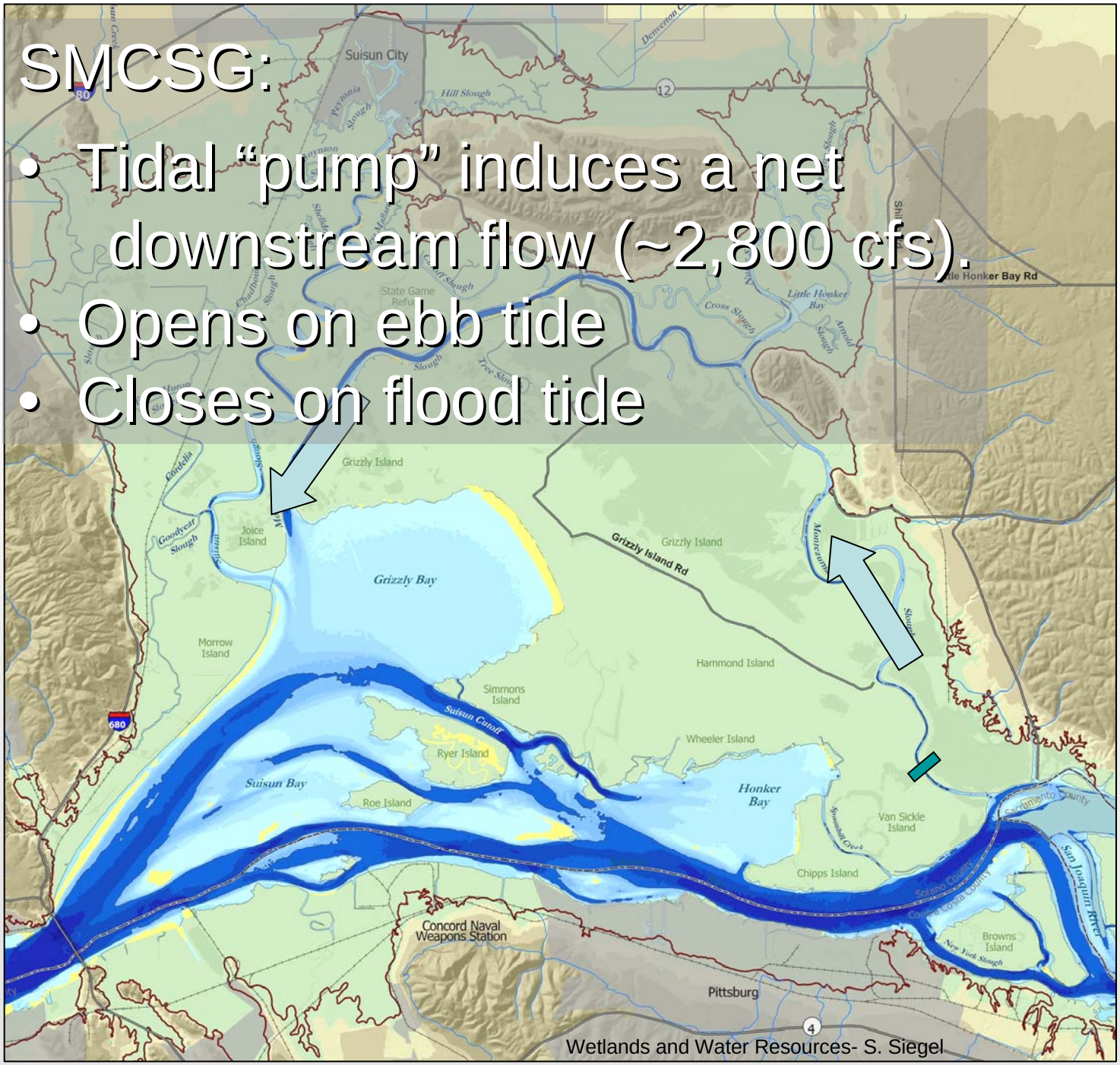
SMSCG Purpose:

- Reduce salinity in Suisun Marsh to help mitigate the impacts of the water projects

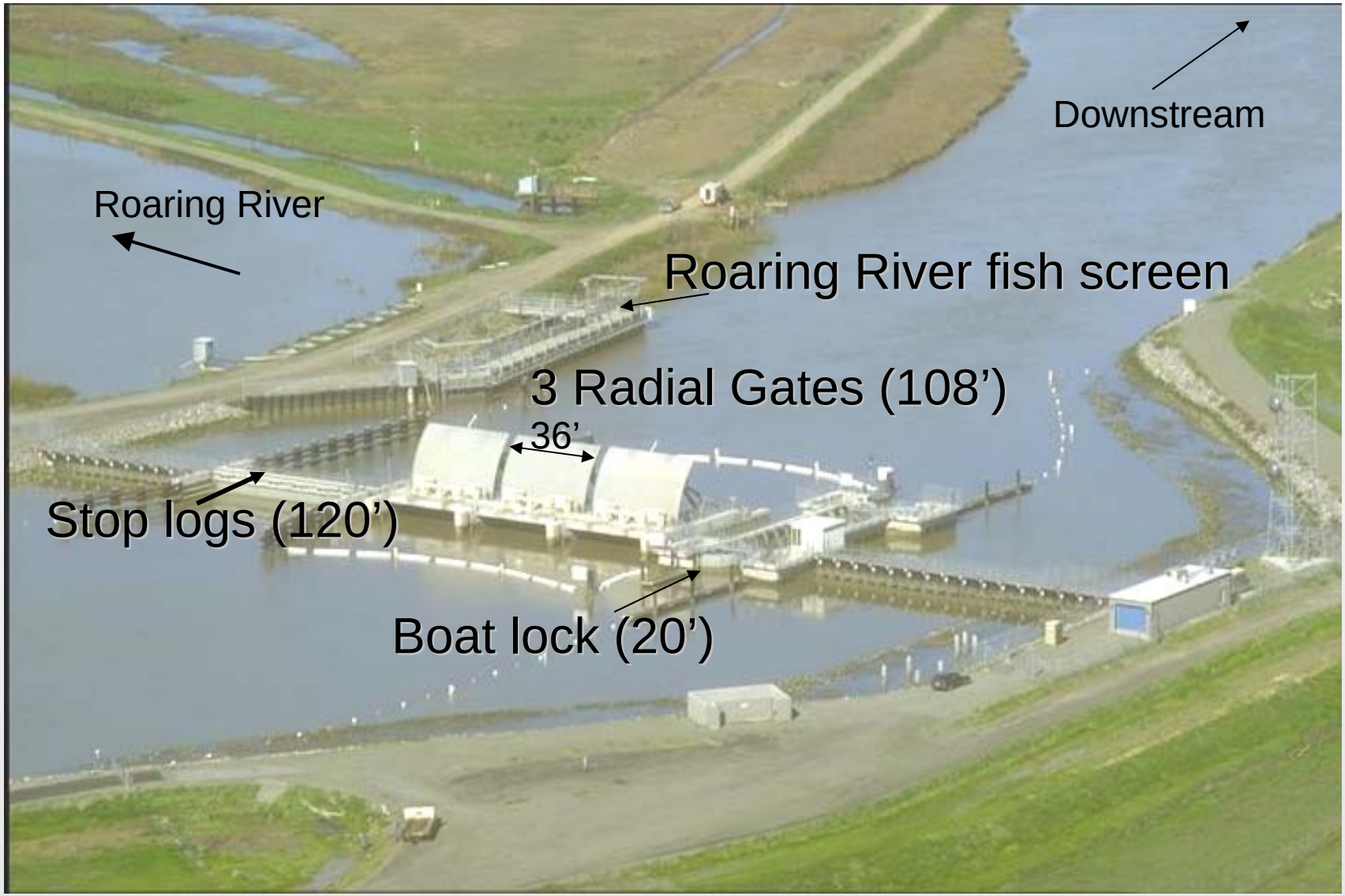


SMCSG:

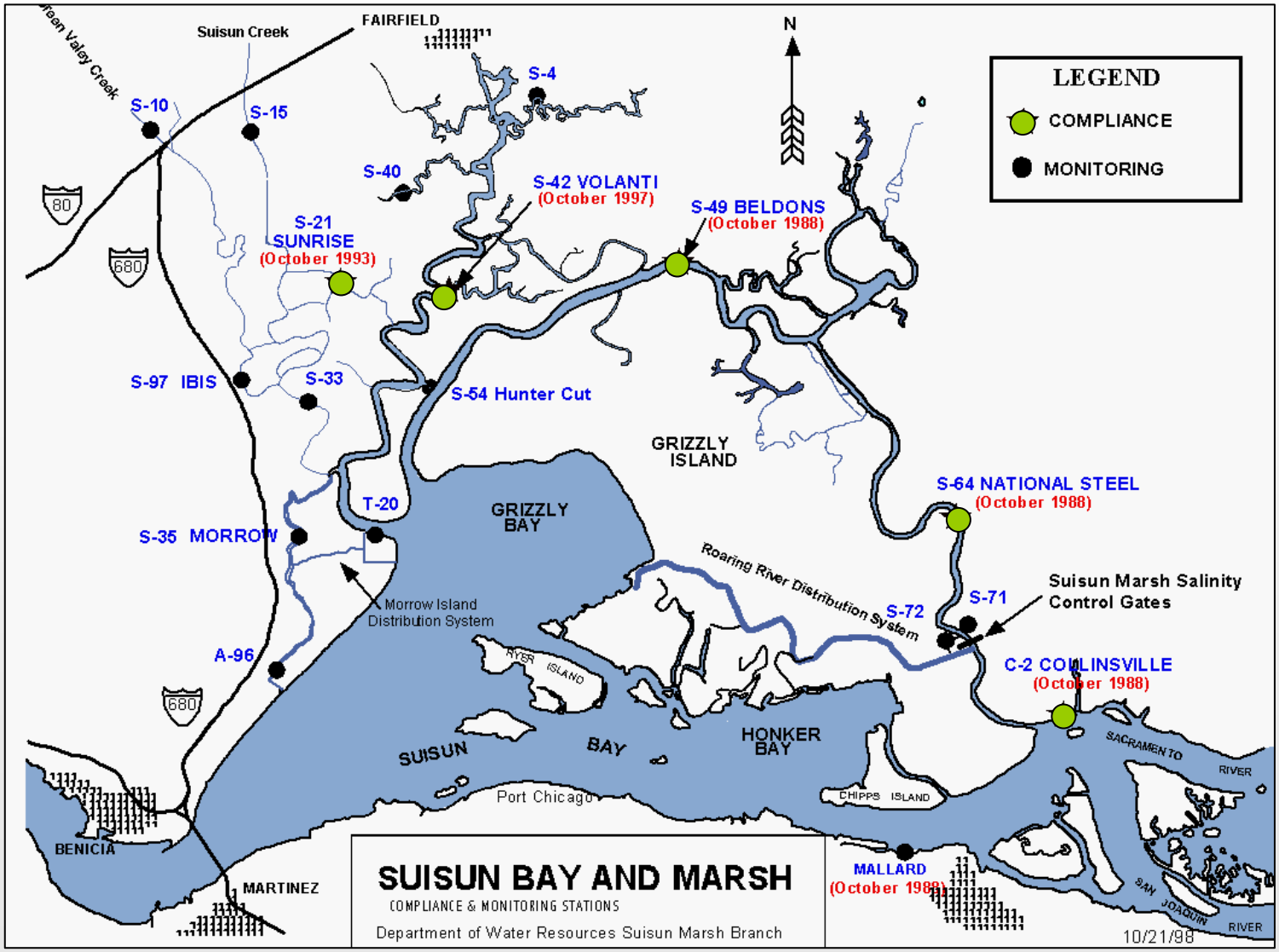
- Tidal “pump” induces a net downstream flow (~2,800 cfs).
- Opens on ebb tide
- Closes on flood tide



SMSCG Components

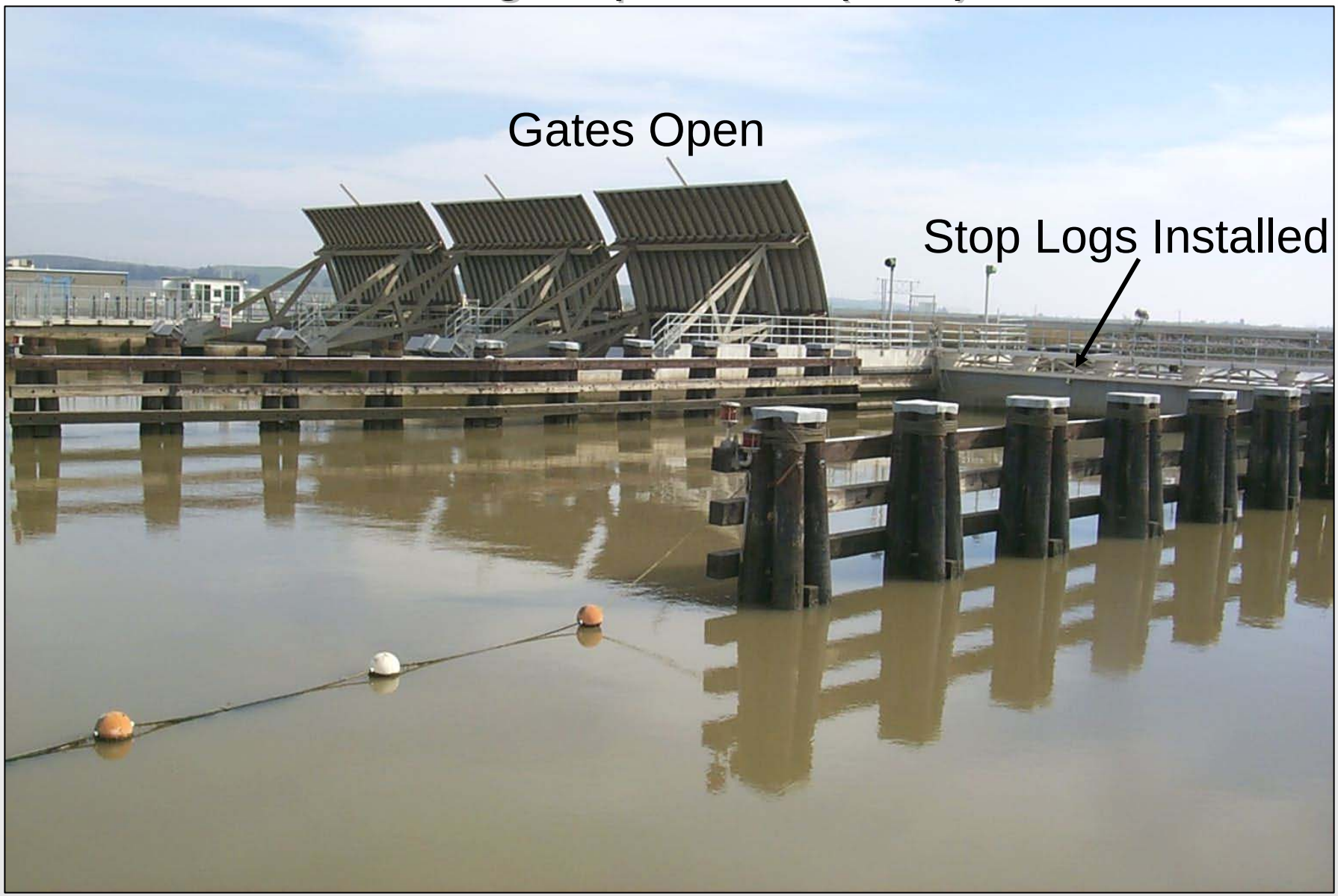


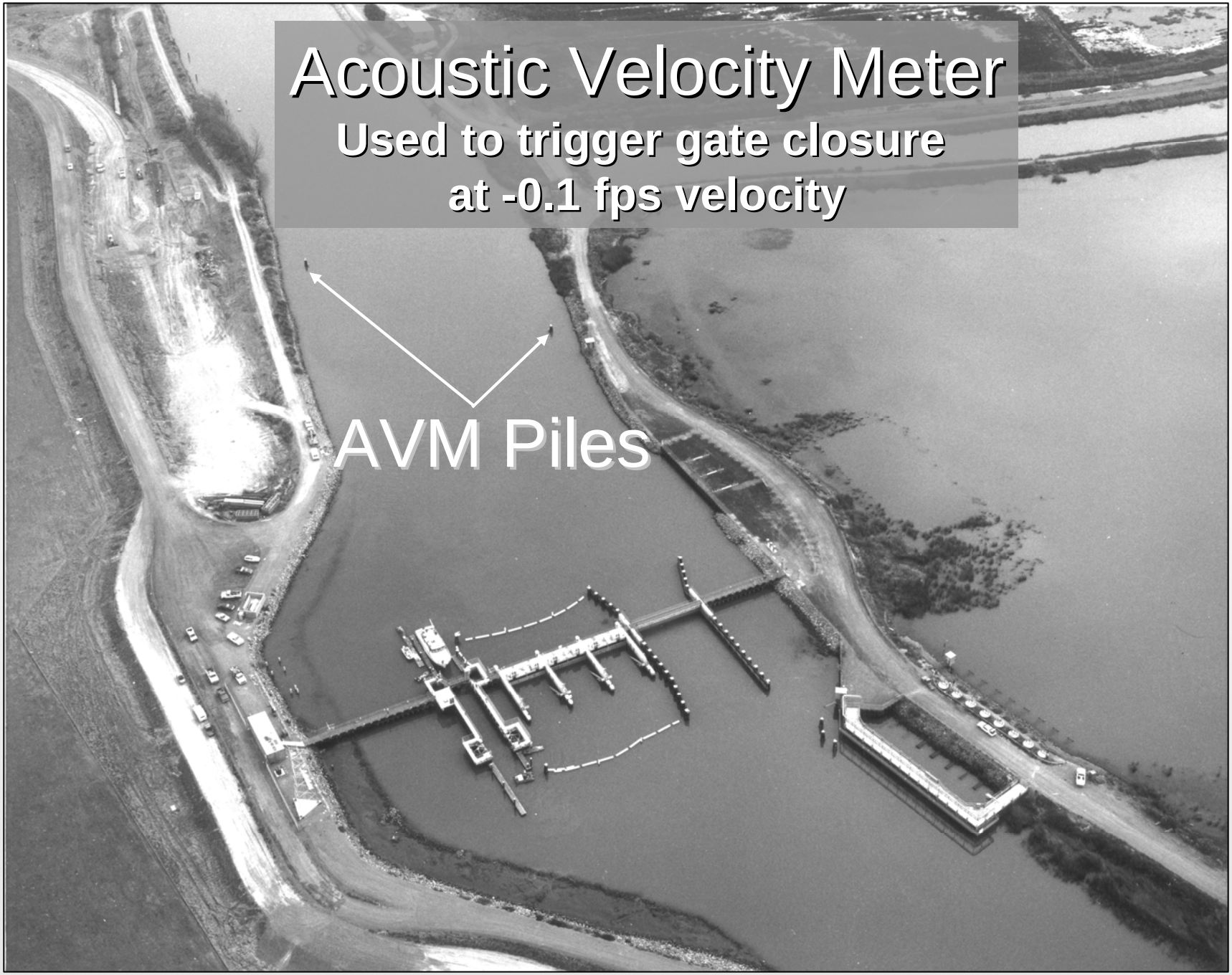
Salinity Standard Compliance Locations
Both regulatory and contractual



Looking Upstream (southeast)

Looking ~Upstream (east)



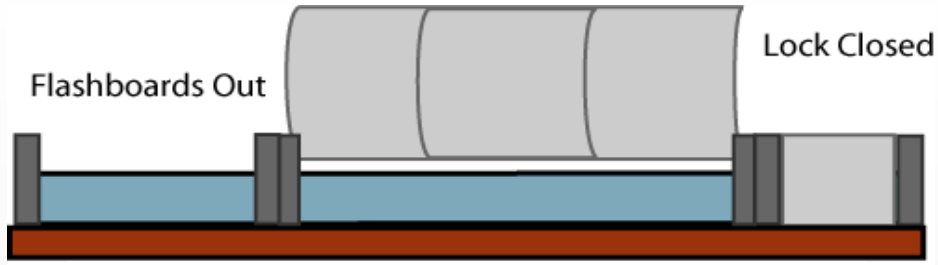

Acoustic Velocity Meter
Used to trigger gate closure
at -0.1 fps velocity
AVM Piles

SMSCG Boat Lock (looking downstream - flood tide)

SMSCG Boat Lock (looking upstream - flood tide)

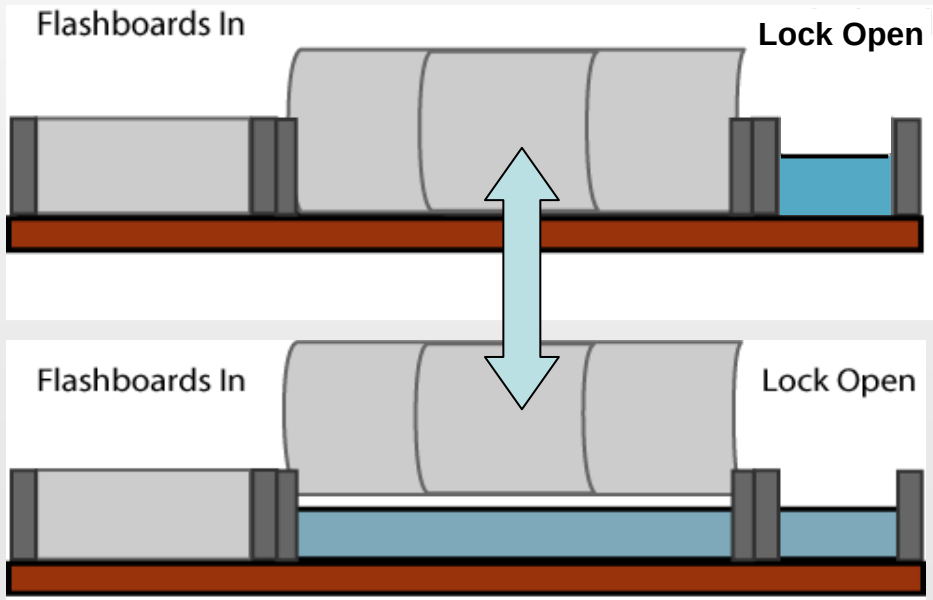
Suisun Marsh Salinity Control Gate Configurations

June ⟹ September



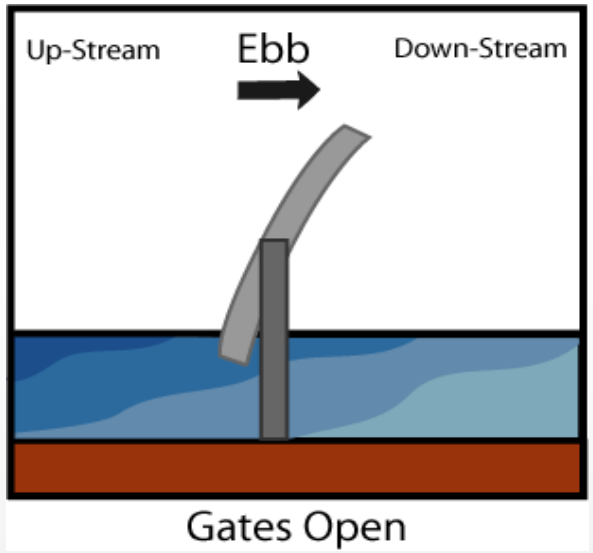
SMSCG Not Operating

October ⟹ May
(when needed to meet standards)



SMSCG Operating

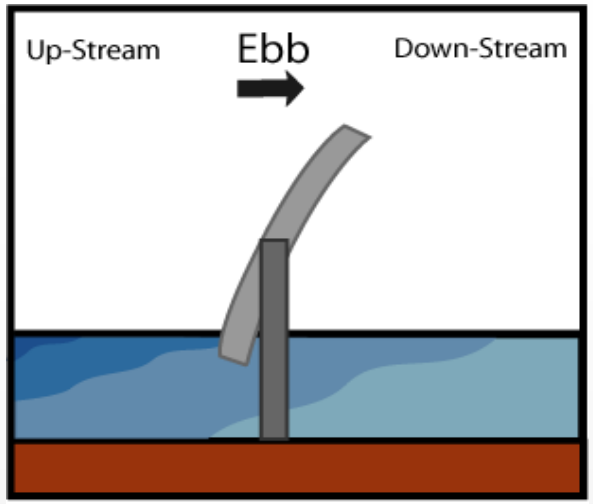
SMSCG Side View



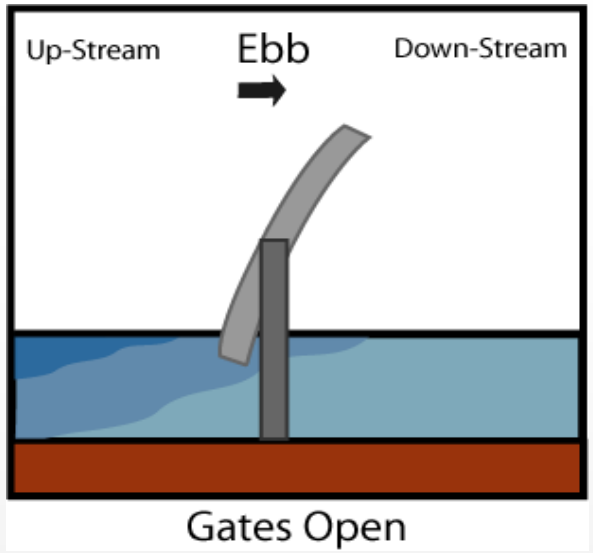
In operation:

- Closes on flood tide when current > -0.1 fps
- Open on ebb tide when upstream water level is 0.3 ft > downstream water level

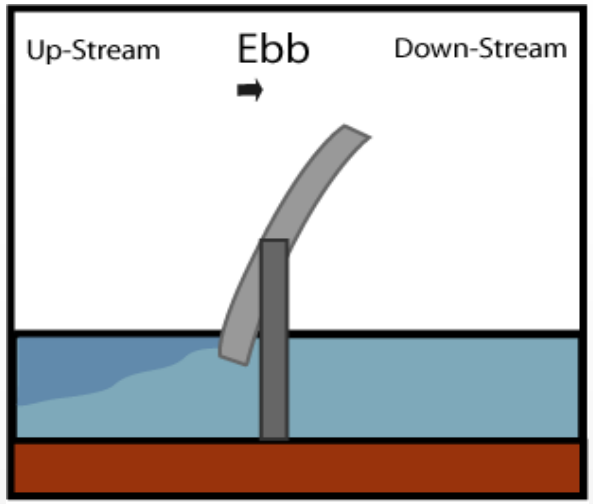
SMSCG Side View



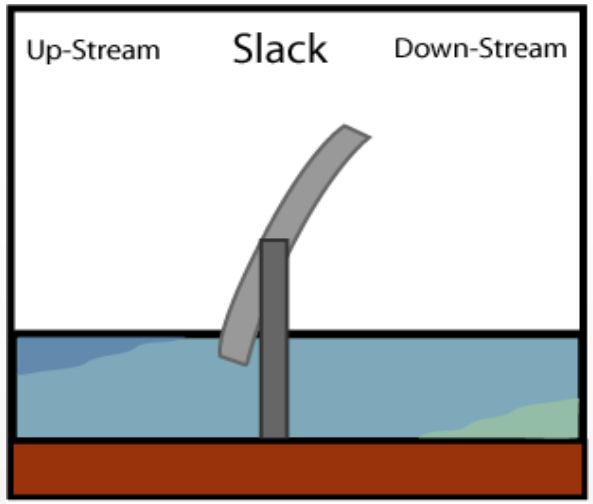
SMSCG Side View

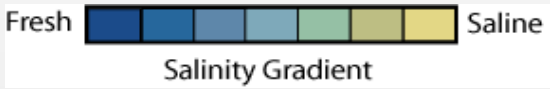


SMSCG Side View

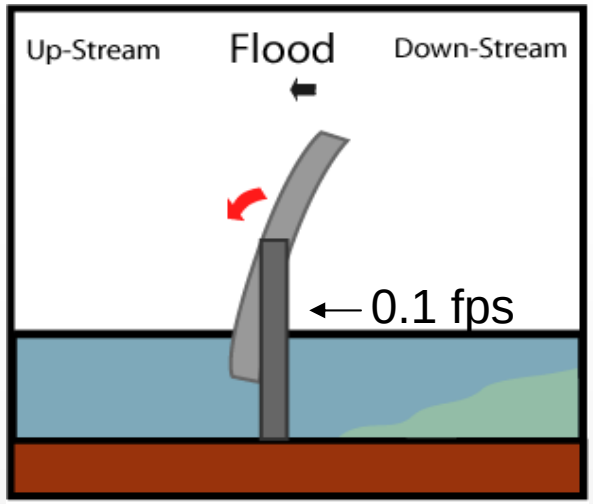


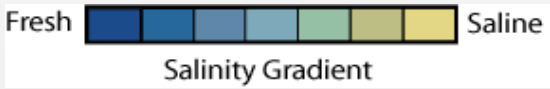
SMSCG Side View



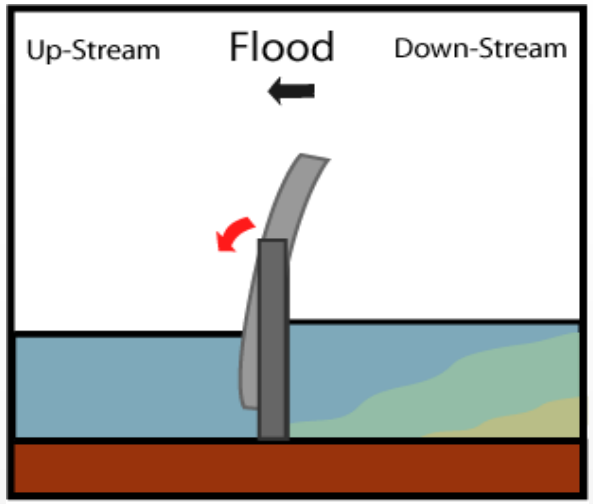


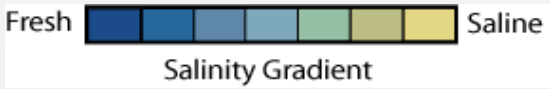
SMSCG Side View



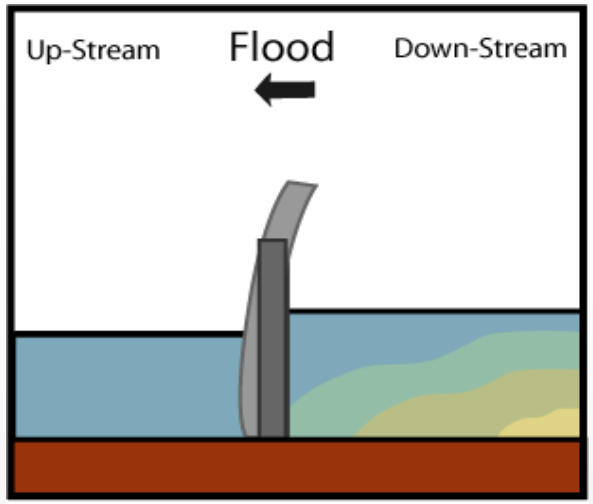


SMSCG Side View

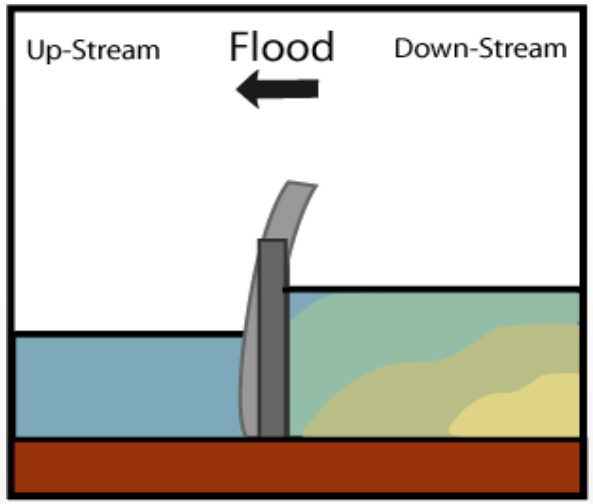




SMSCG Side View



SMSCG Side View



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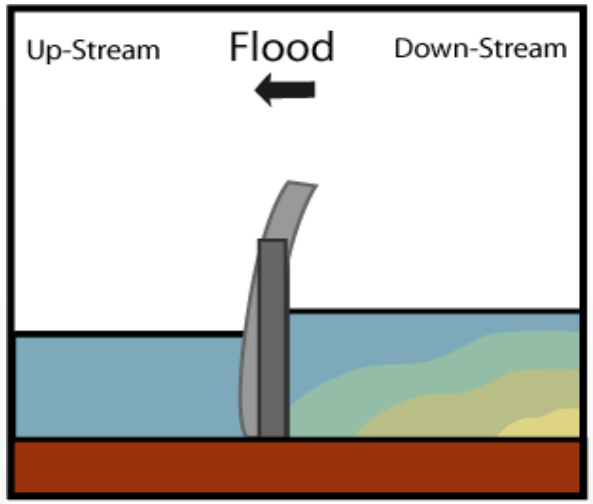

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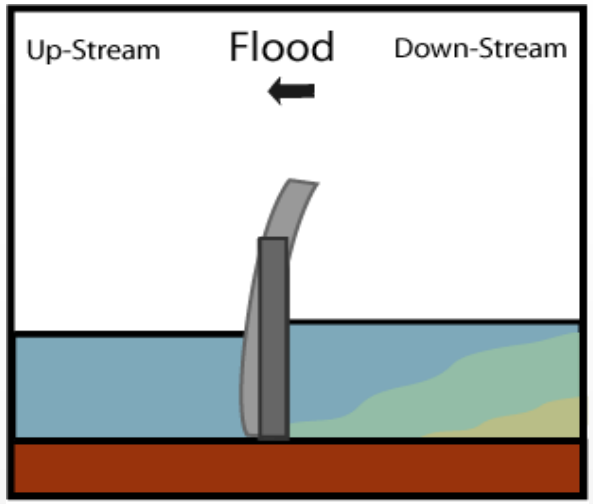
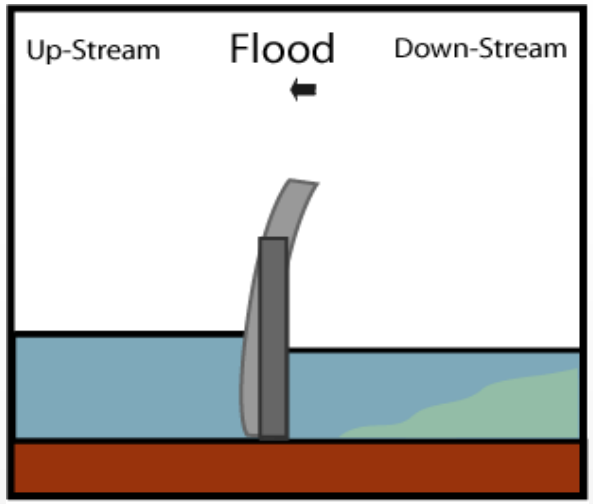


SMSCG Side View



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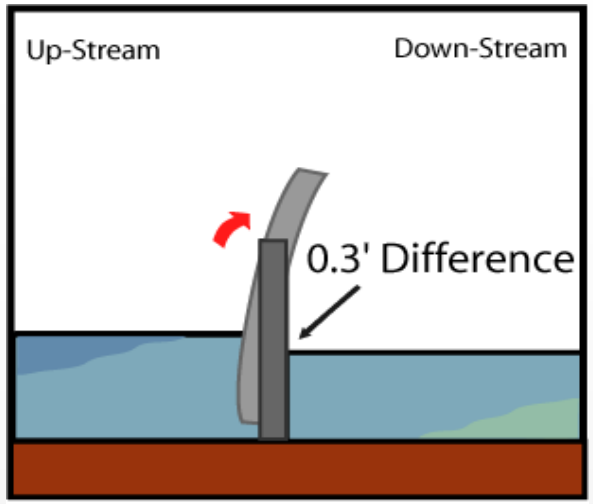

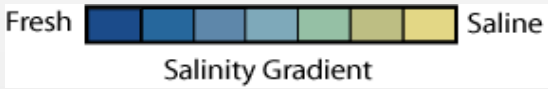

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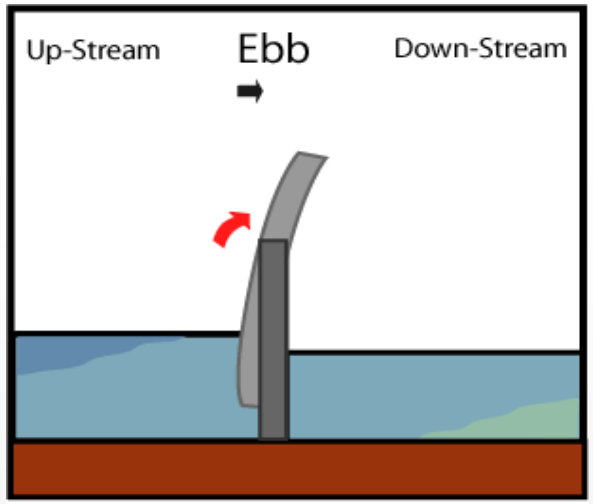

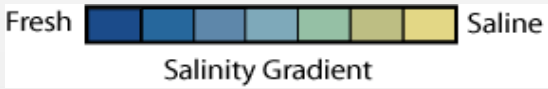

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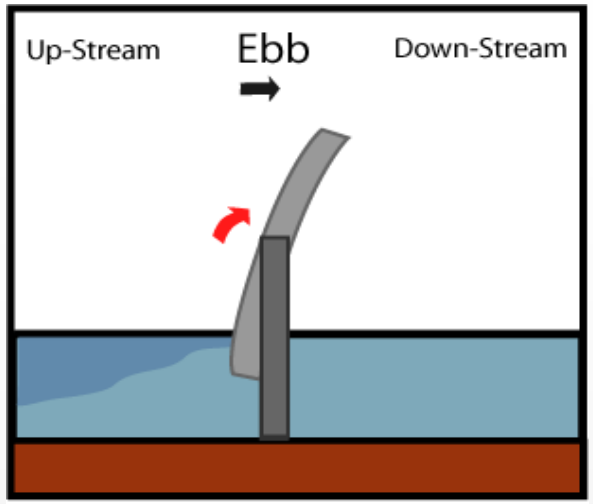

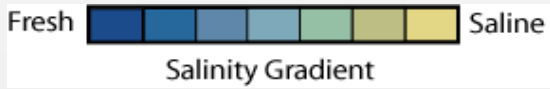

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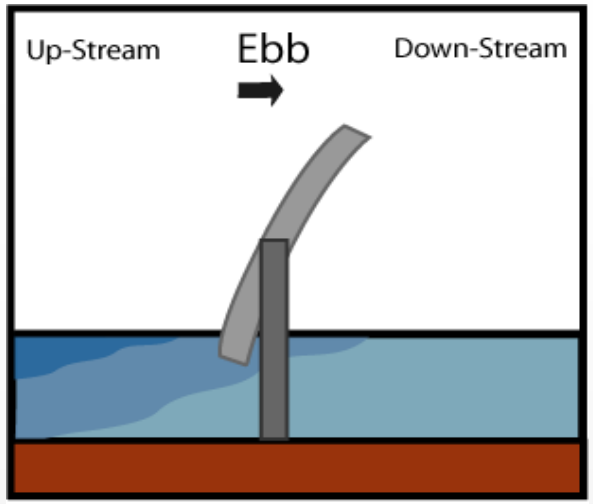

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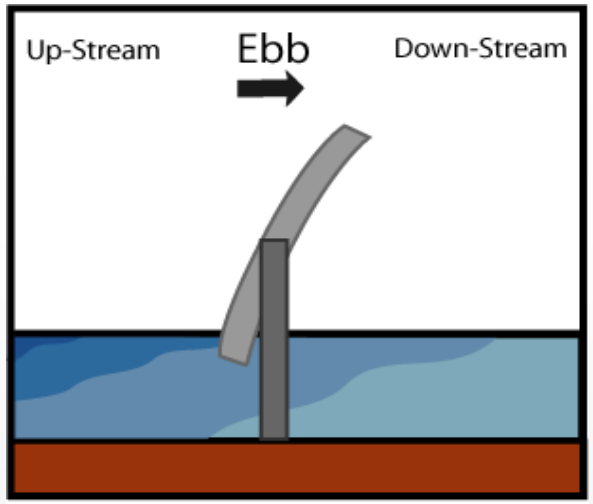
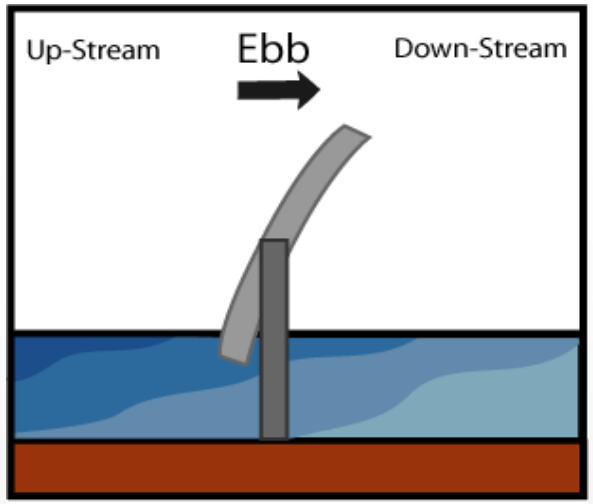
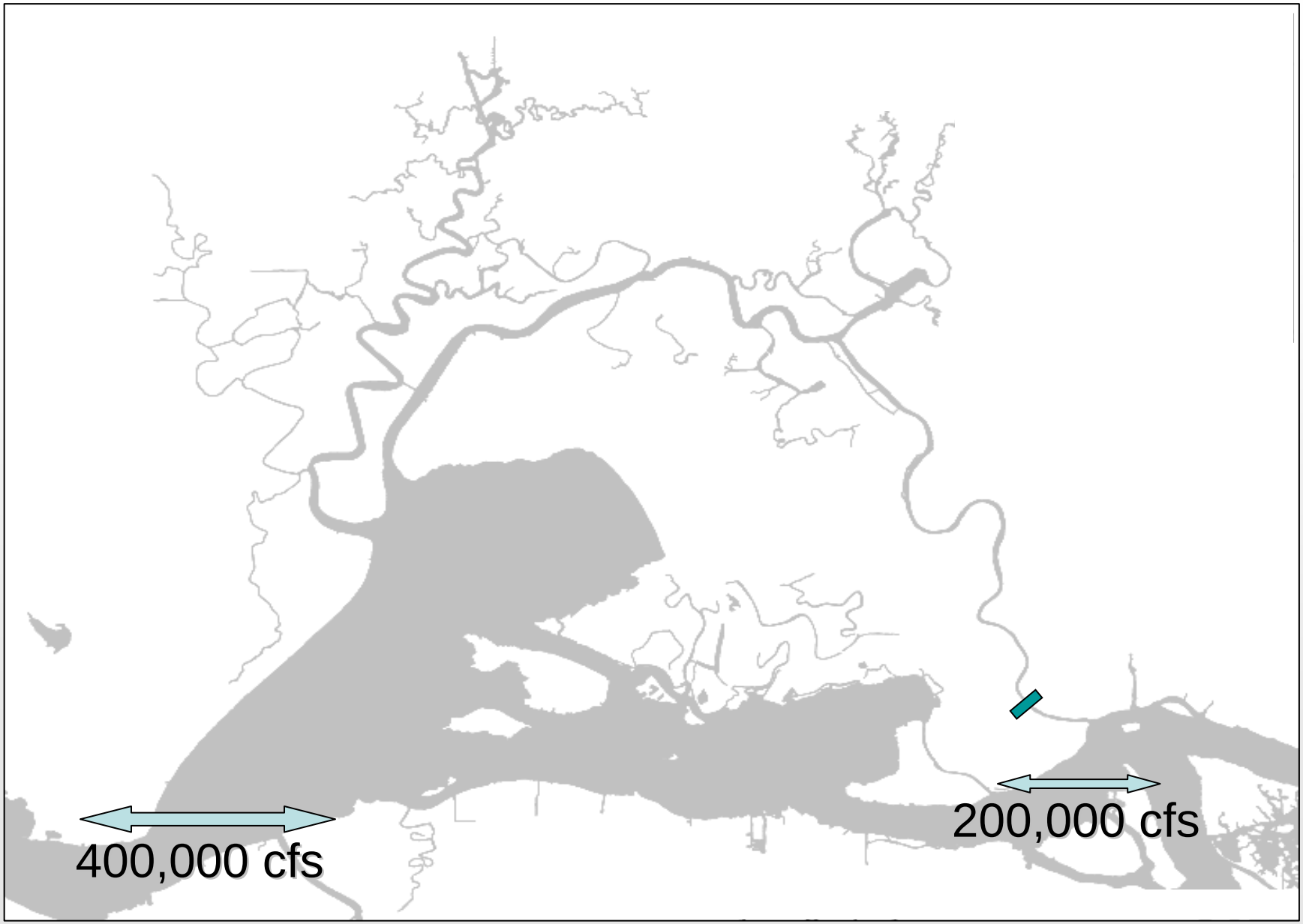


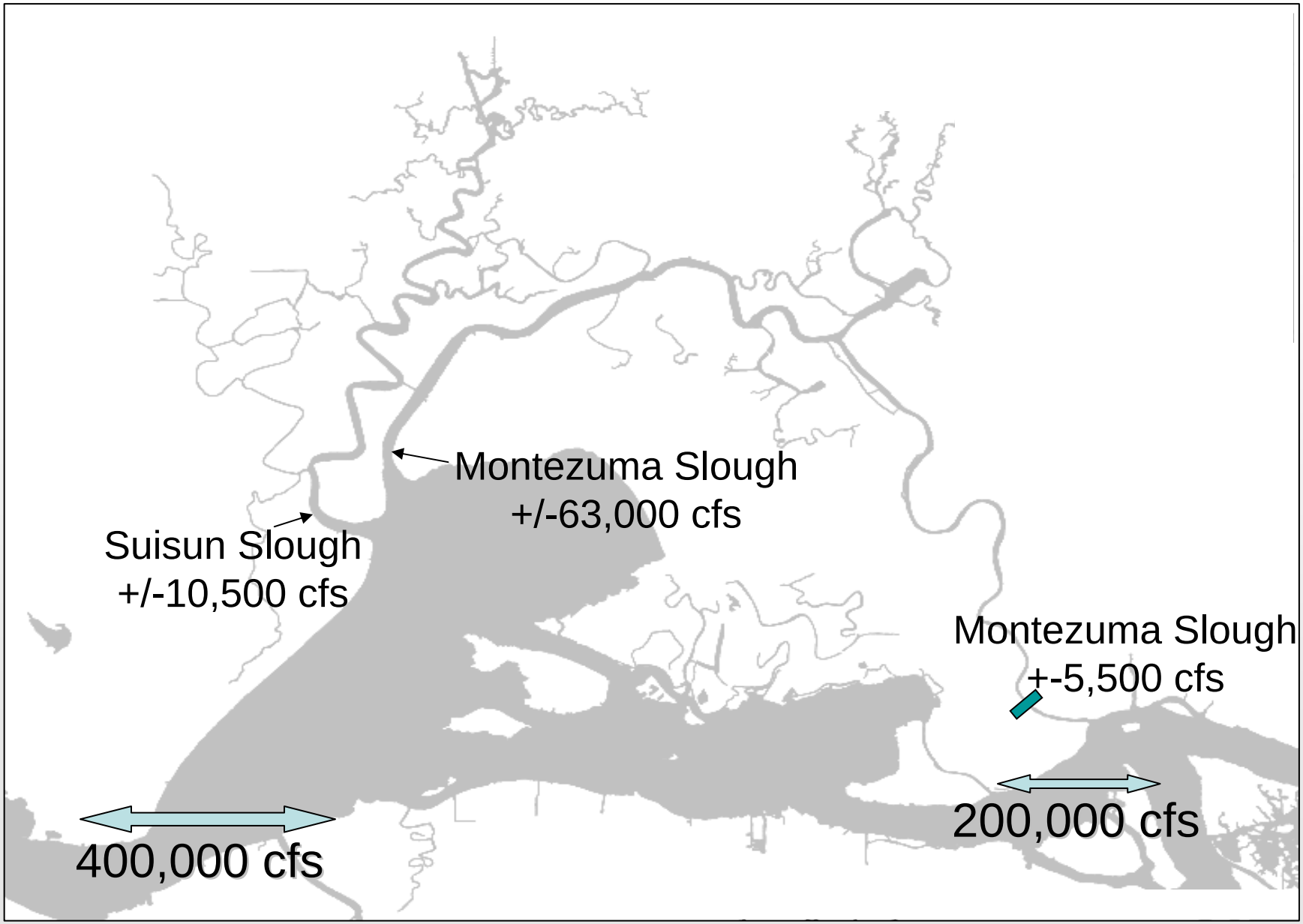
SMSCG Side View



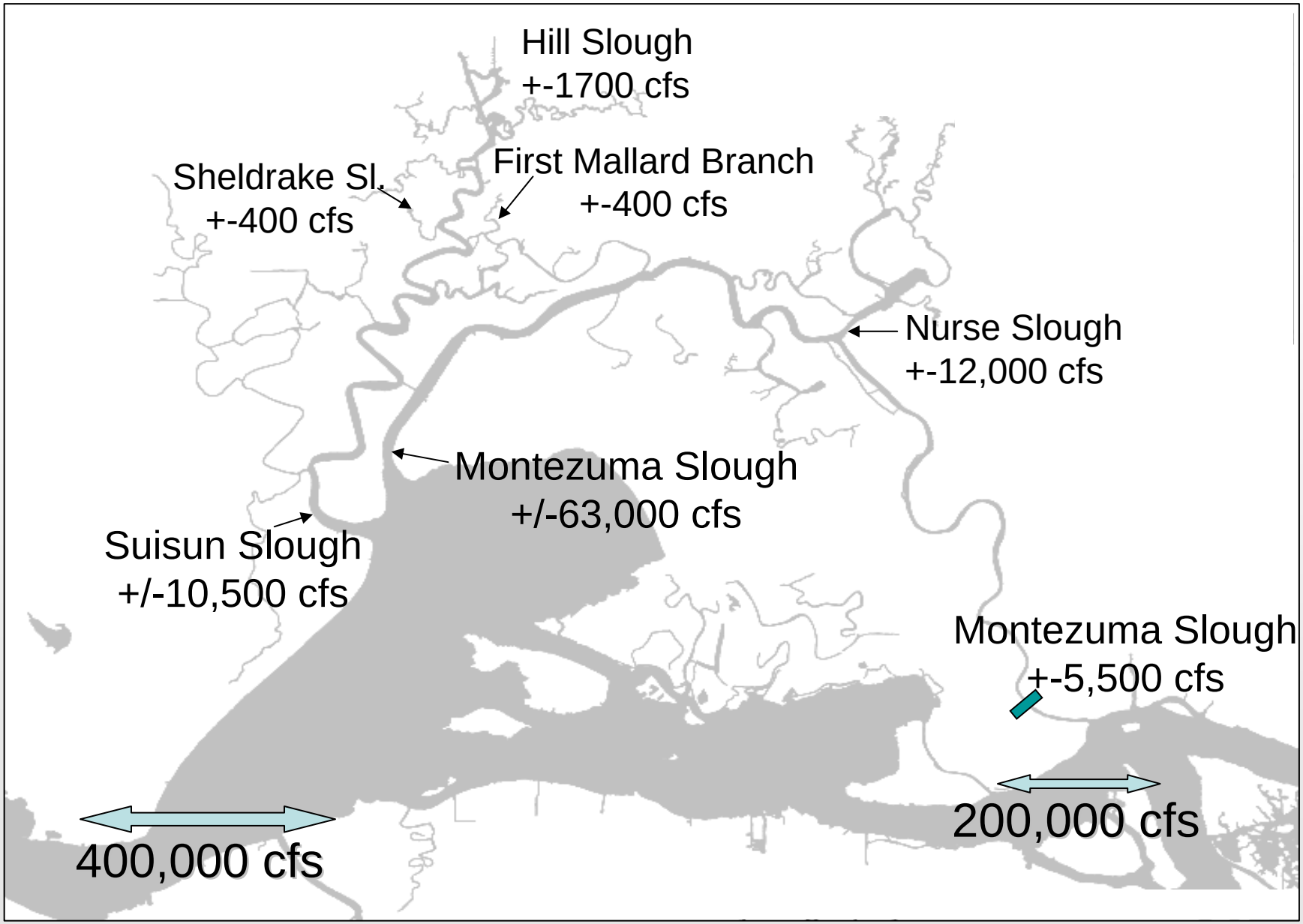
Tidal Time Scale Flows



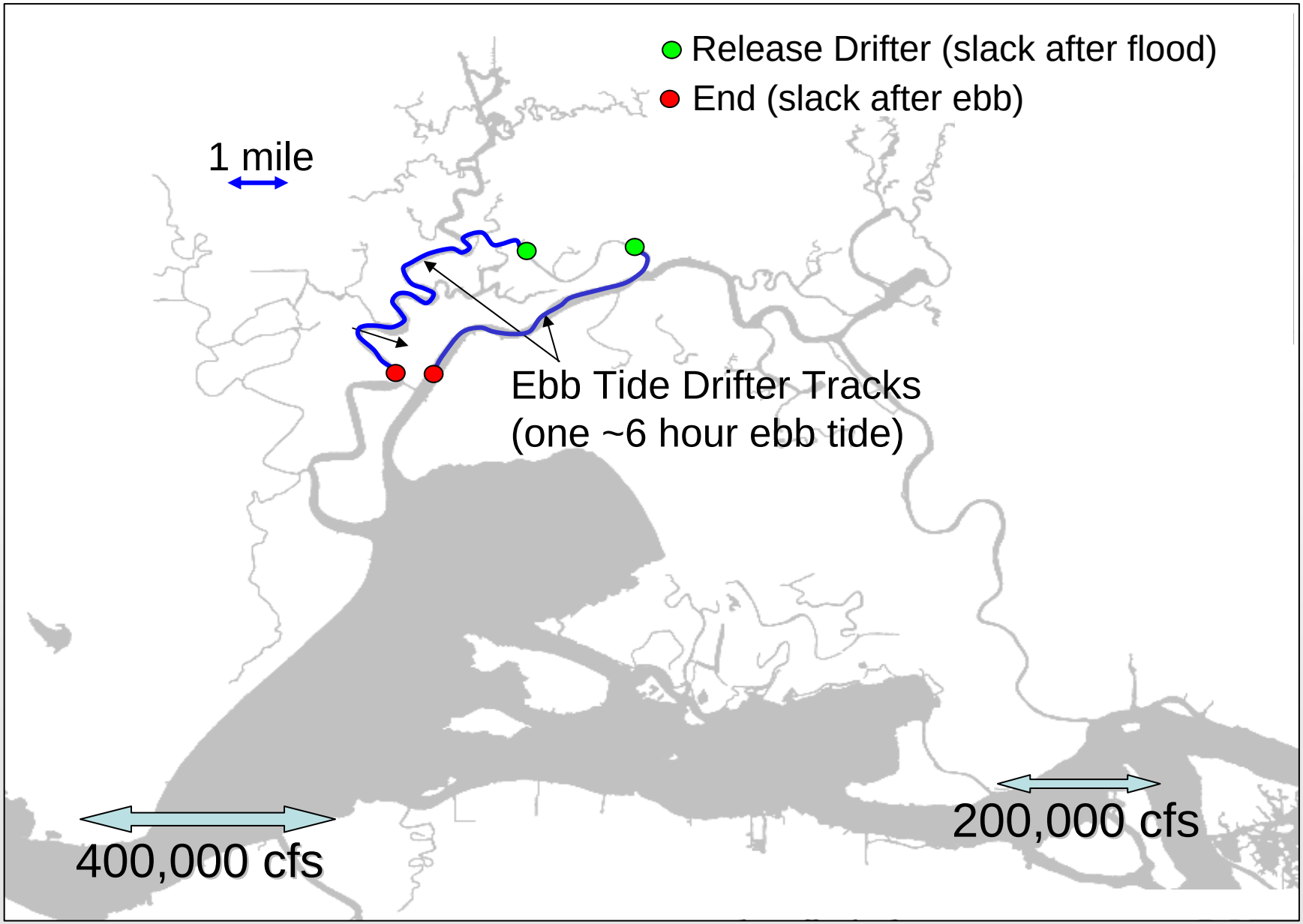
Tidal Time Scale Flows



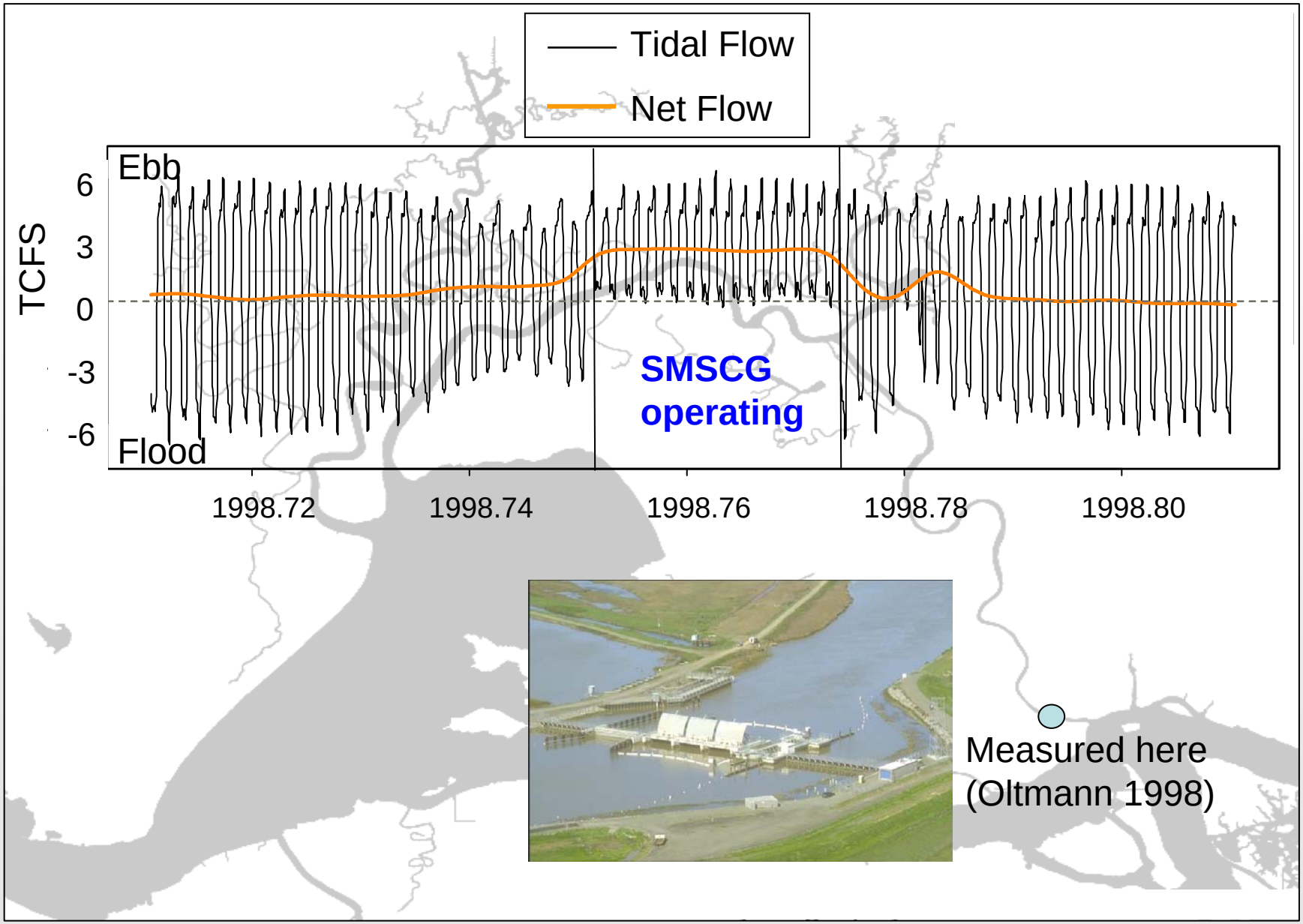
Tidal Time Scale Flows



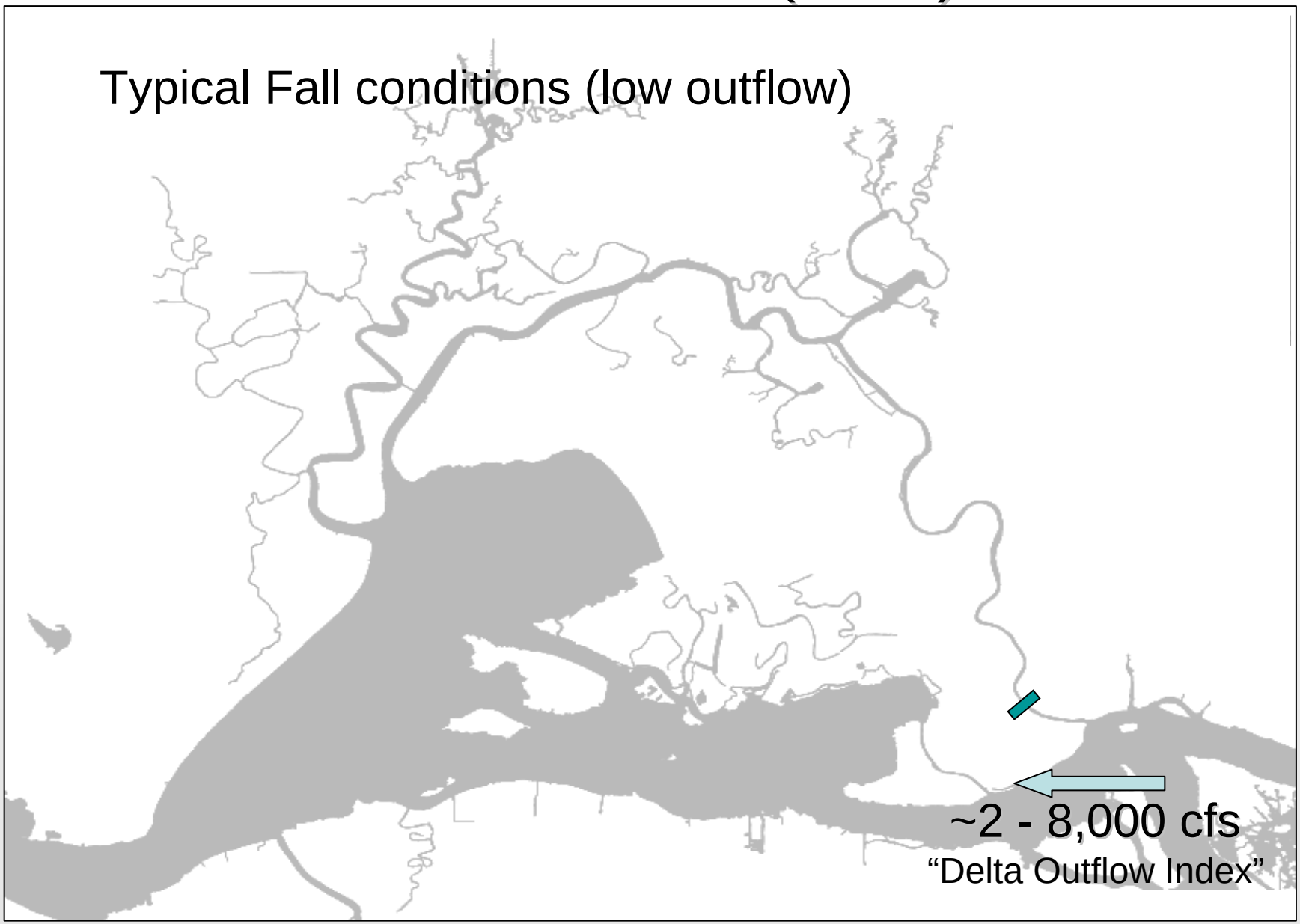
Tidal Time Scale Excursion



Tidal Time Scale Flows



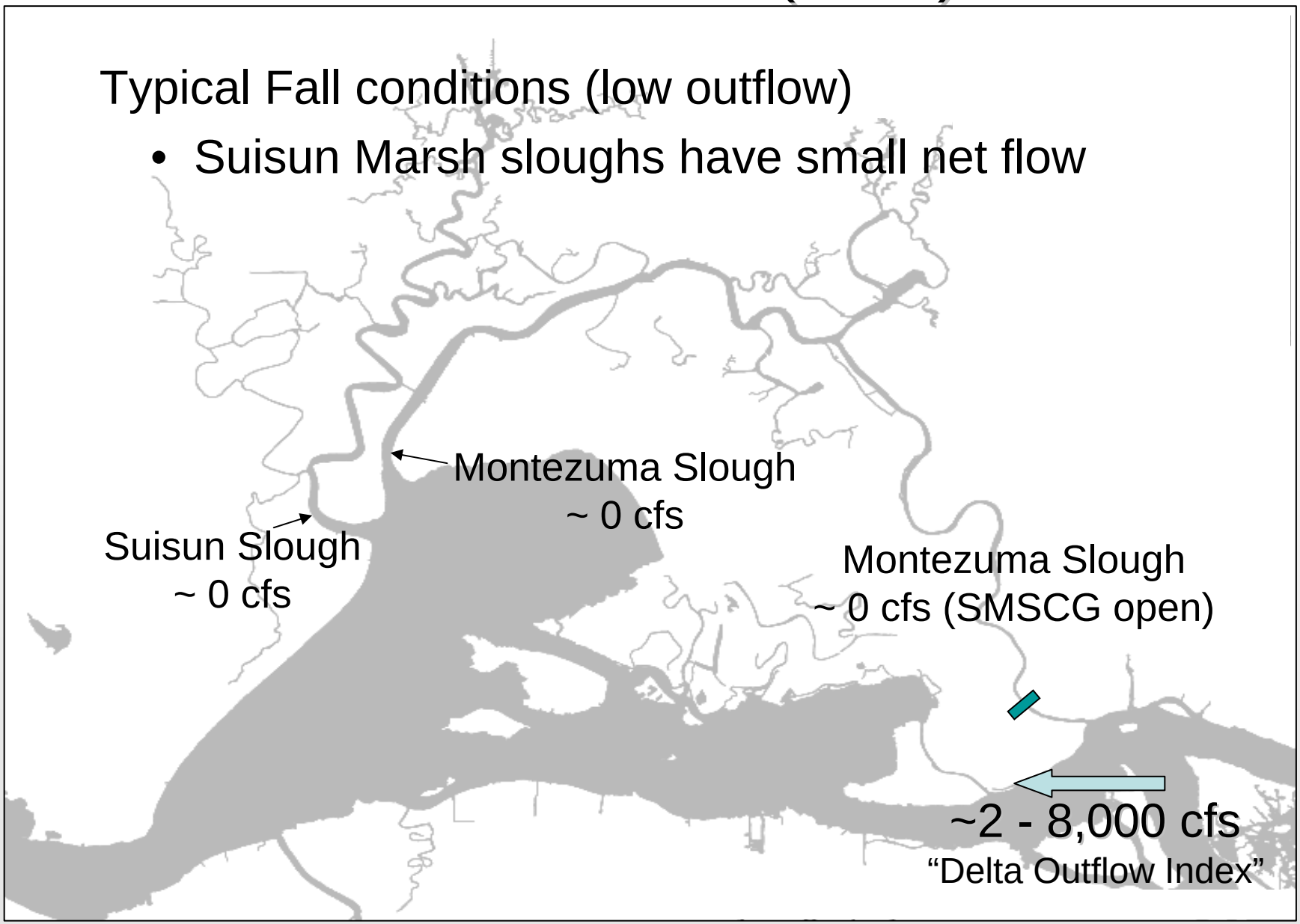
Sub-tidal Time Scale (“Net”) Flows



Sub-tidal Time Scale ("Net") Flows

Typical Fall conditions (low outflow)

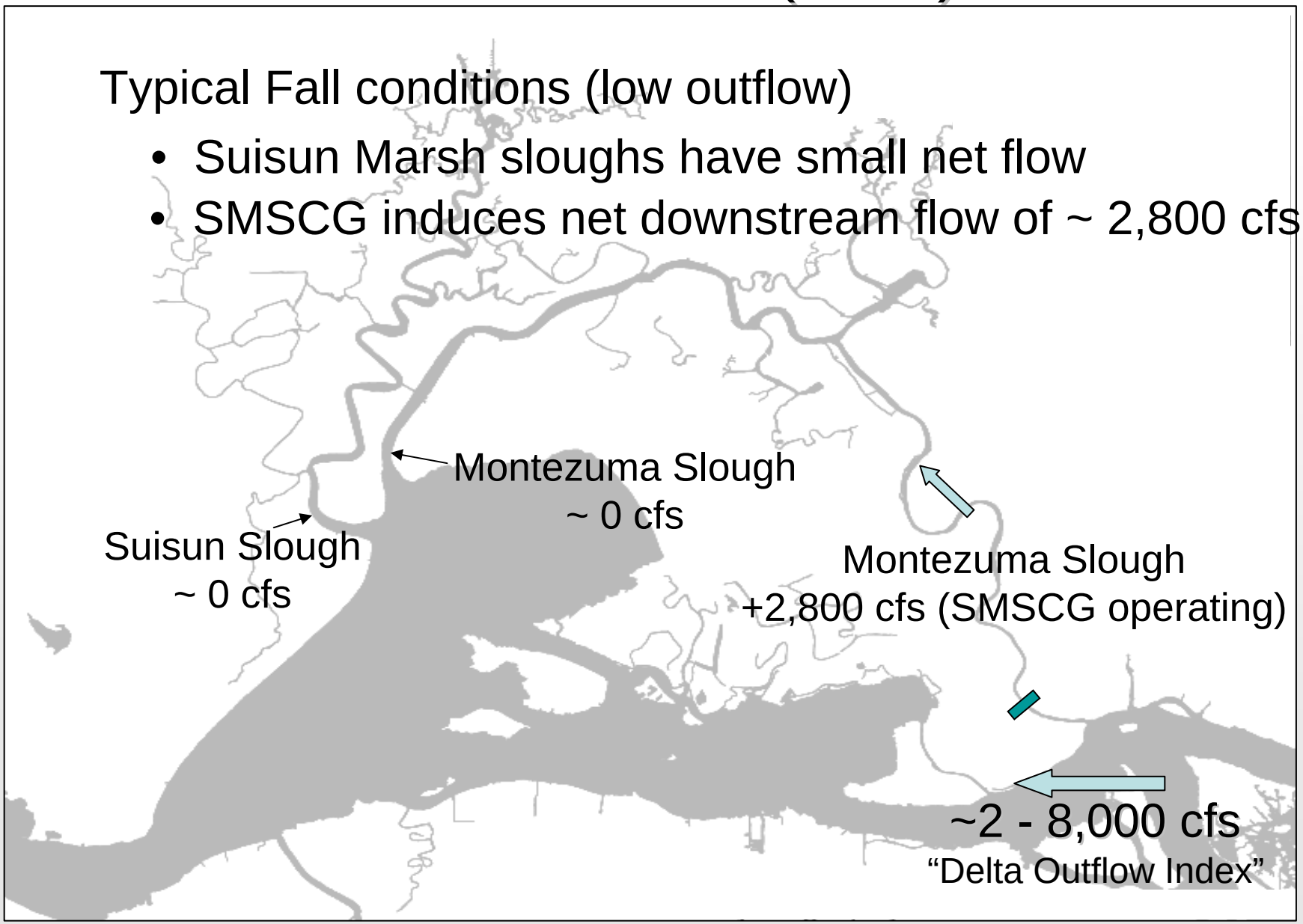
- Suisun Marsh sloughs have small net flow



Sub-tidal Time Scale ("Net") Flows

Typical Fall conditions (low outflow)

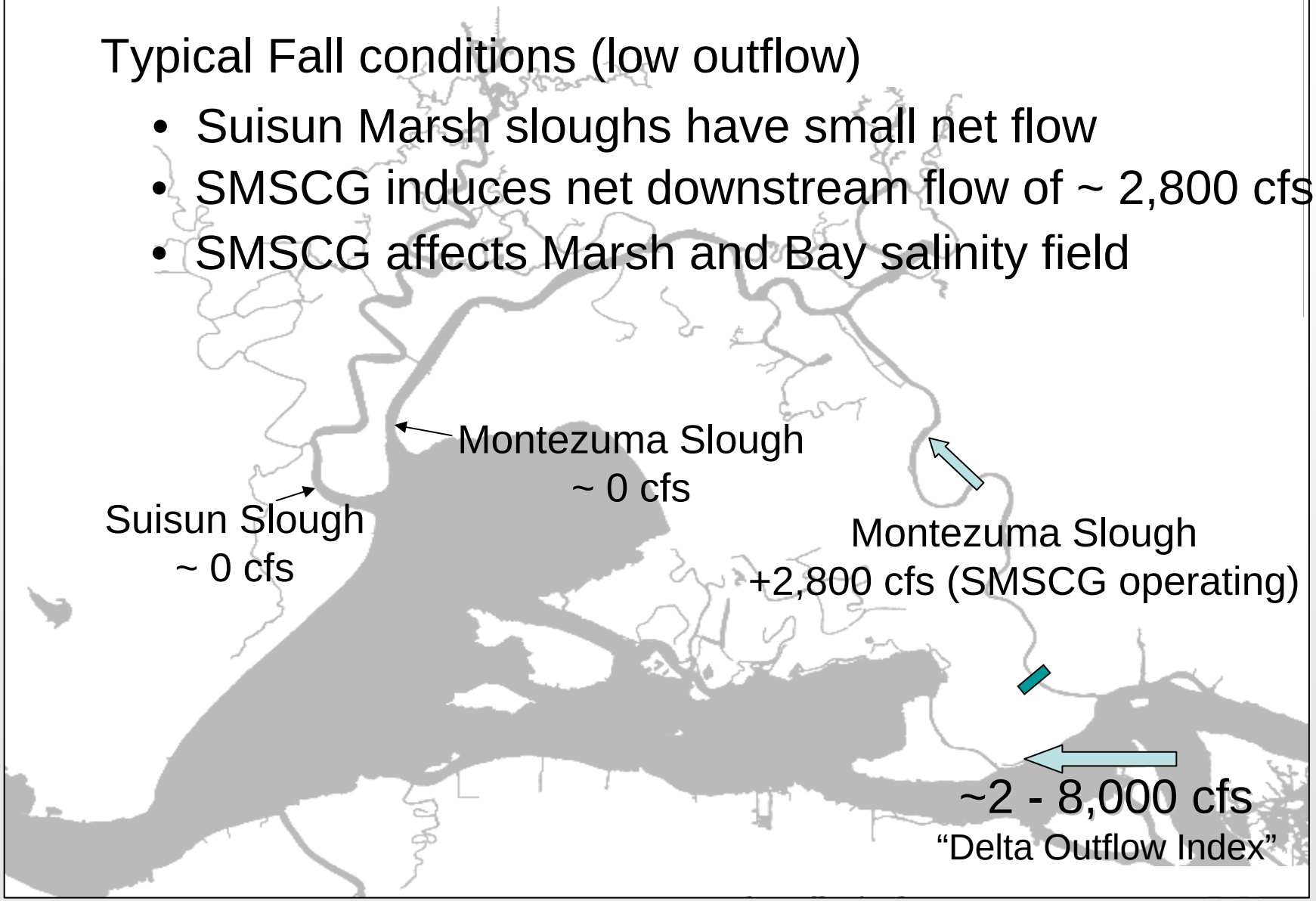
- Suisun Marsh sloughs have small net flow
- SMSCG induces net downstream flow of ~ 2,800 cfs



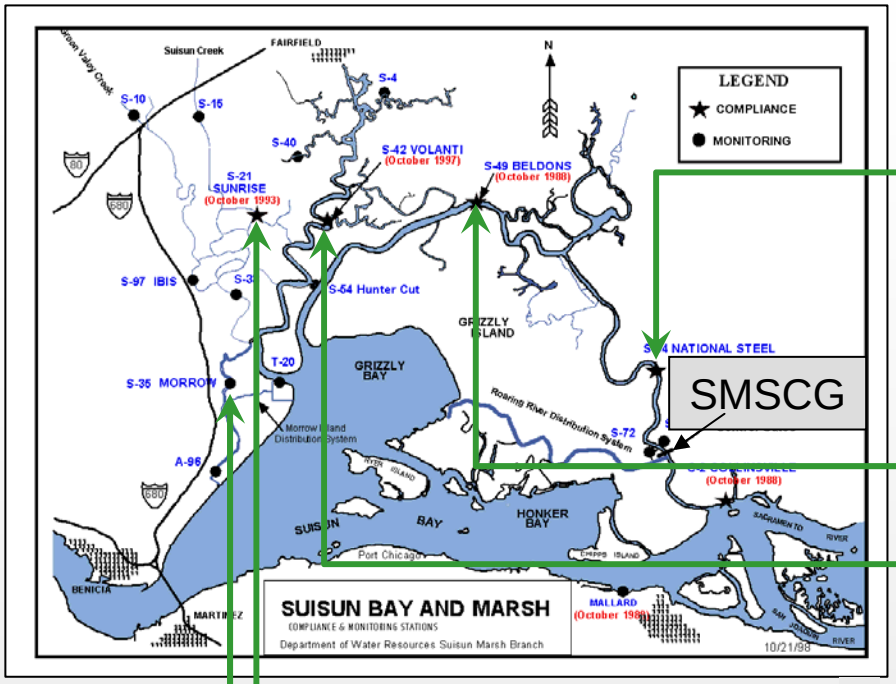
Sub-tidal Time Scale ("Net") Flows

Typical Fall conditions (low outflow)

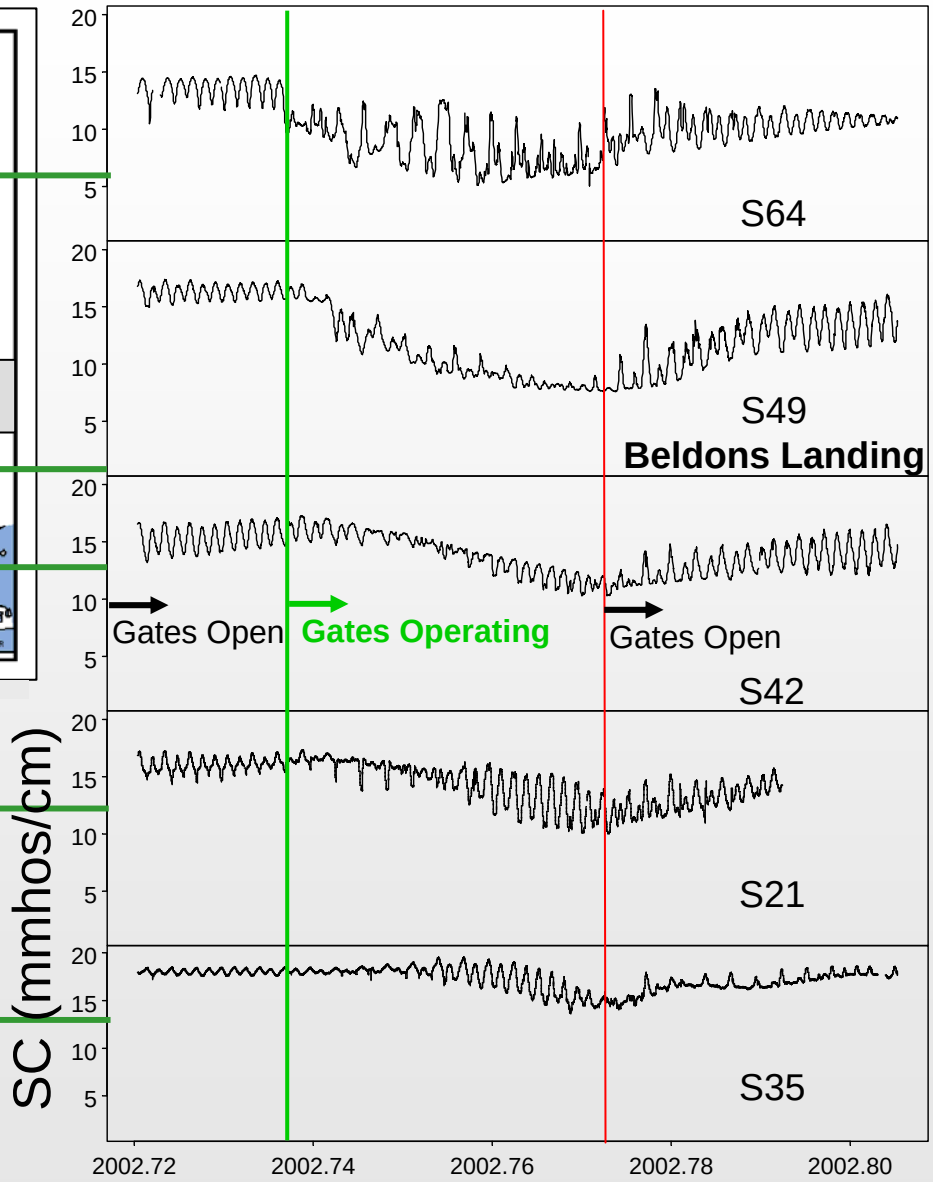
- Suisun Marsh sloughs have small net flow
- SMSCG induces net downstream flow of ~ 2,800 cfs
- SMSCG affects Marsh and Bay salinity field



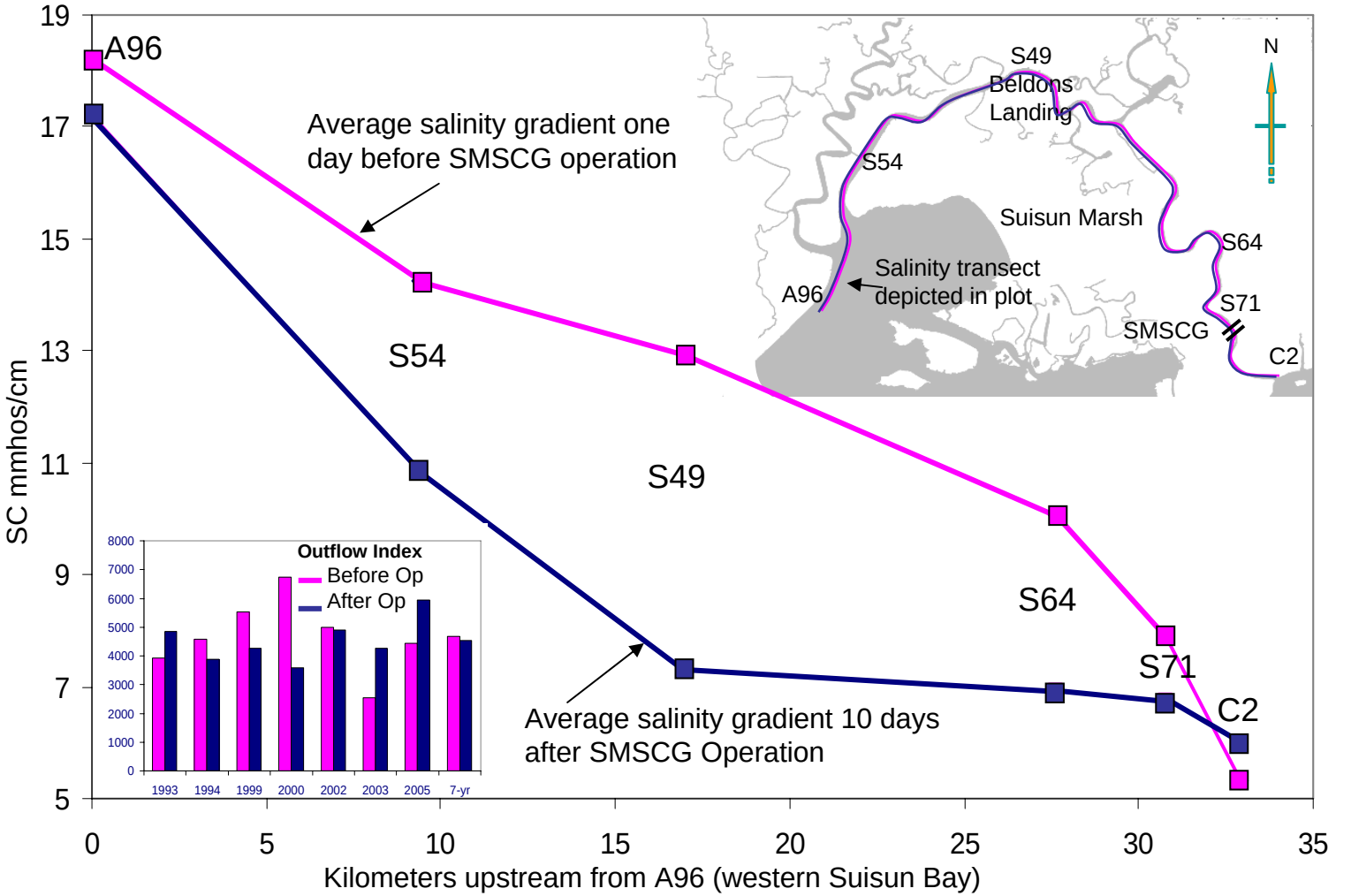
Salinity Response to SMSCG Operation



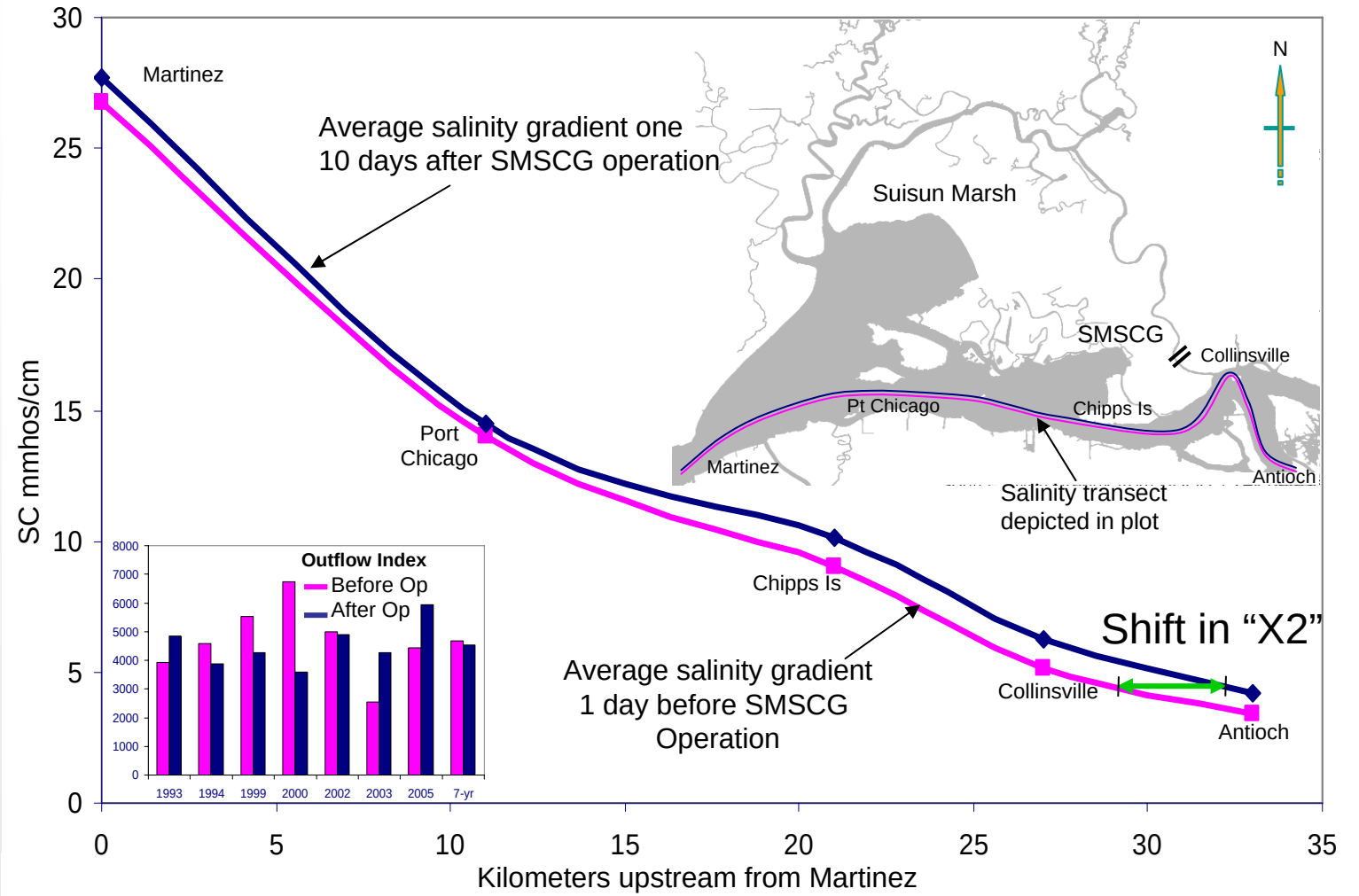
SMSCG

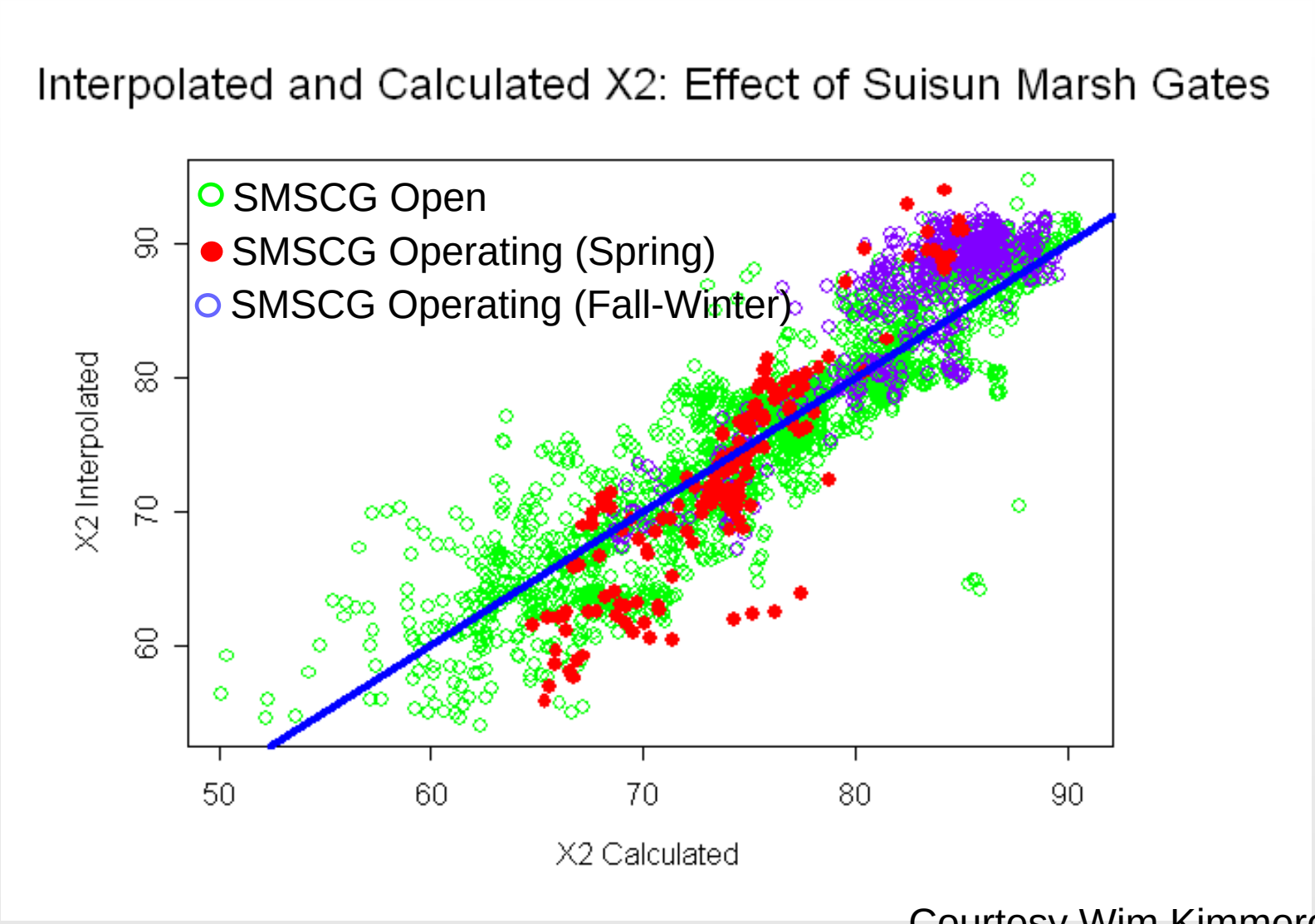


SMSCG effect on Montezuma Slough



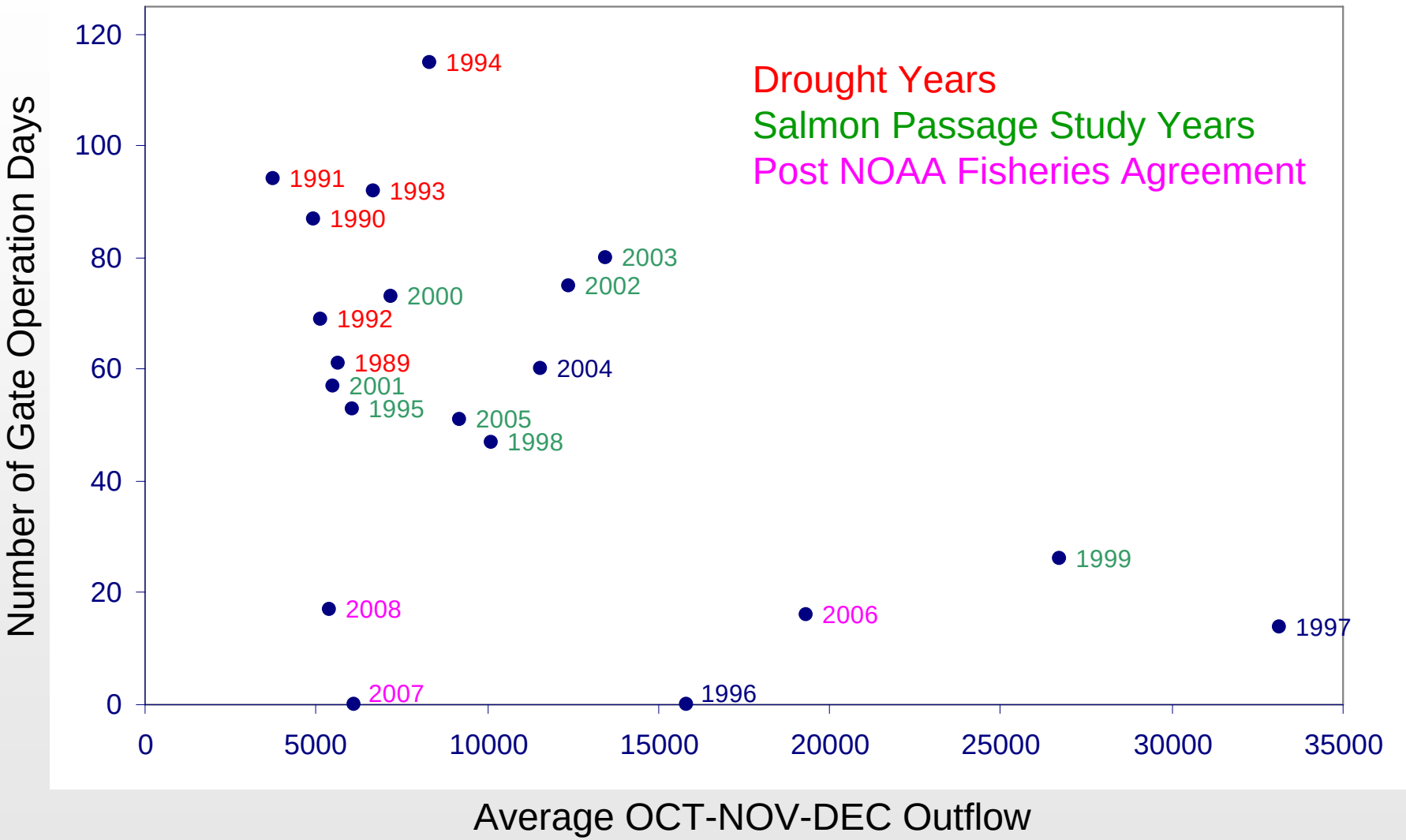
SMSCG effect on Suisun Bay



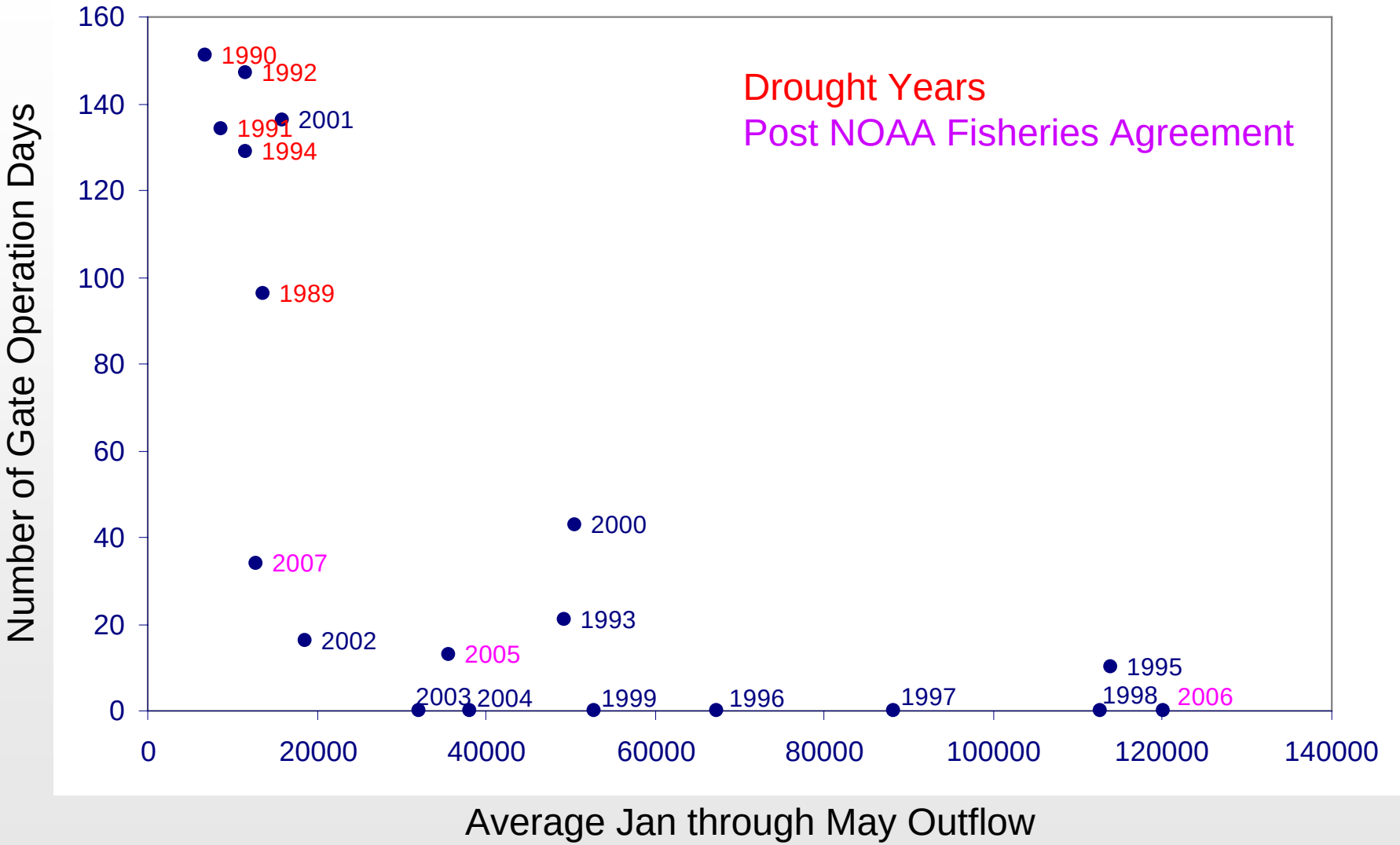


Courtesy Wim Kimmerer

SMSCG Operation Frequency Versus Outflow



SMSCG Operation Frequency Versus Outflow



Thank You

- Paul Massera
- Jim Sung
- Kate Le
- Brad Tom