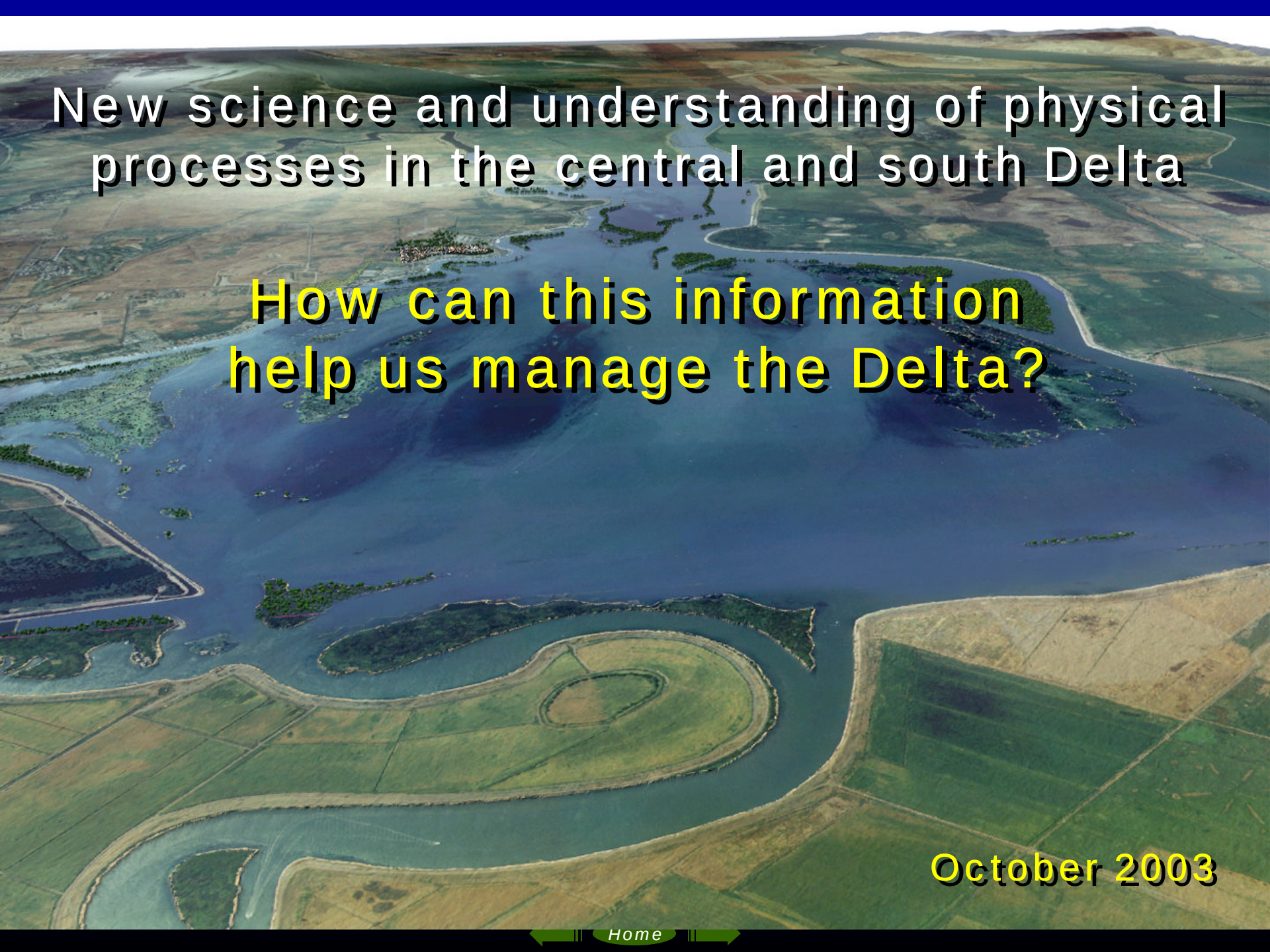

New science and understanding of physical processes in the central and south Delta
How can this information help us manage the Delta?
October 2003
Home

Outline

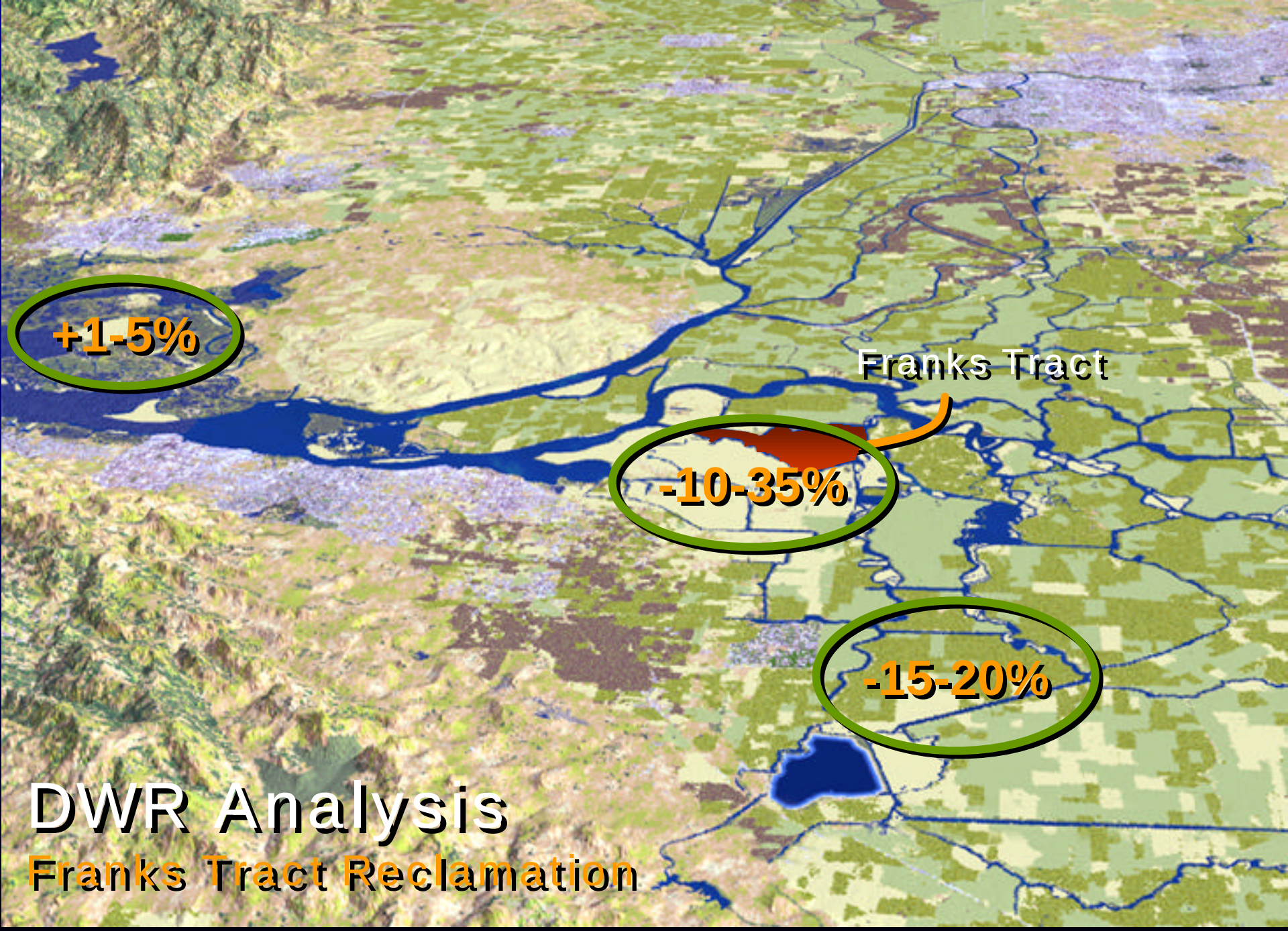
Central Delta

Motivation – Modeling of Franks Tract
Conceptual Model – "Pool of fresh water"
Field Data – Salt flux (How it works)
Management Scenarios

South Delta

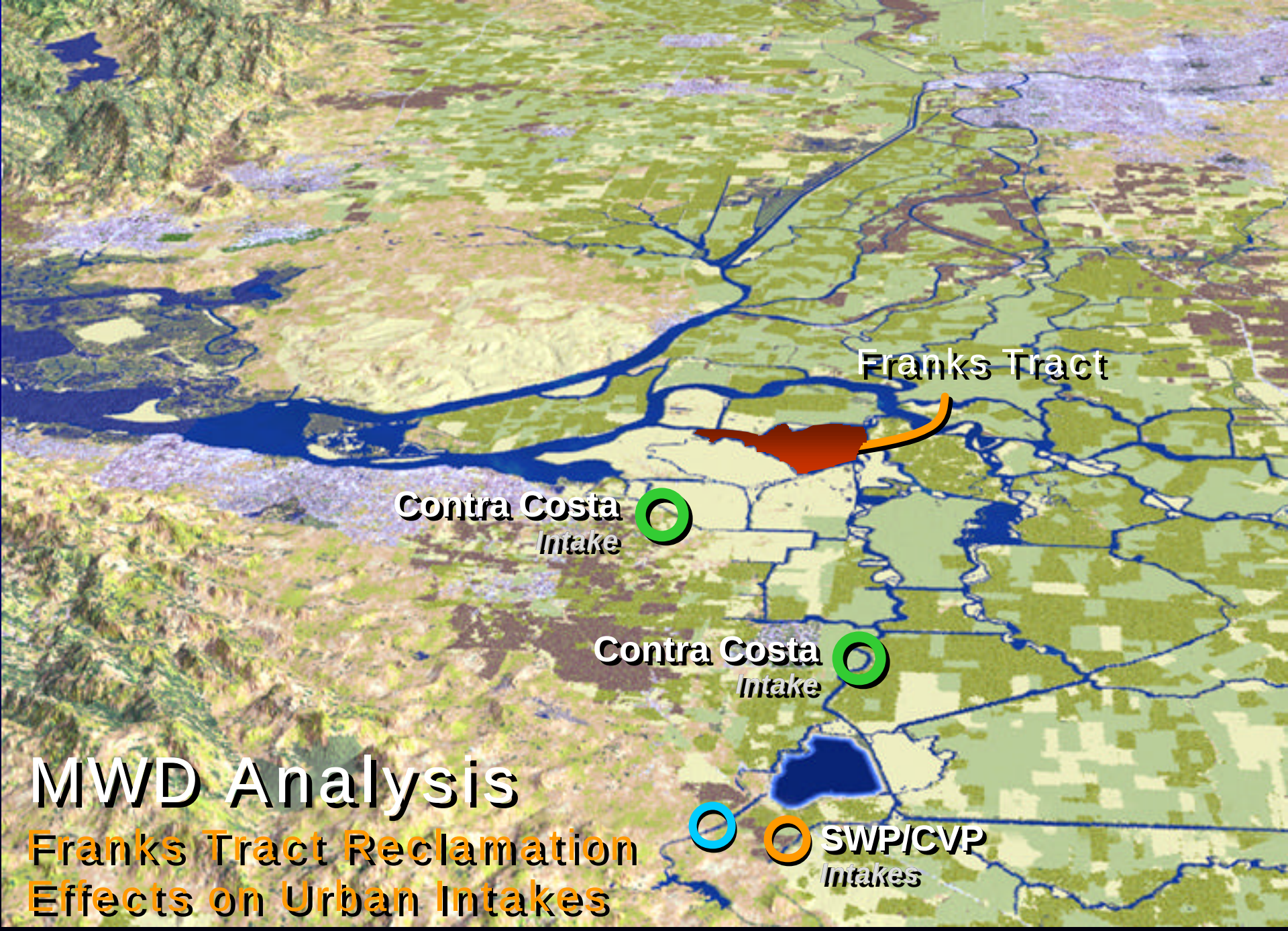
Reducing Salvage through changes in withdrawal timing

- Control the zone of influence?
- Take water during day?
- Bypass flows?



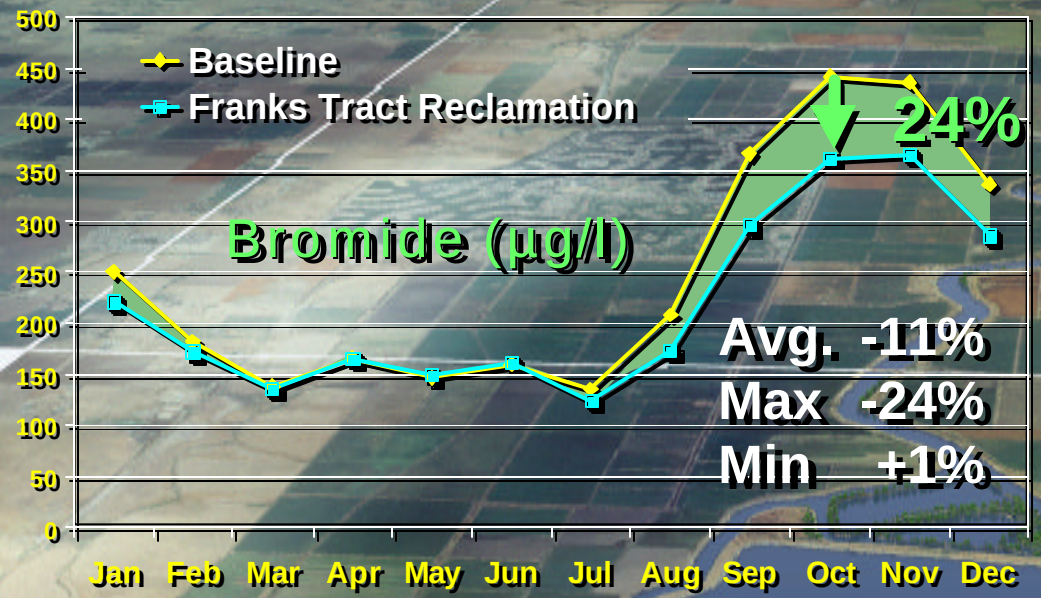
DWR Analysis

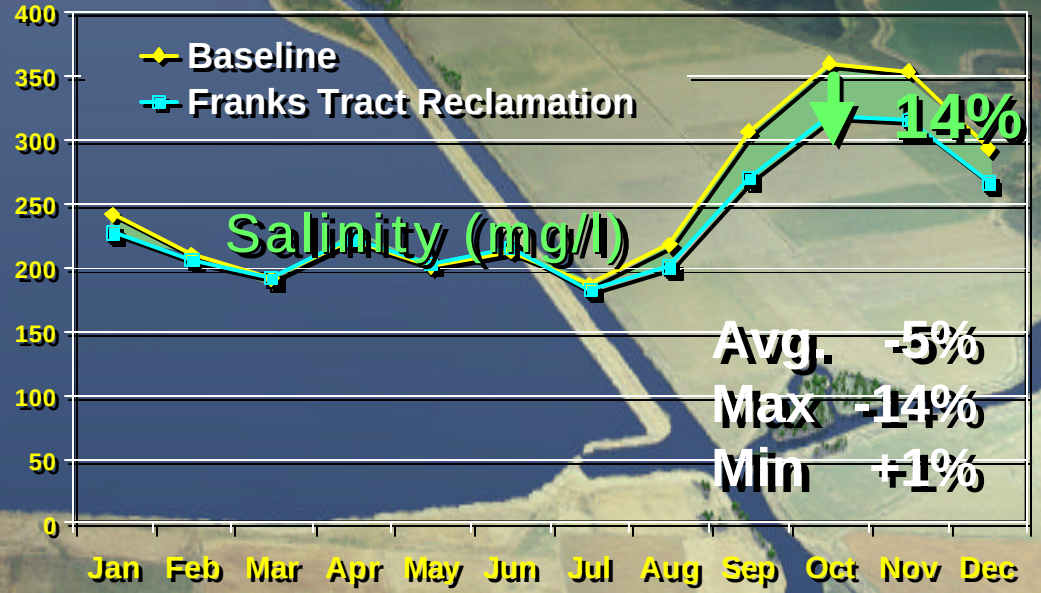
Franks Tract Reclamation



MWD Analysis

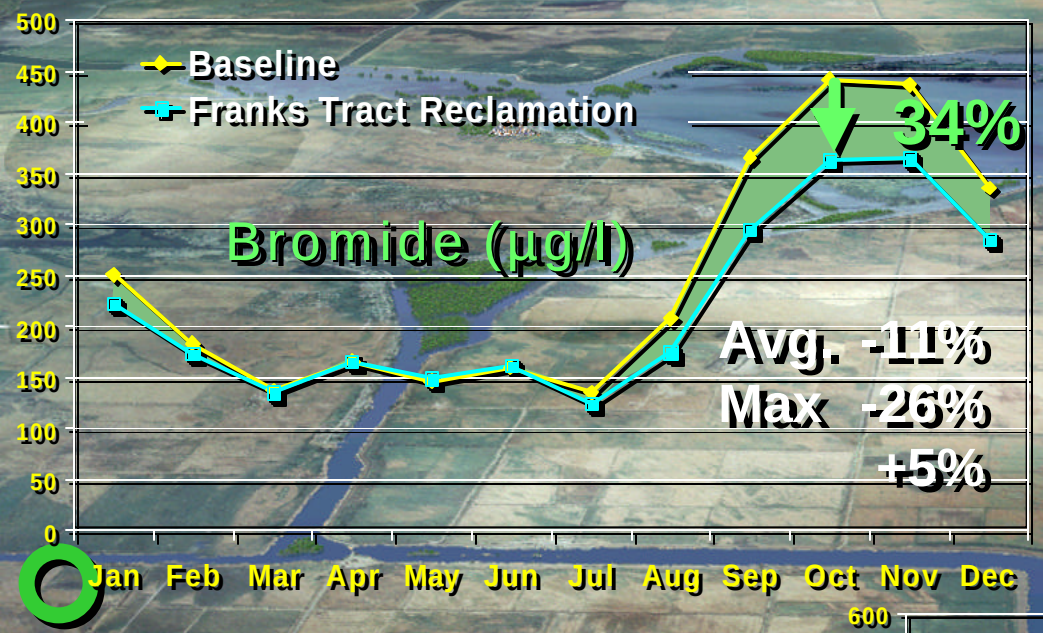
Franks Tract Reclamation
Effects on Urban Intakes





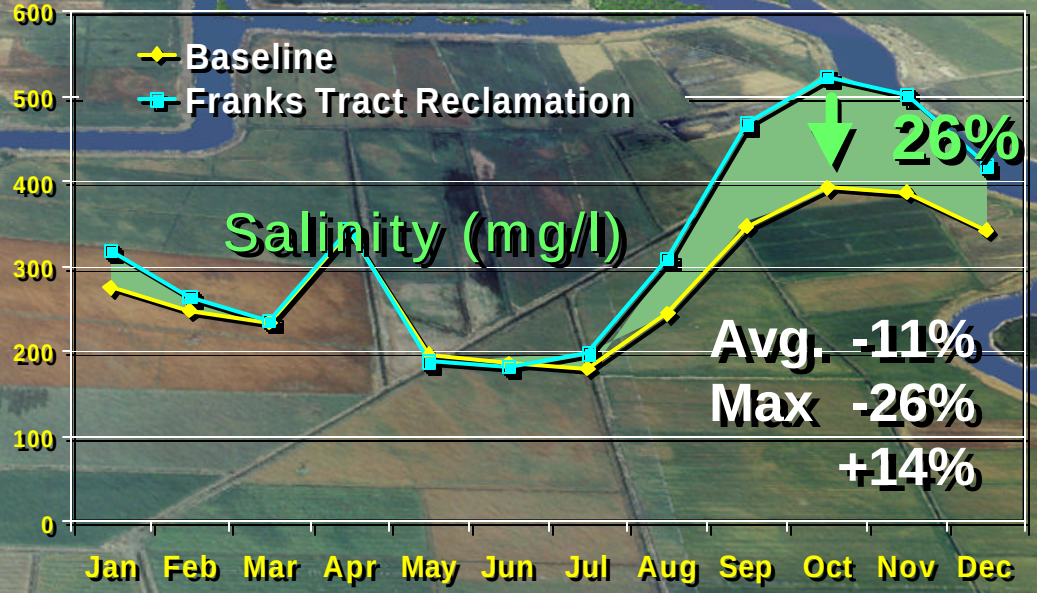
MWD Analysis

SWP Pumping Plant



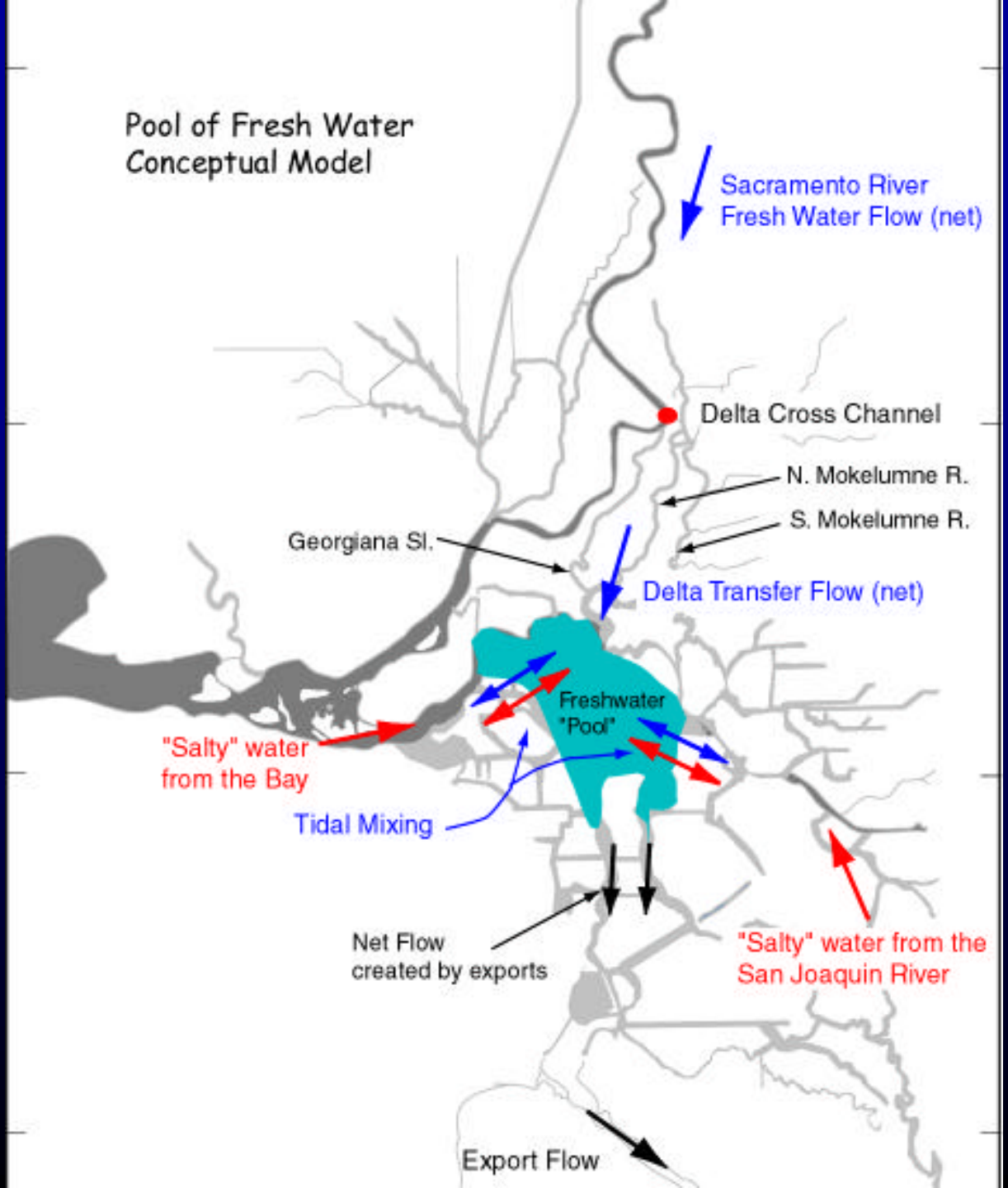
Rock Slough

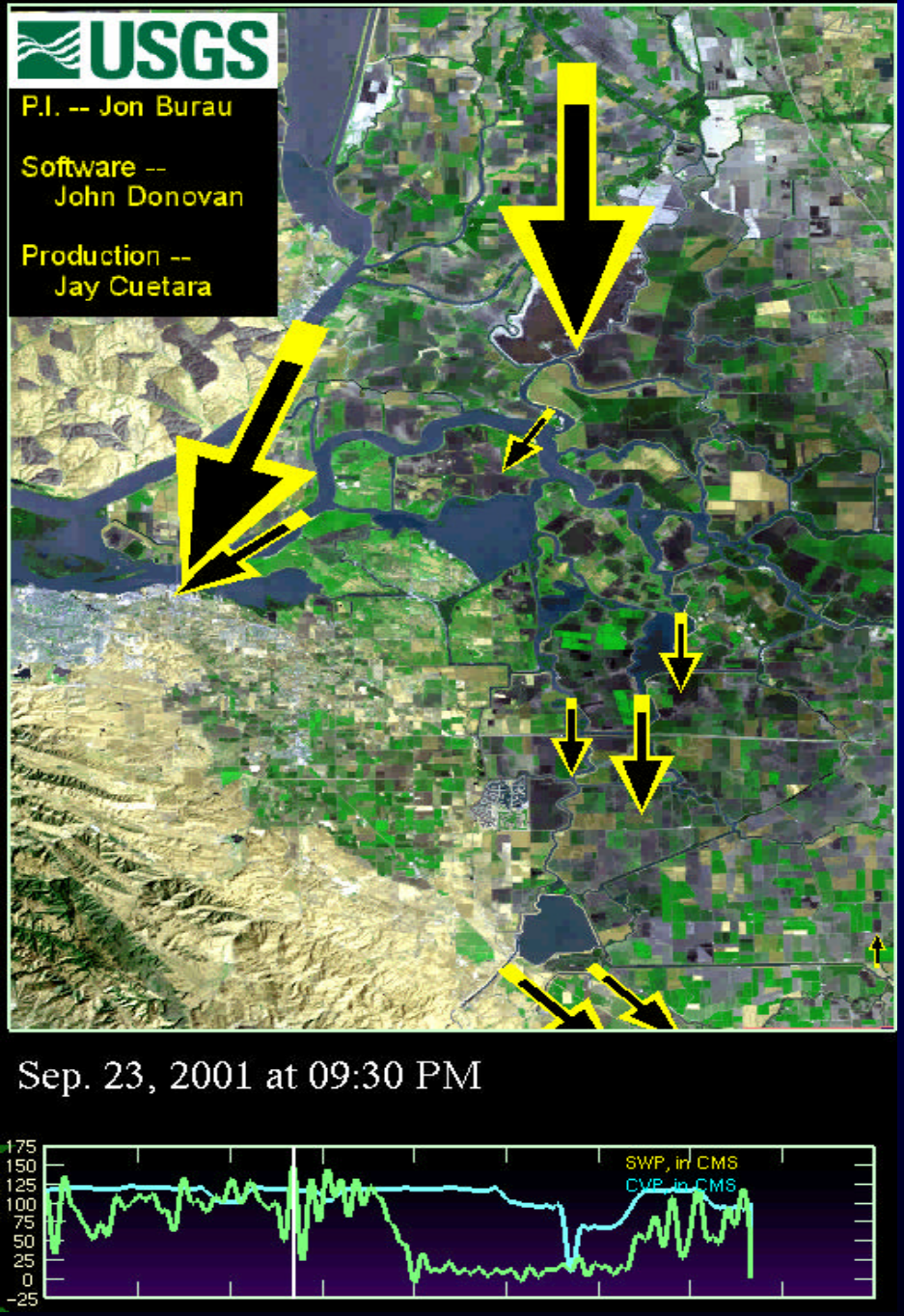
Existing Intake



MWD Analysis

Contra Costa WD -- Rock Slough Intake

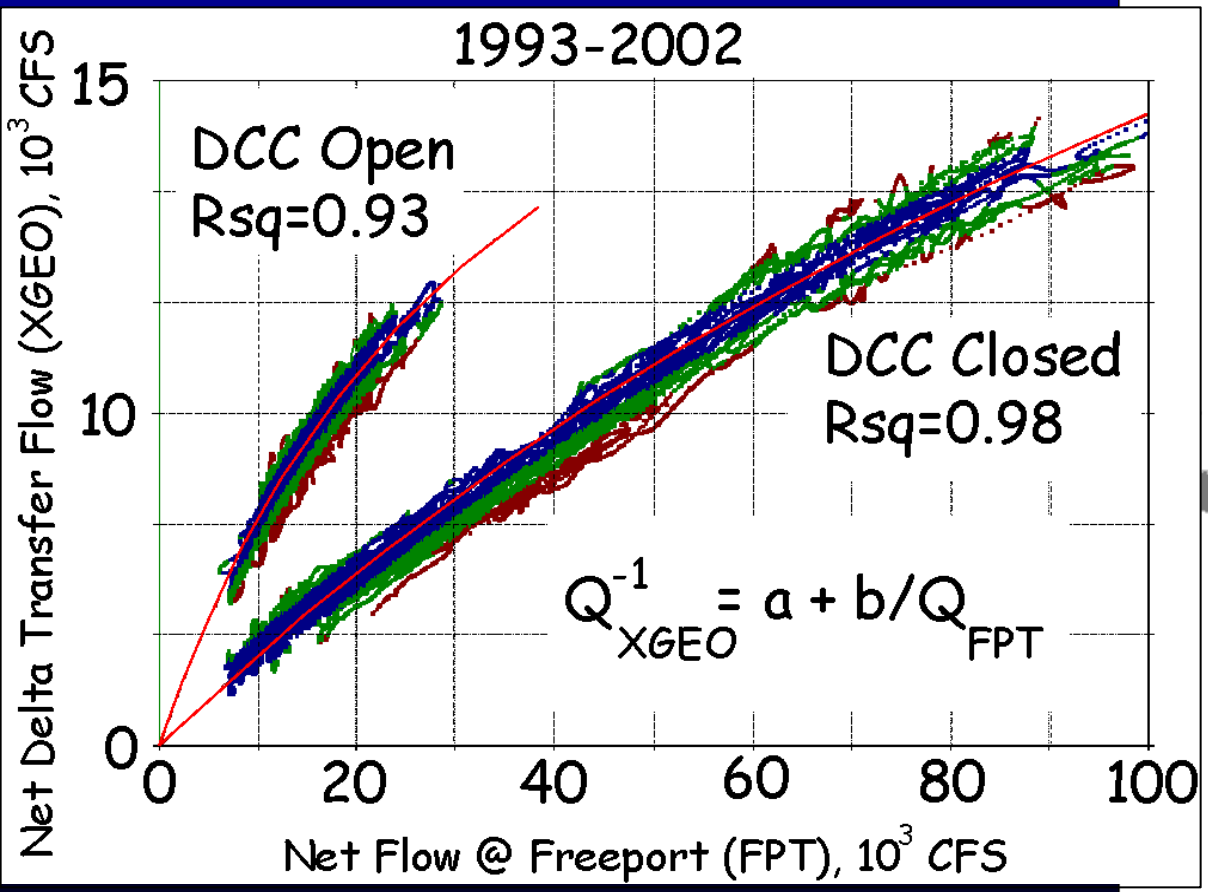

Pool of Fresh Water
Conceptual Model
Sacramento River
Fresh Water Flow (net)
Delta Cross Channel
N. Mokelumne R.
S. Mokelumne R.
Georgiana Sl.
Delta Transfer Flow (net)
Freshwater
"Pool"
"Salty" water
from the Bay
Tidal Mixing
Net Flow
created by exports
"Salty" water from the
San Joaquin River
Export Flow

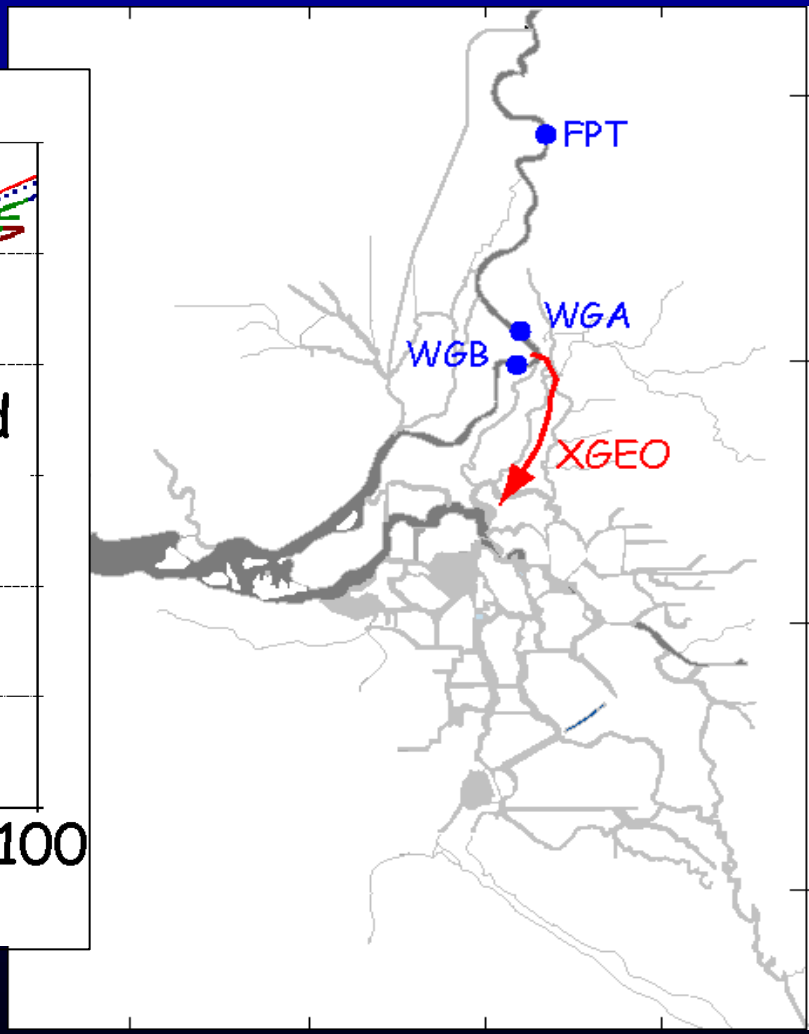


Pumps do not “suck” water from North Delta

JRB

Delta Transfer flow is “mostly” a function of Sac river flows

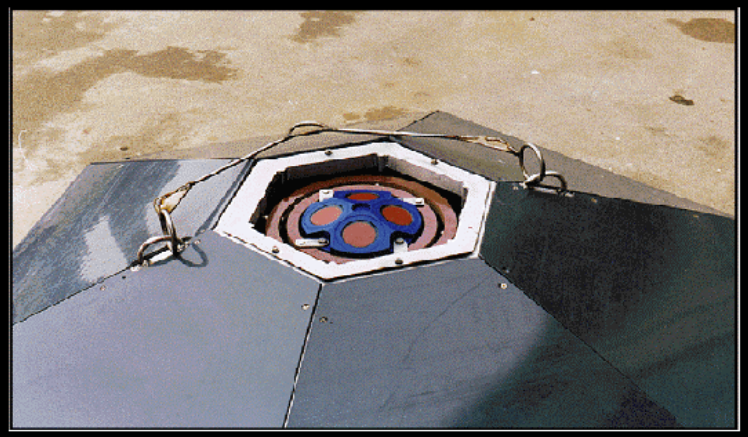




USGS Analysis

Acoustic Doppler Current Profiler

Acoustic Doppler Current Profiler (ADCP)



ADCP Deployment

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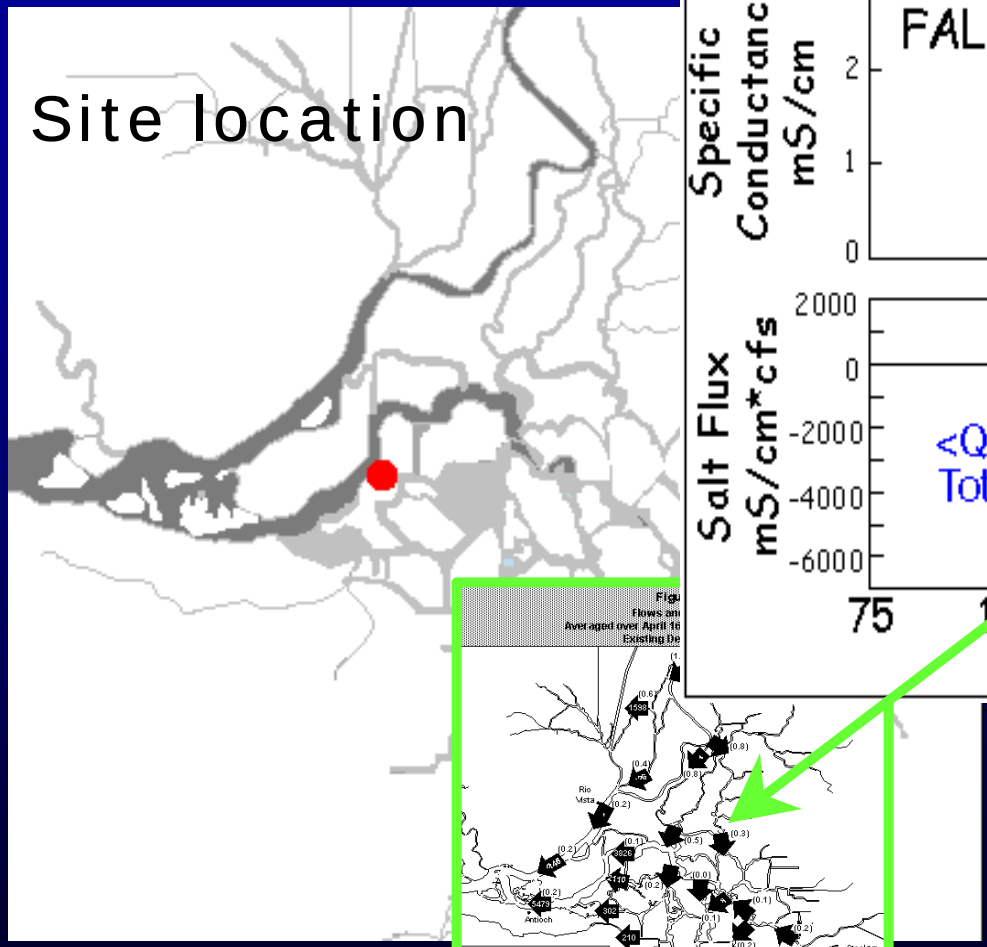
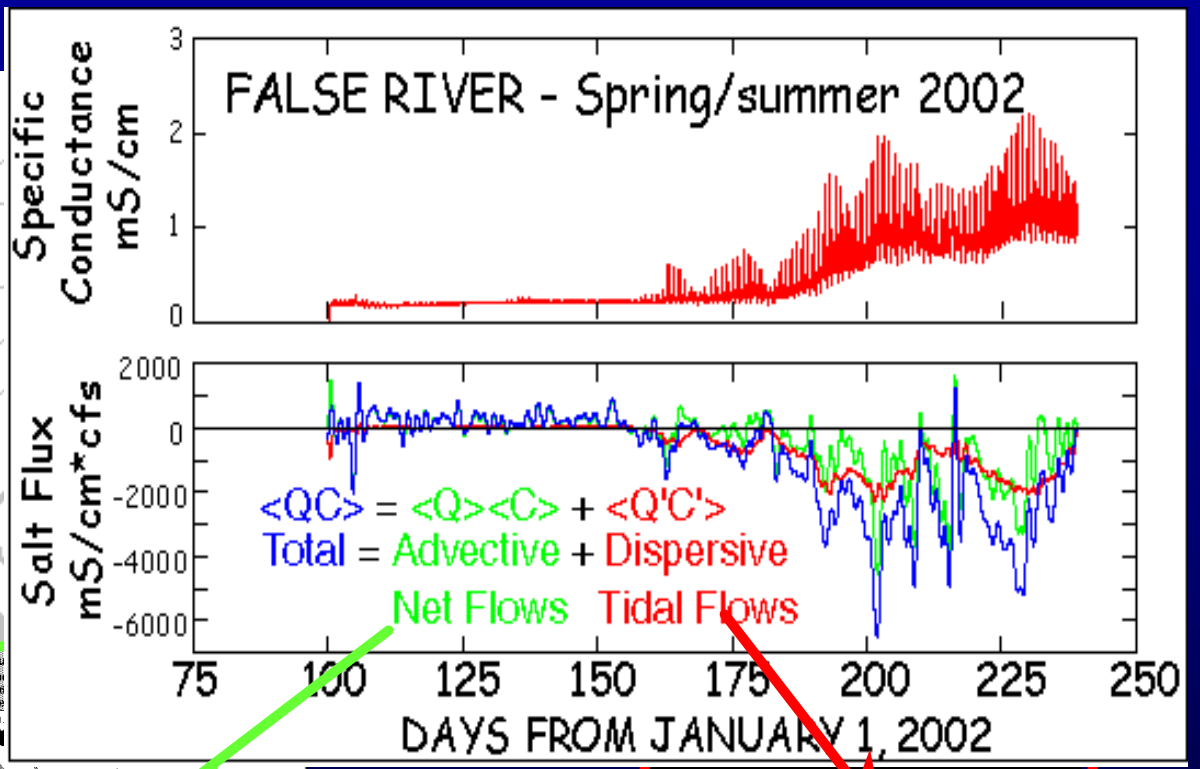
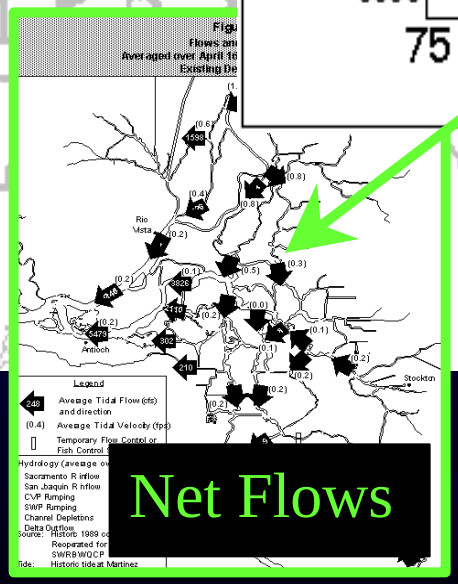
Modes of Transport - Salt Flux Decomposition







Home

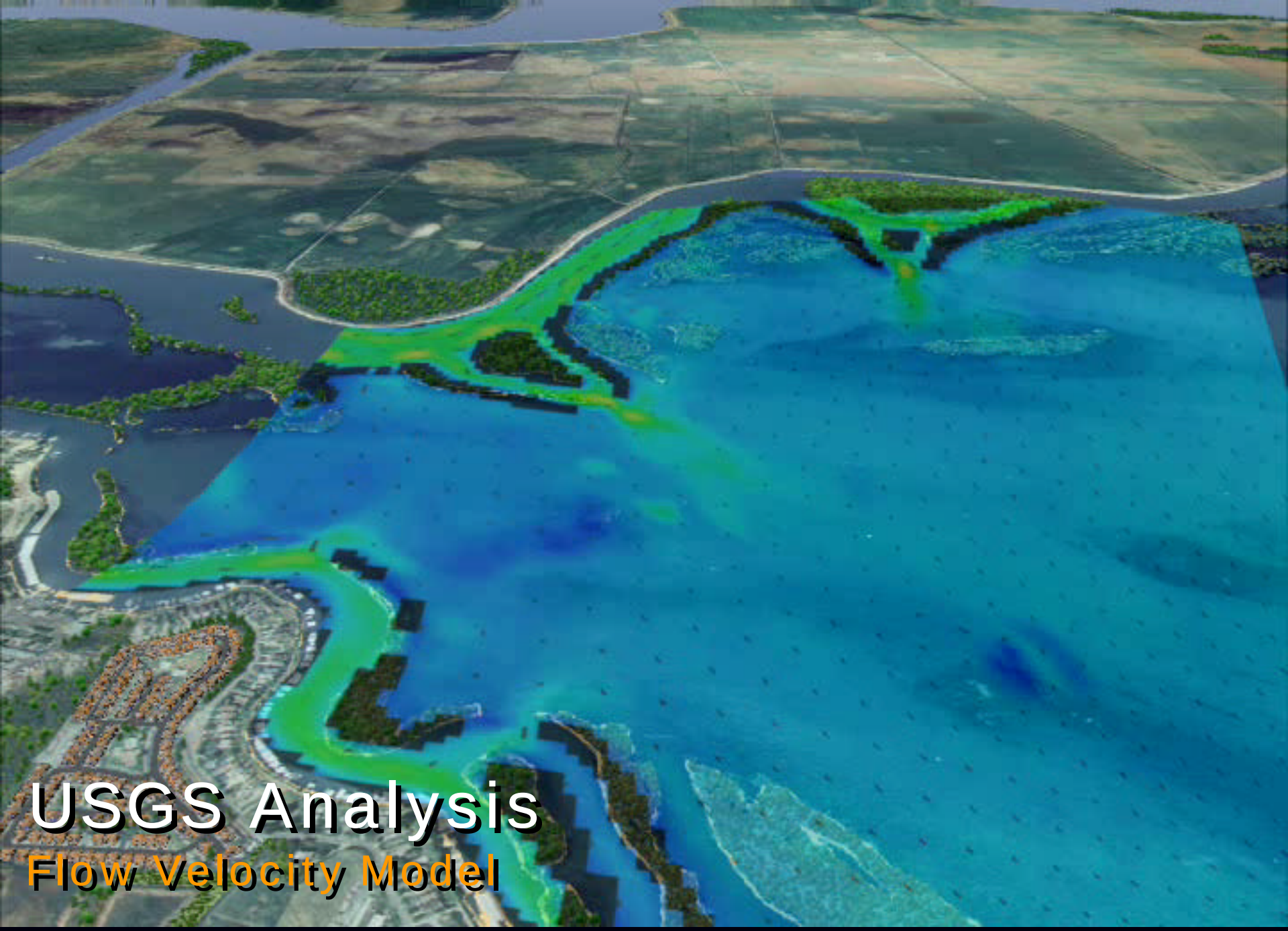
USGS Analysis

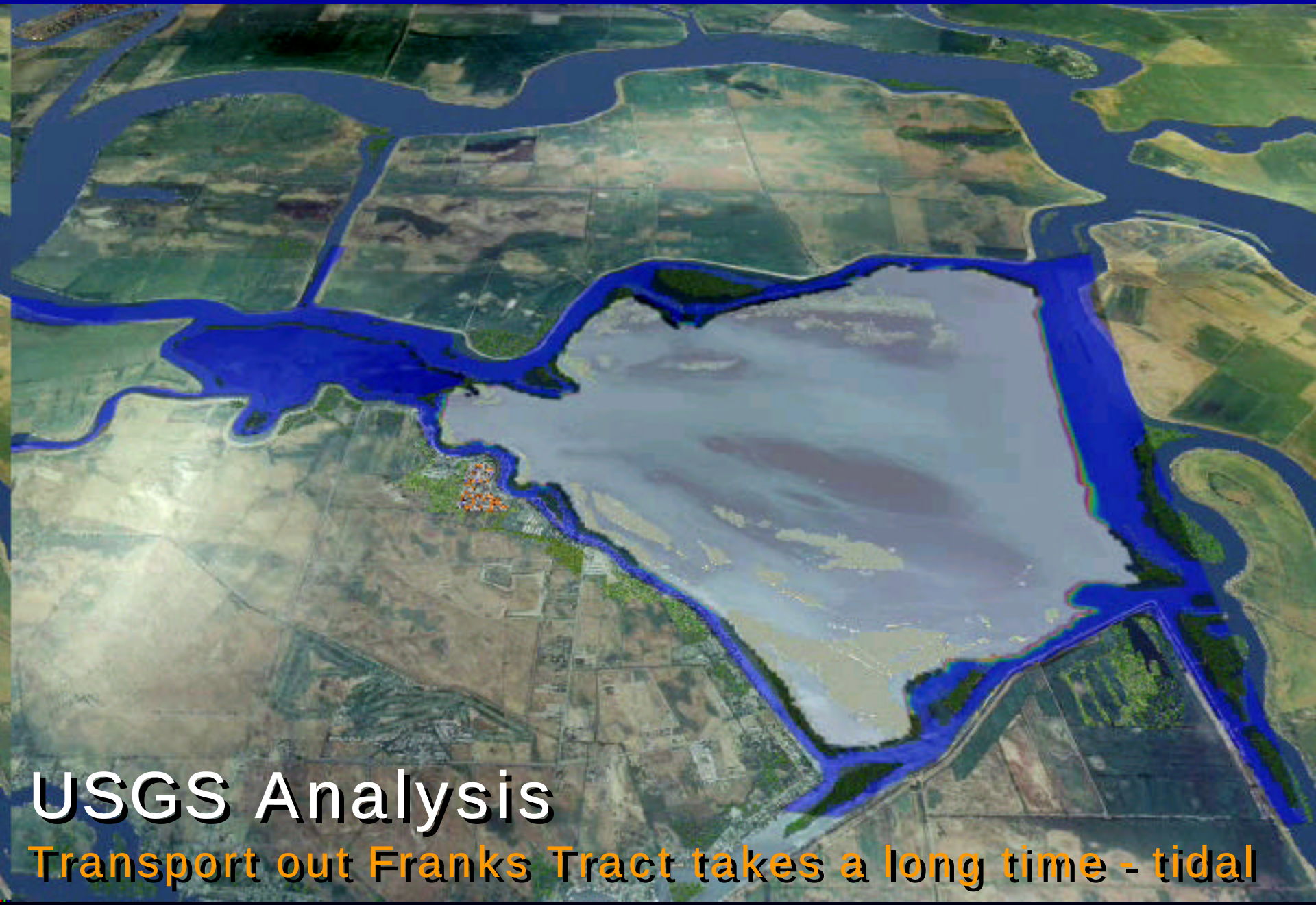
Seawater Transport into Franks Tract

Home

Numerous levee breaches (nozzles) in Franks Tract

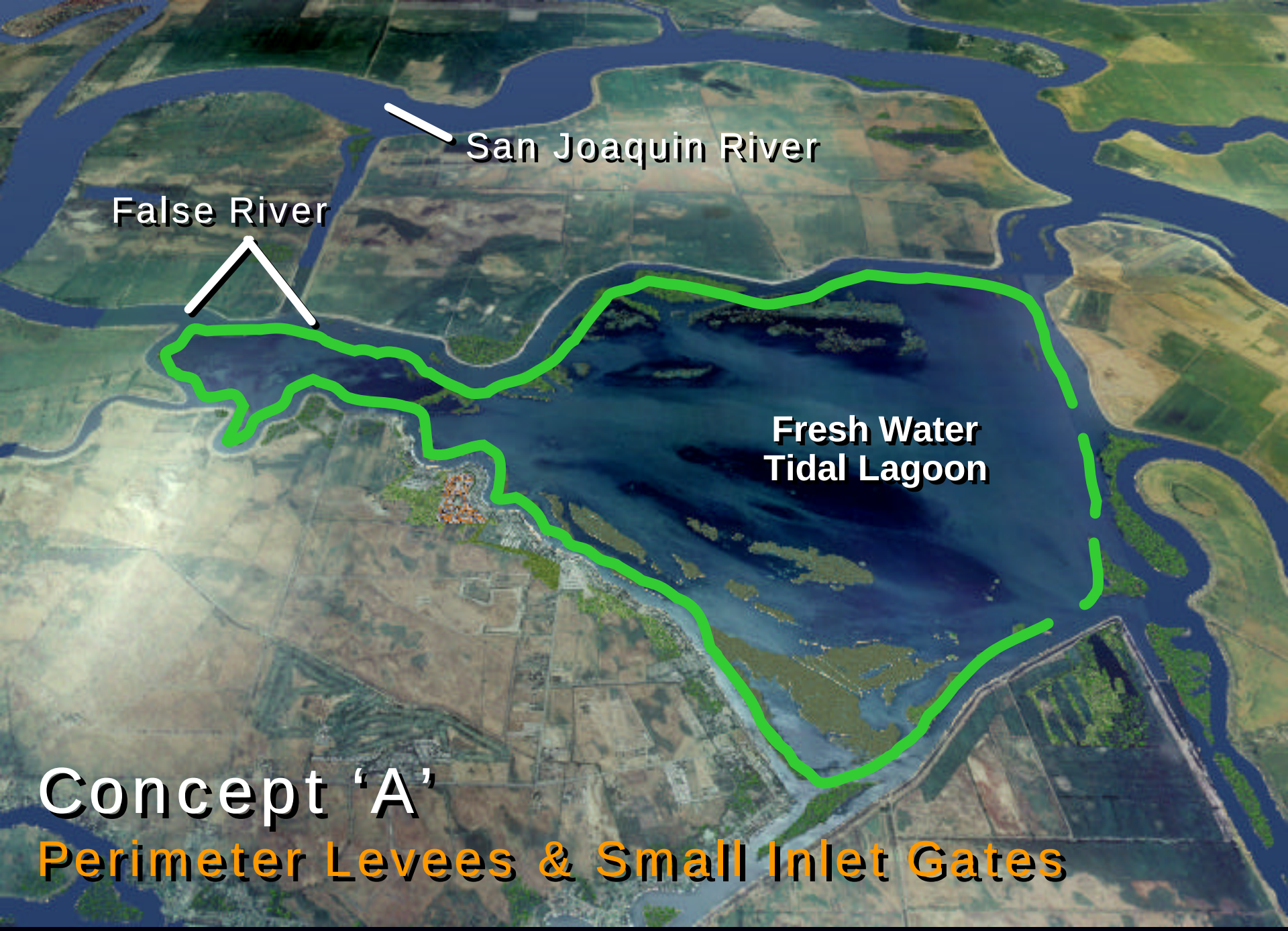
Home


USGS Analysis
Flow Velocity Model


USGS Analysis
Transport out Franks Tract takes a long time - tidal

Concepts/Scenarios

- **Passive**
  - A) Enclose Franks Tract
  - B) Repair North & East levees
- **Active**
  - C) Tide gate: West-end of Little Franks Tract
  - D) Tide gate: False River East-Side

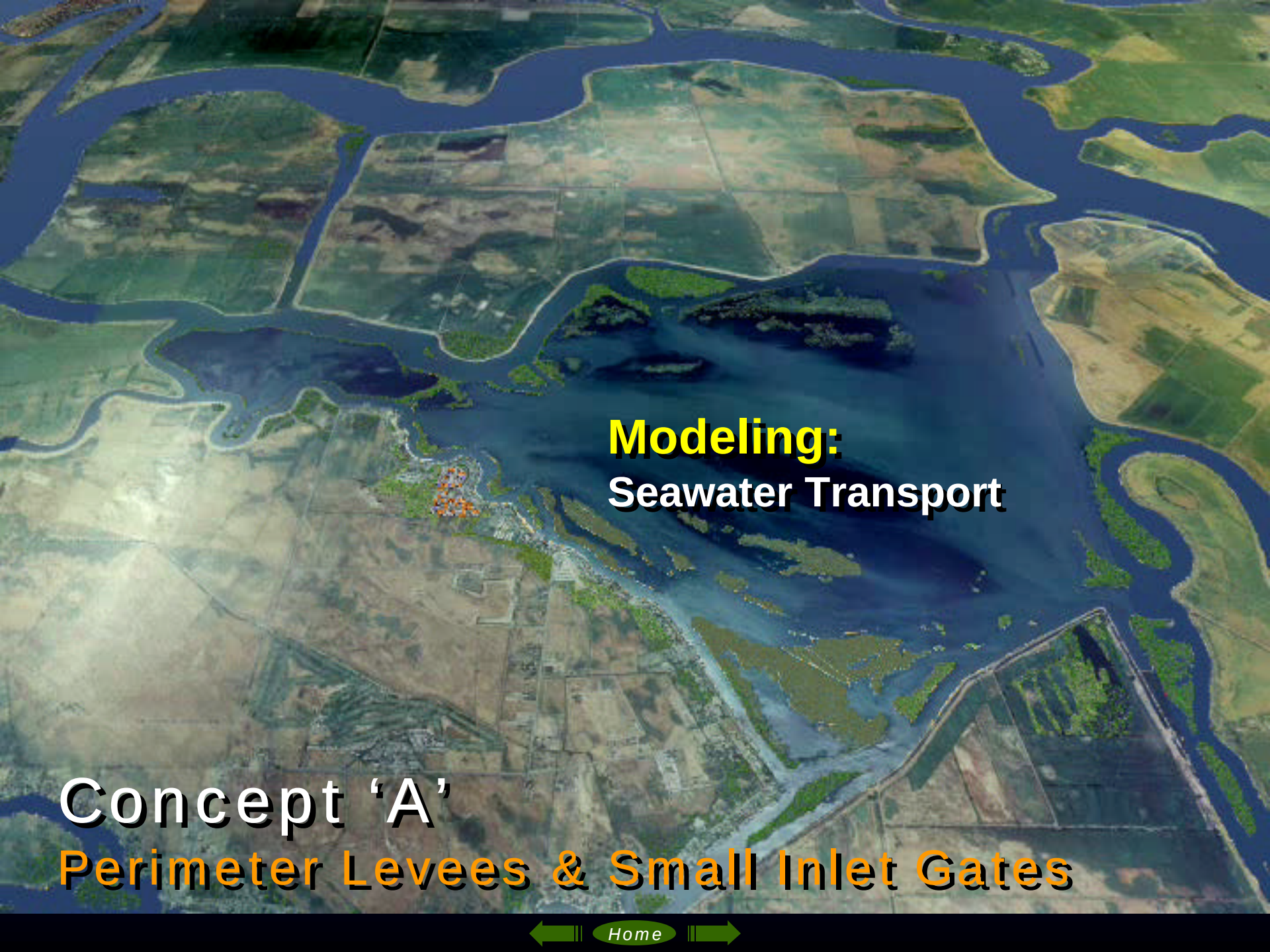


Concept ‘A’

Perimeter Levees & Small Inlet Gates

Concept ‘A’

Perimeter Levees & Small Inlet Gates

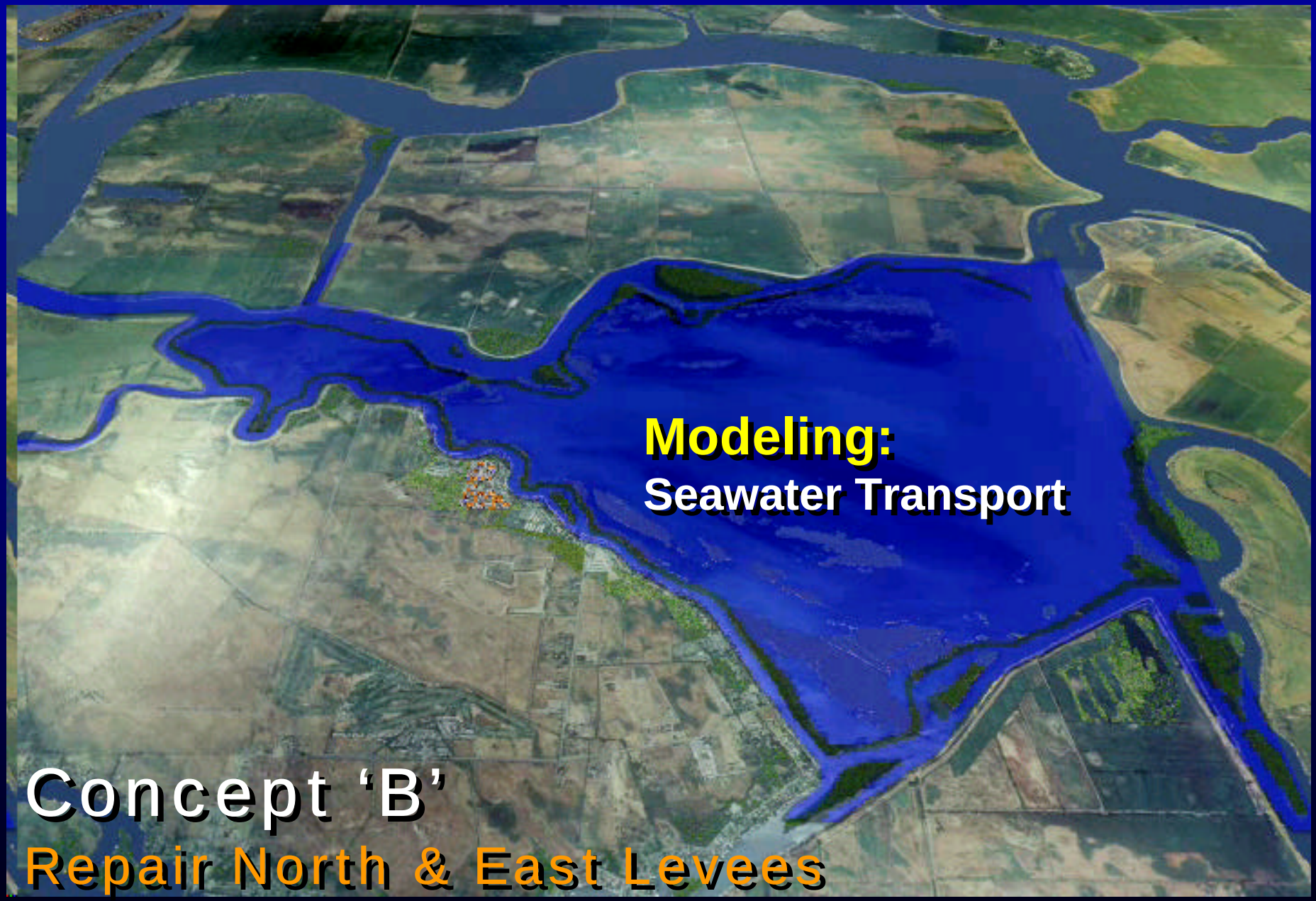


Concept ‘A’

Perimeter Levees & Small Inlet Gates

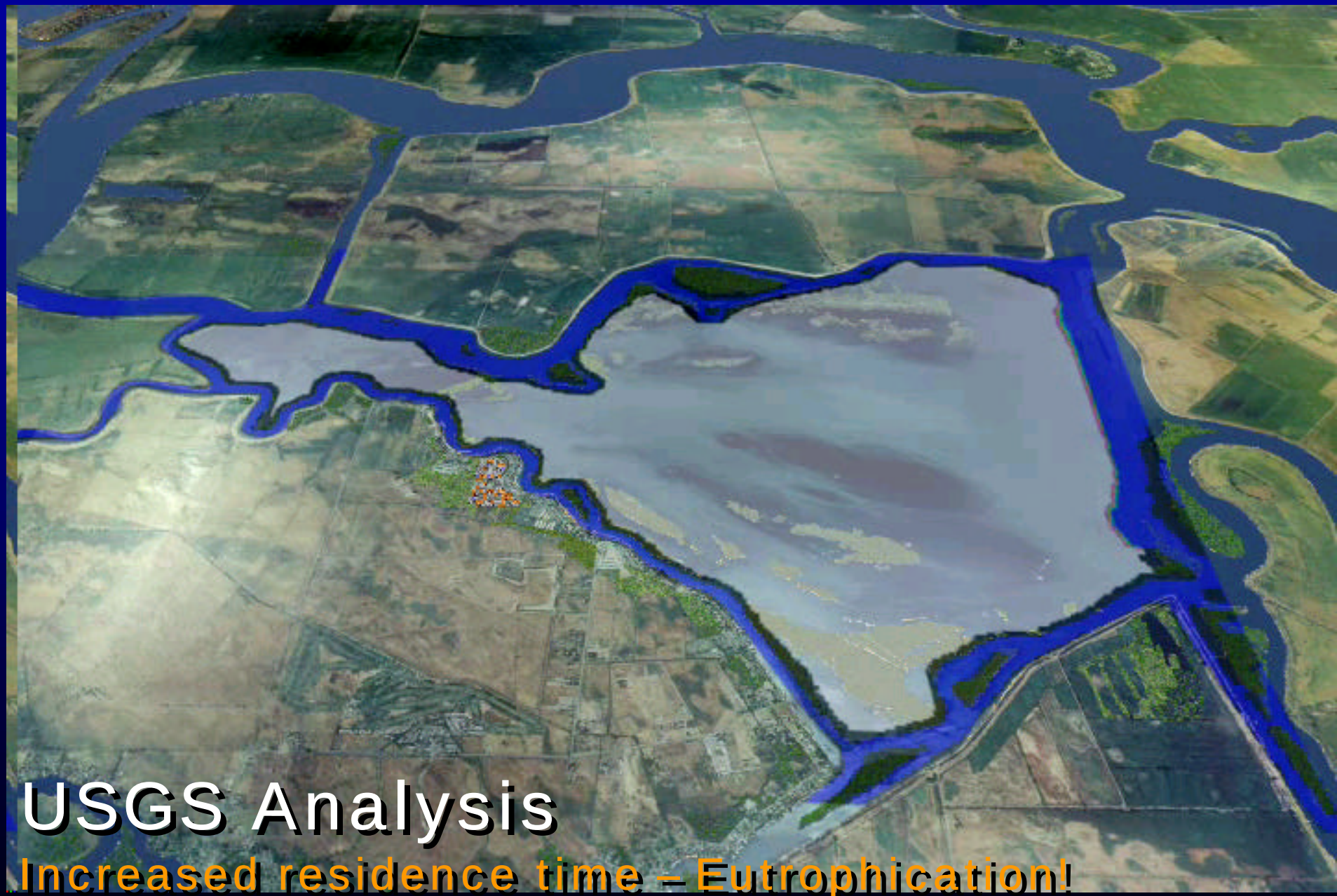
Concept ‘B’

Repair North & East Levees



Concept ‘B’

Repair North & East Levees



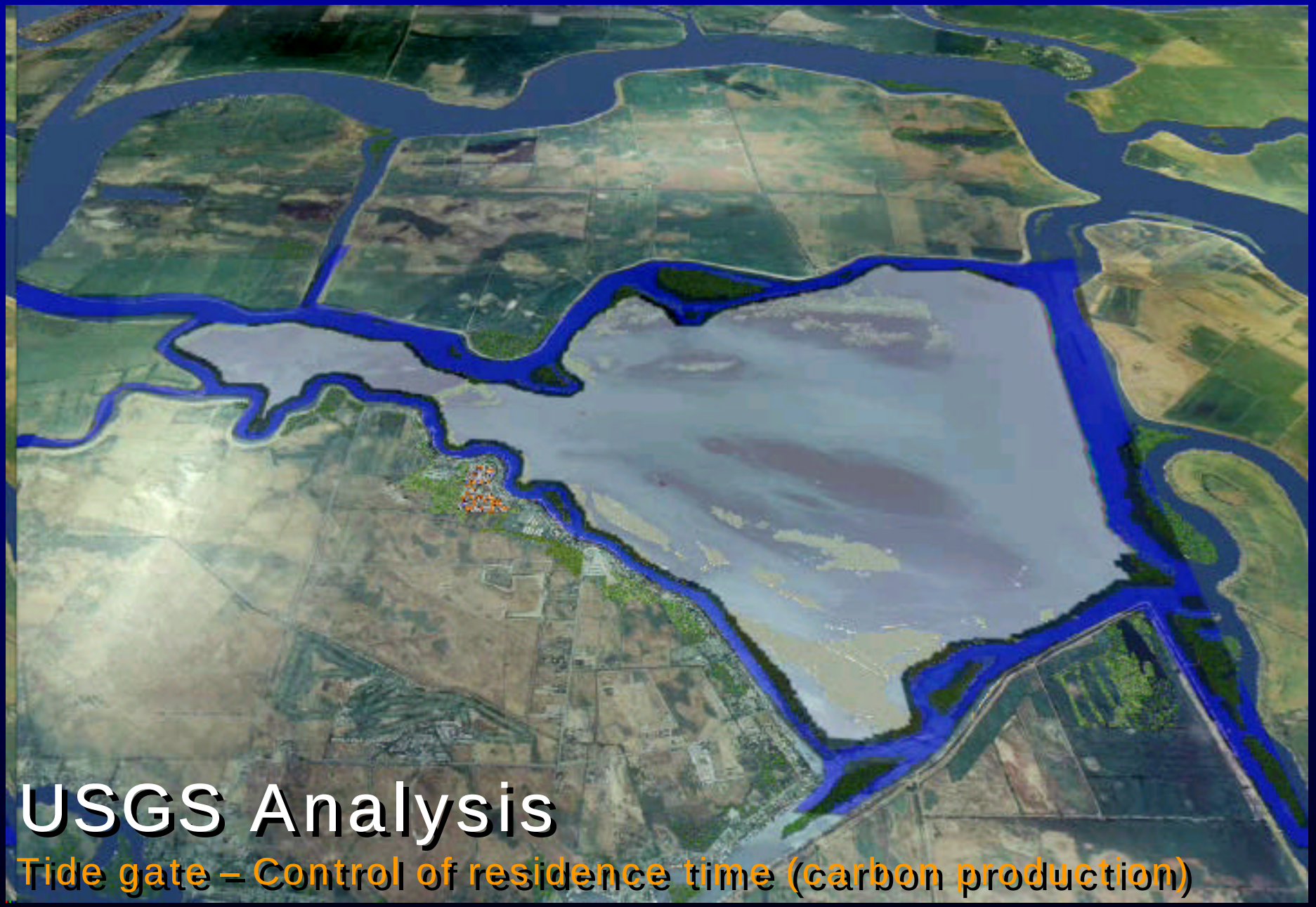
USGS Analysis

Increased residence time – Eutrophication!

Concept 'C'

Repair North & East Levees

Tide Gate in Little Franks Tract

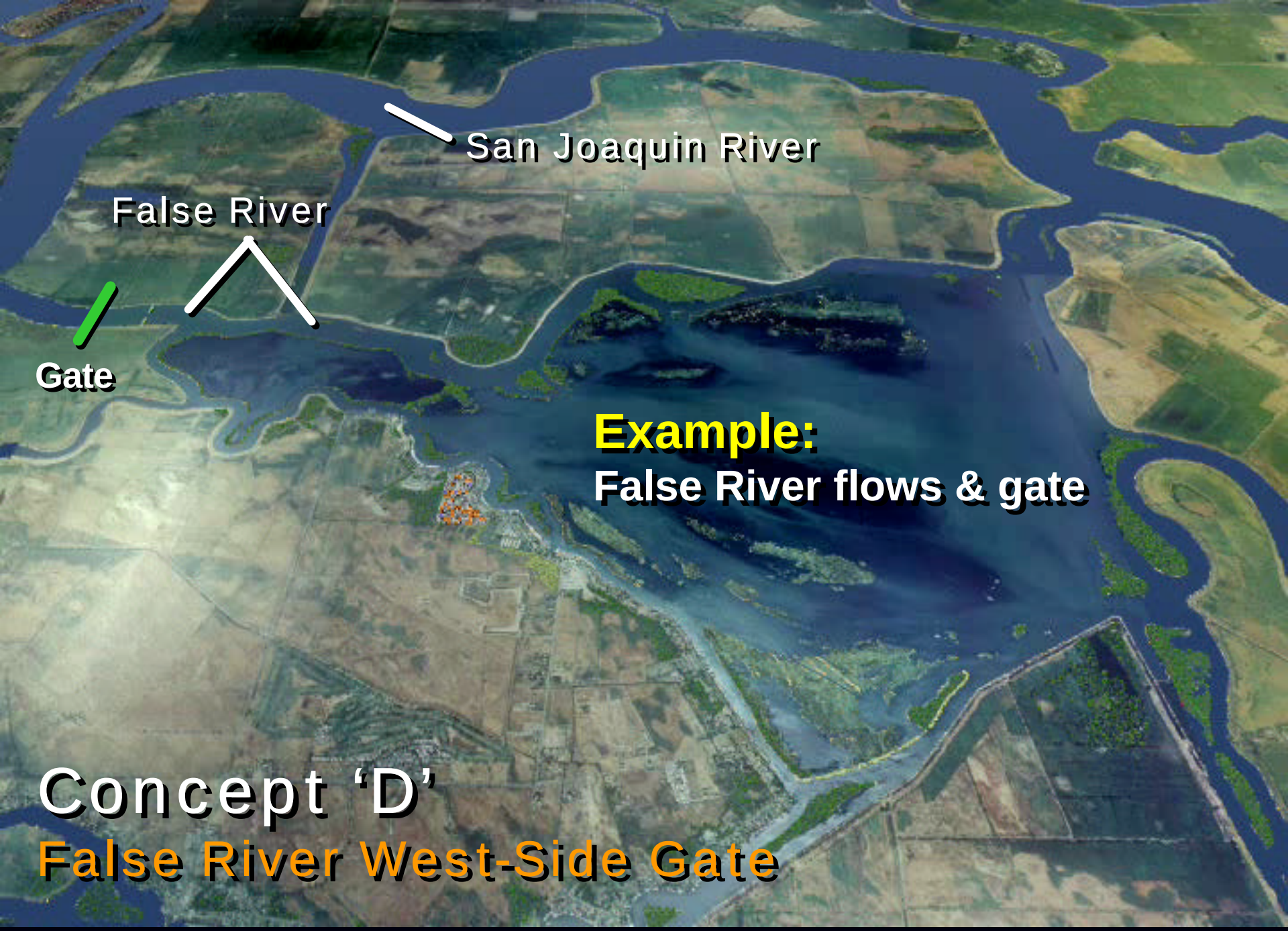


USGS Analysis

Tide gate – Control of residence time (carbon production)

Concept ‘D’

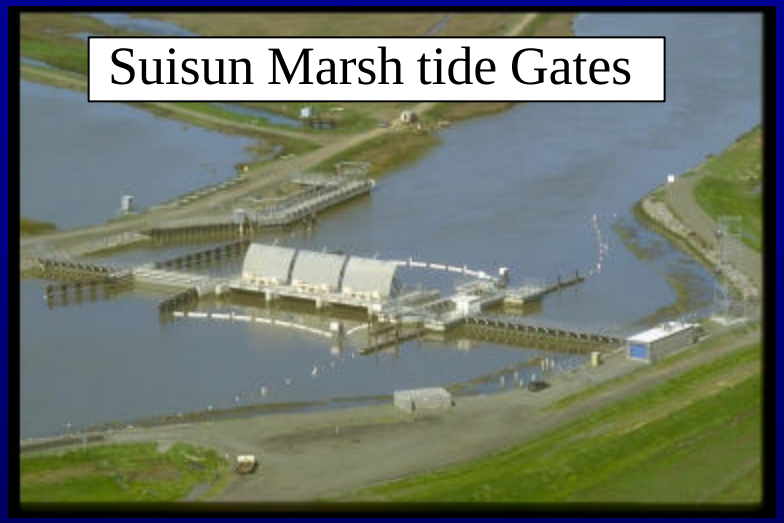
False River West-Side Gate

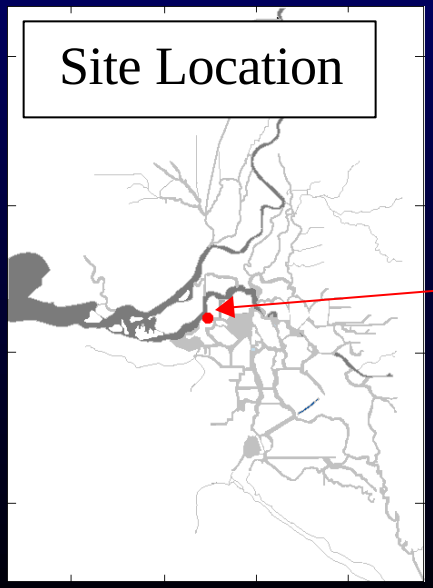


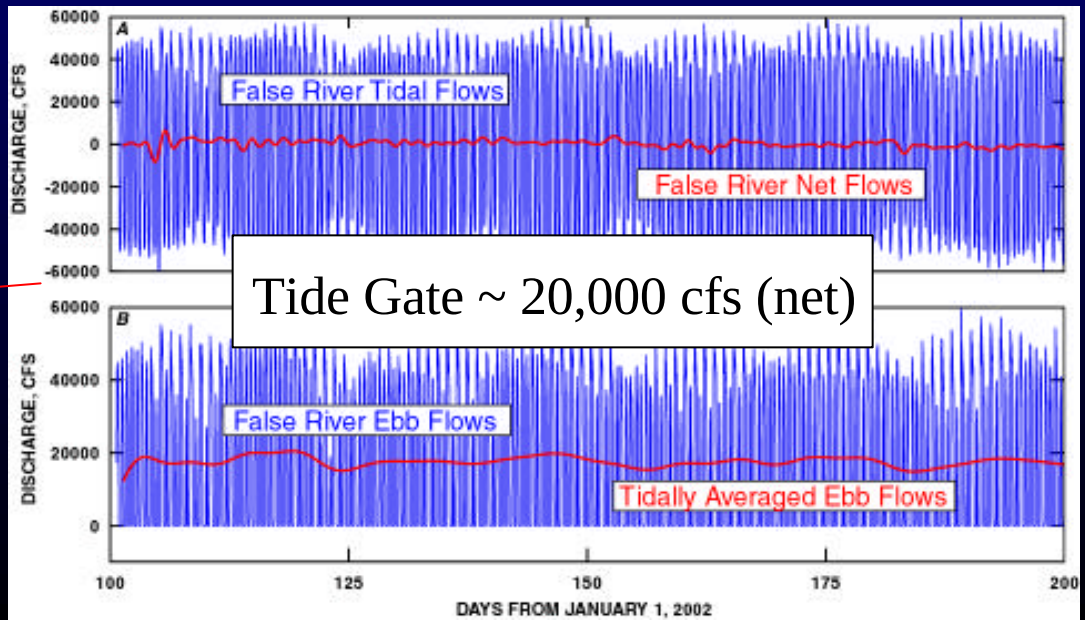
Concept ‘D’

False River West-Side Gate

Power of Tide Gates
Working in synchrony with Natural Processes



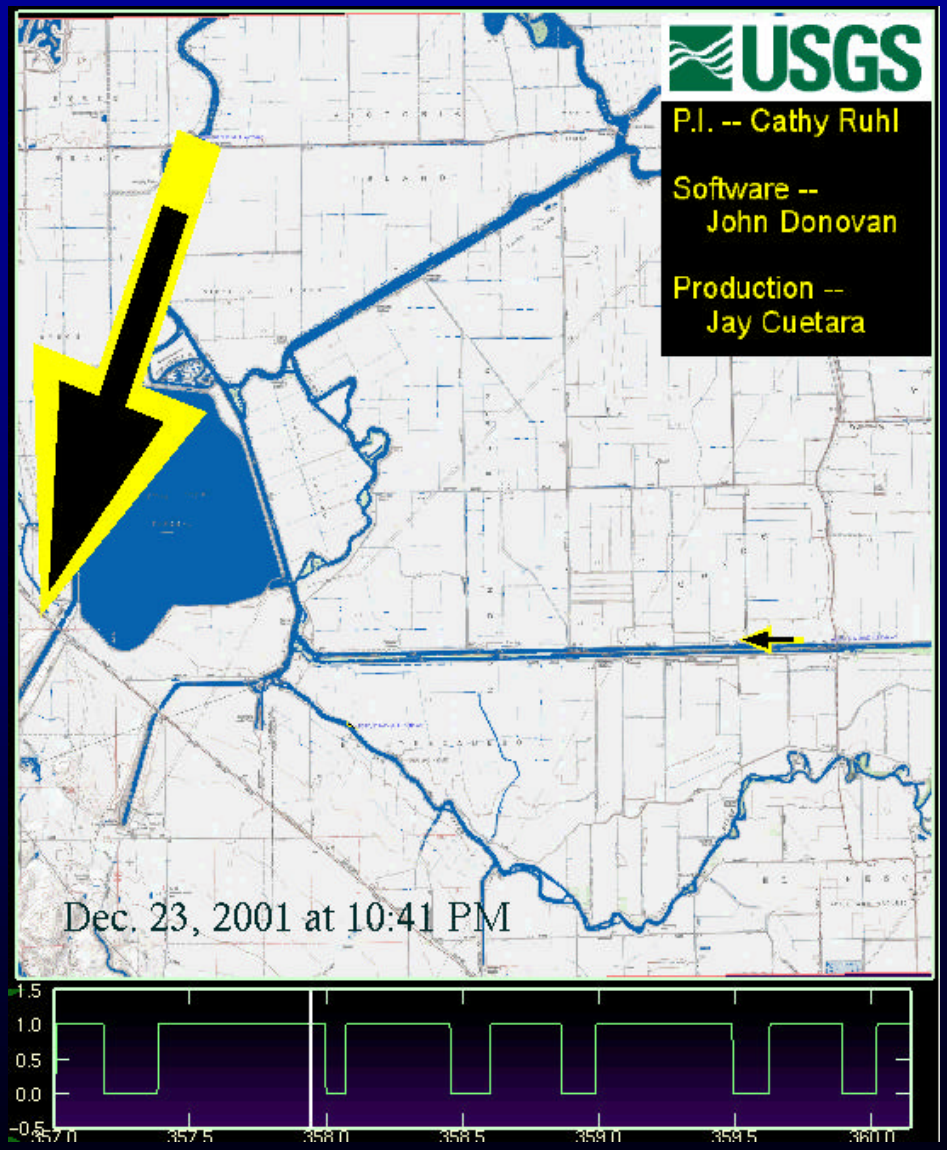




South Delta
Reducing salvage through Clifton Court Gate Operations

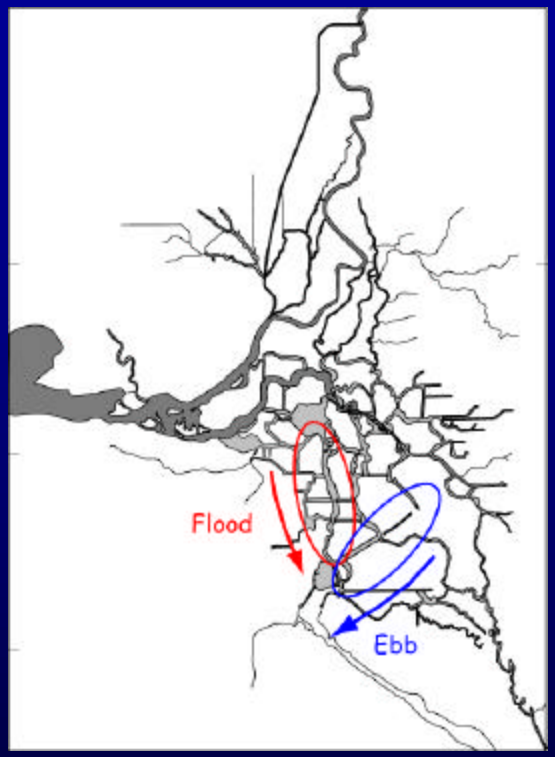
The South Delta in NOT a dead end slough

Strongly Tidal!



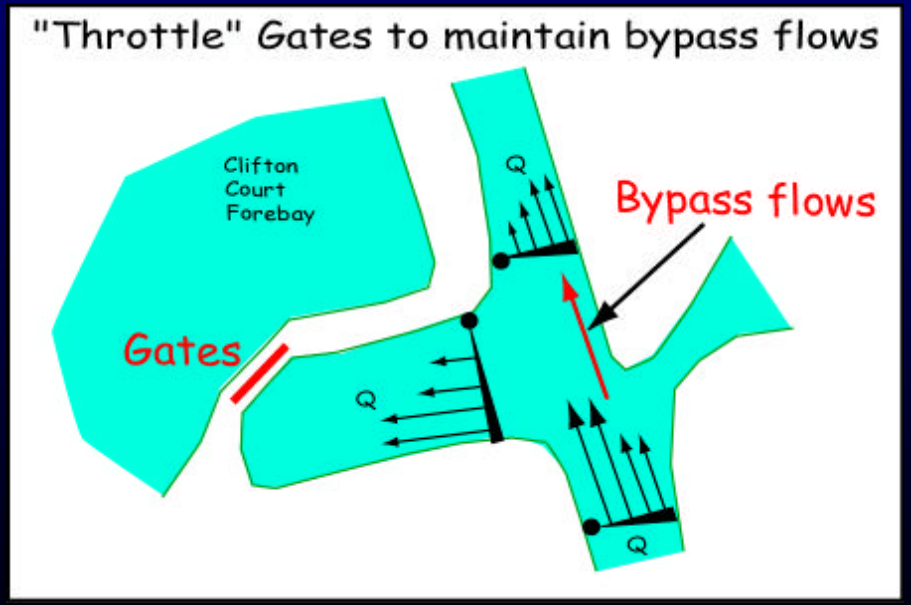
Three possible operations that could reduce salvage at SWP

(1) Control the Zone of Influence?

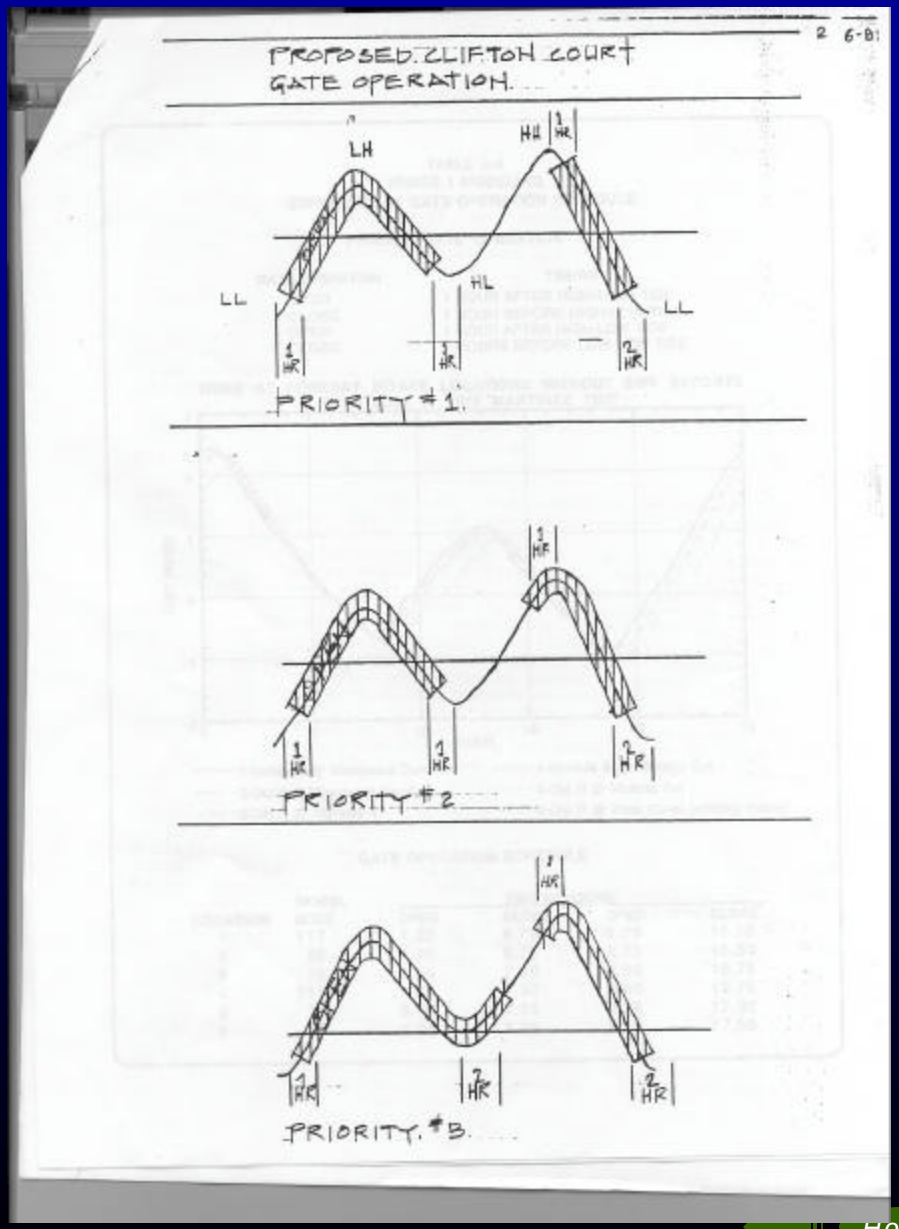


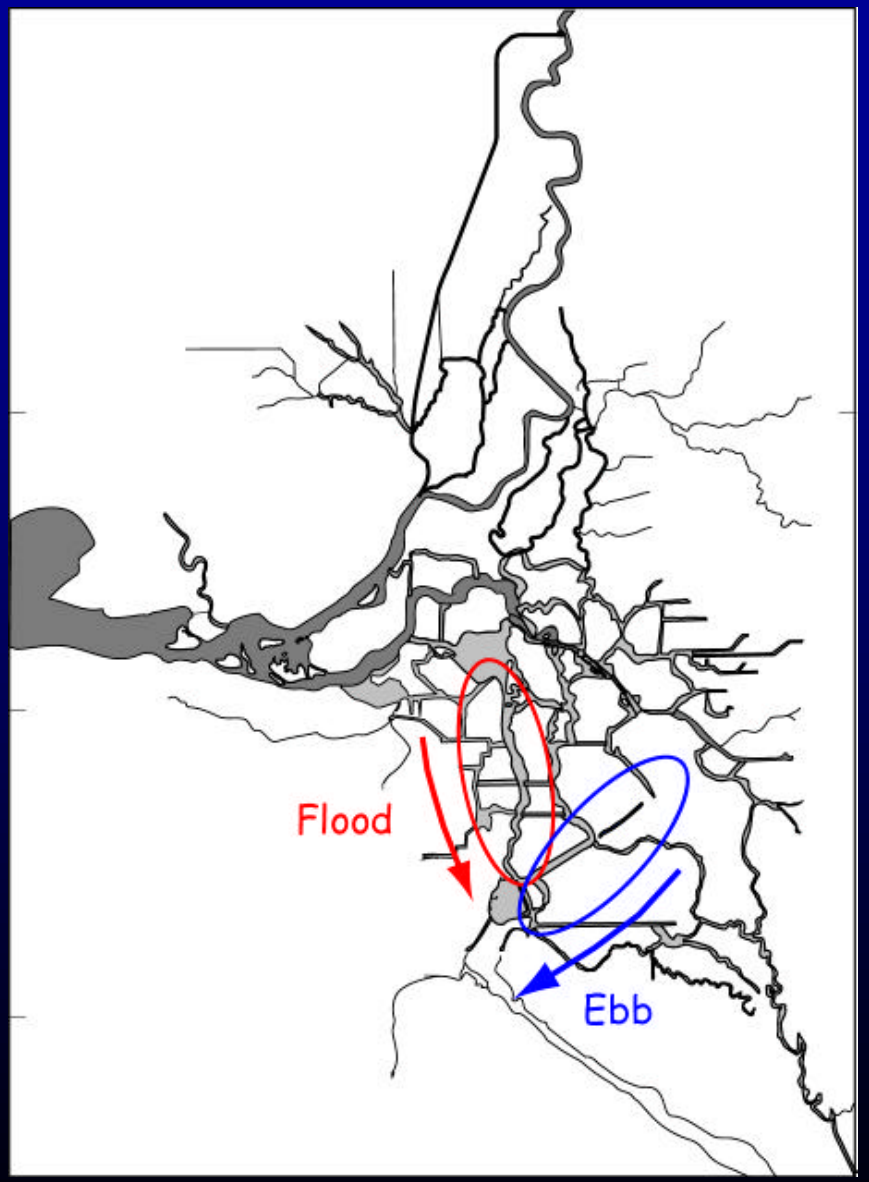
(2) Take water during day?

(3) Bypass Flows?



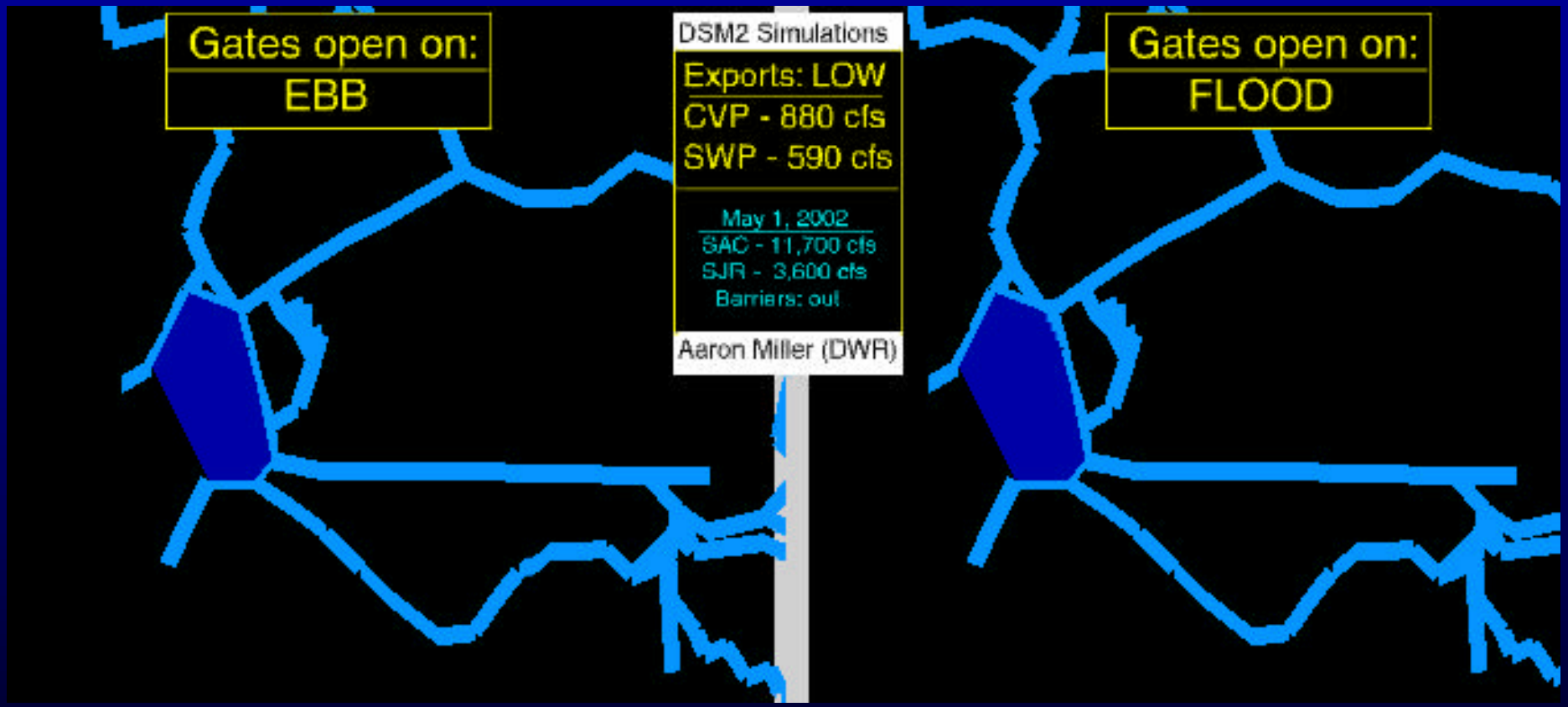
Can we alter the "zone of influence" by biasing gateops to a particular tidal phase (end of ebb vs end of flood)?





Zone of Influence of a single gate opening

Low export rate – 1,470 cfs

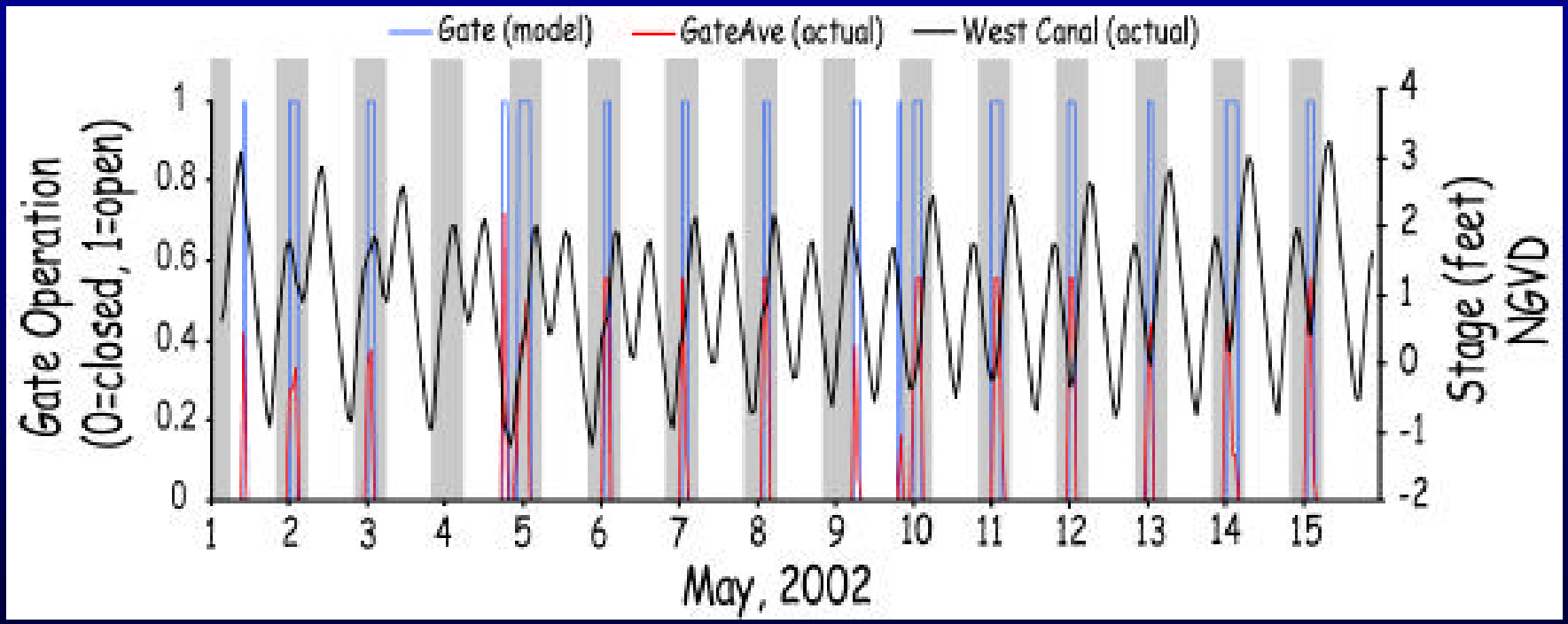


Zone of Influence of a single gate opening

High export rate – 10,800 cfs

Clifton Court Forebay Gate operation

During low SWP pumping – water taken at night



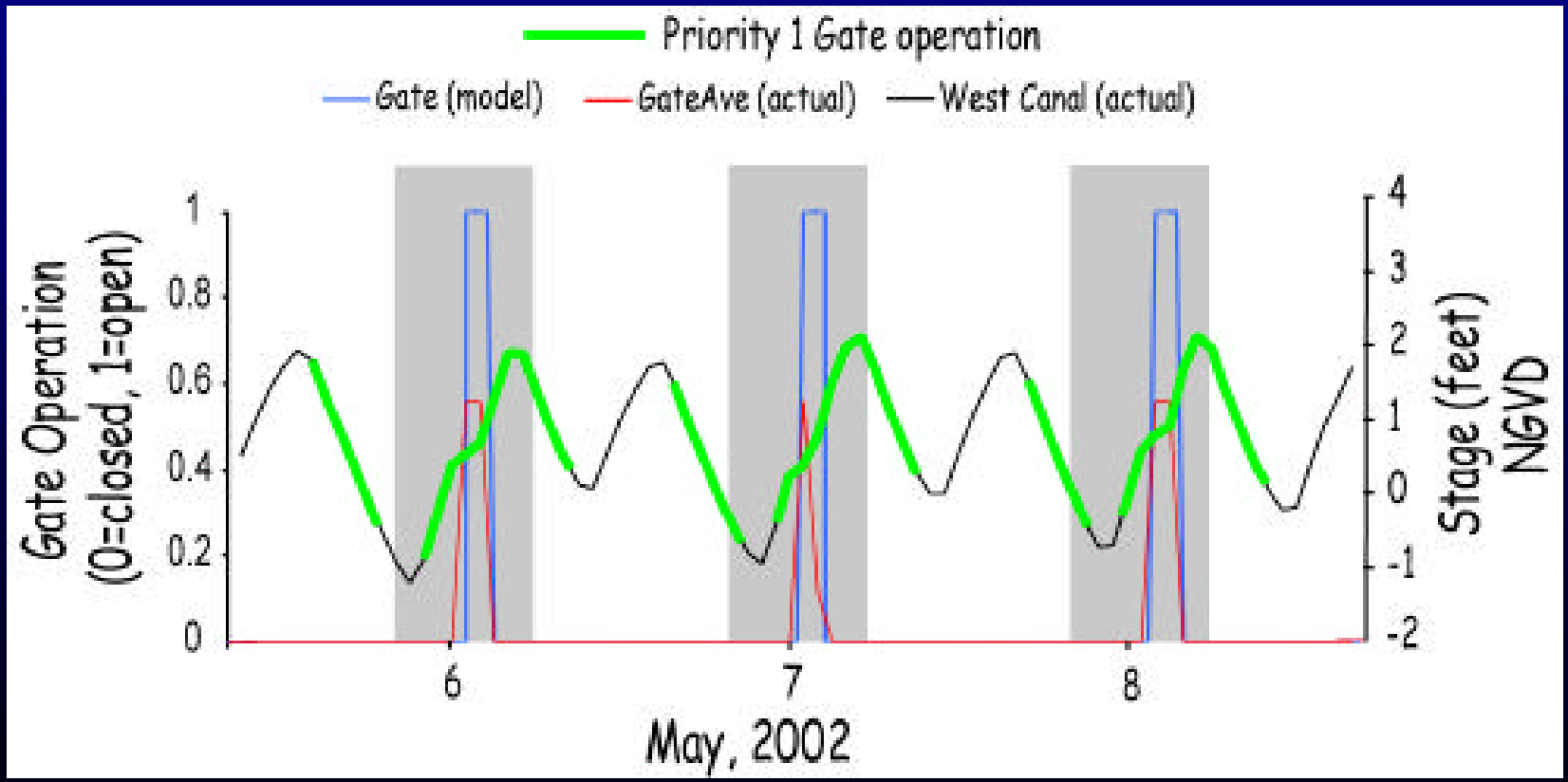
Clifton Court Forebay Gate operation

Lots of flexibility during periods of low exports:

(1) Take water during day?

(2) Lower withdrawals over longer periods

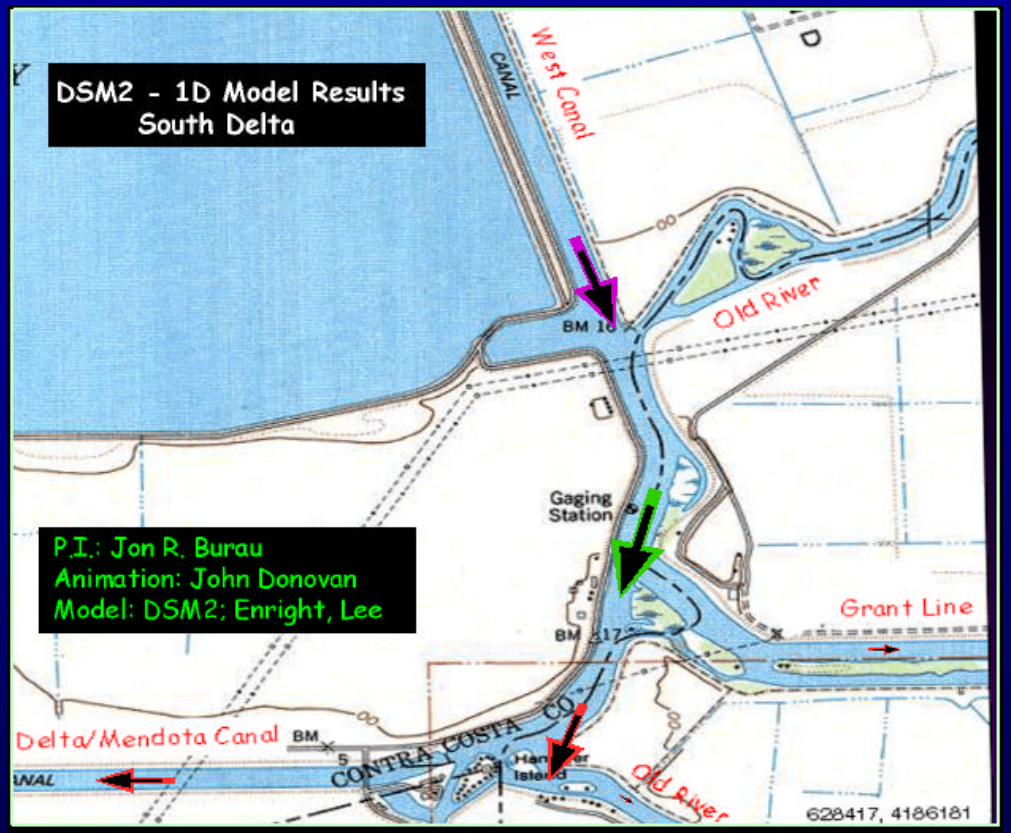
- Bypass flows



Bypass Flows are possible – even at fairly high export rates

SWP pumping: 5,000cfs
CVP pumping: 4,000 cfs
Combined: 9,000 cfs

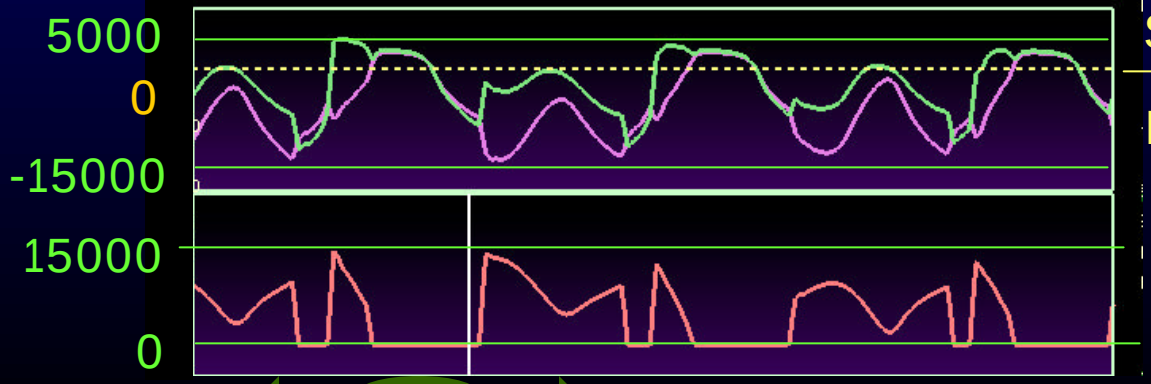
Model results courtesy of Enright and Lee, DWR



Apr. 10, 2000 at 09:55 PM

Flows in channels Outside CCF gates

CCF Gate flows



Thanks to:

Dave Osti – Franks Tract Graphics

Aaron Miller, Chris Enright – DSM2 modeling

Field Crew at USGS