Modeling Challenges for the 2015 Emergency Drought Barrier

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California Department of Water Resources

CWEMF Annual Meeting
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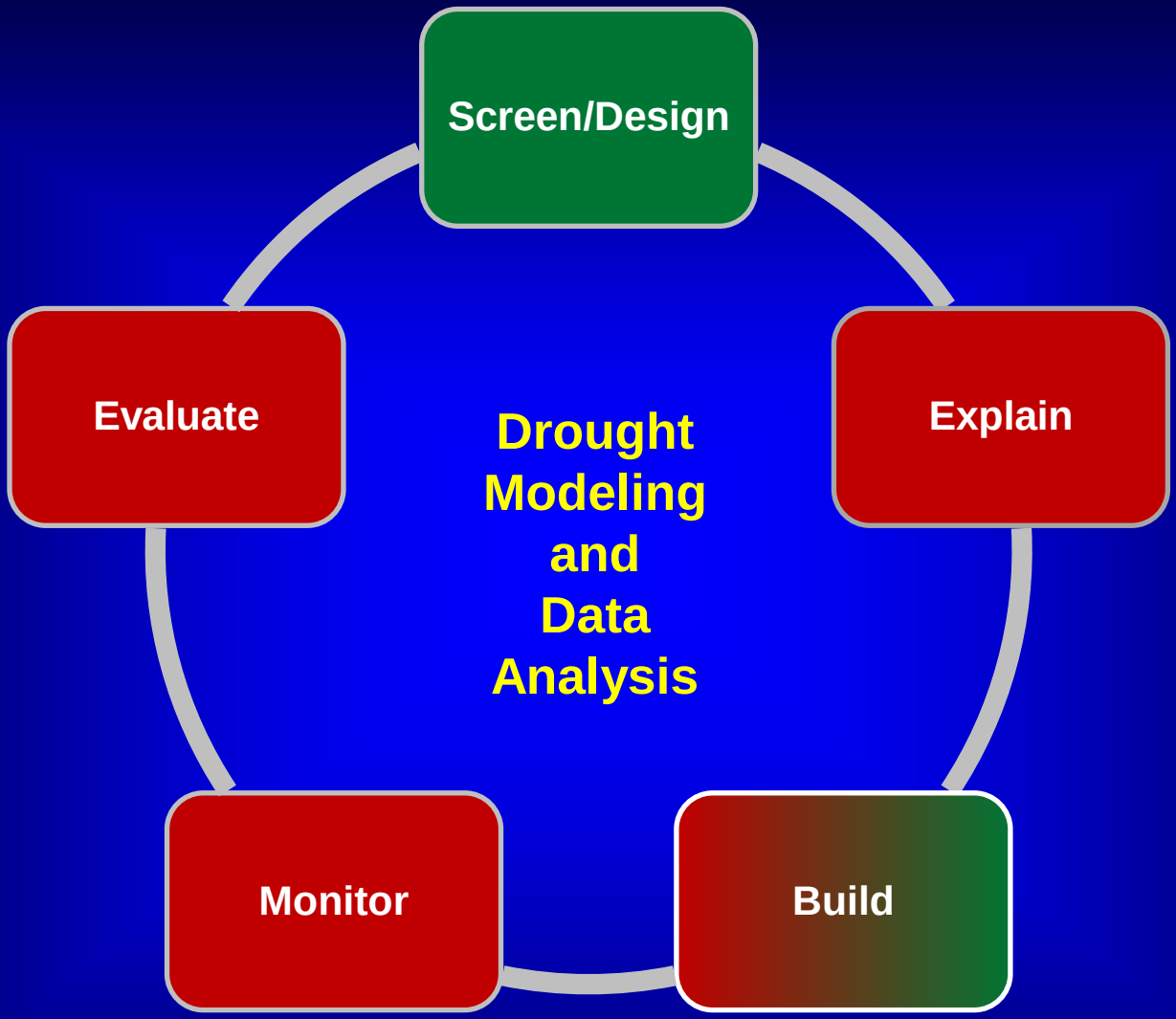
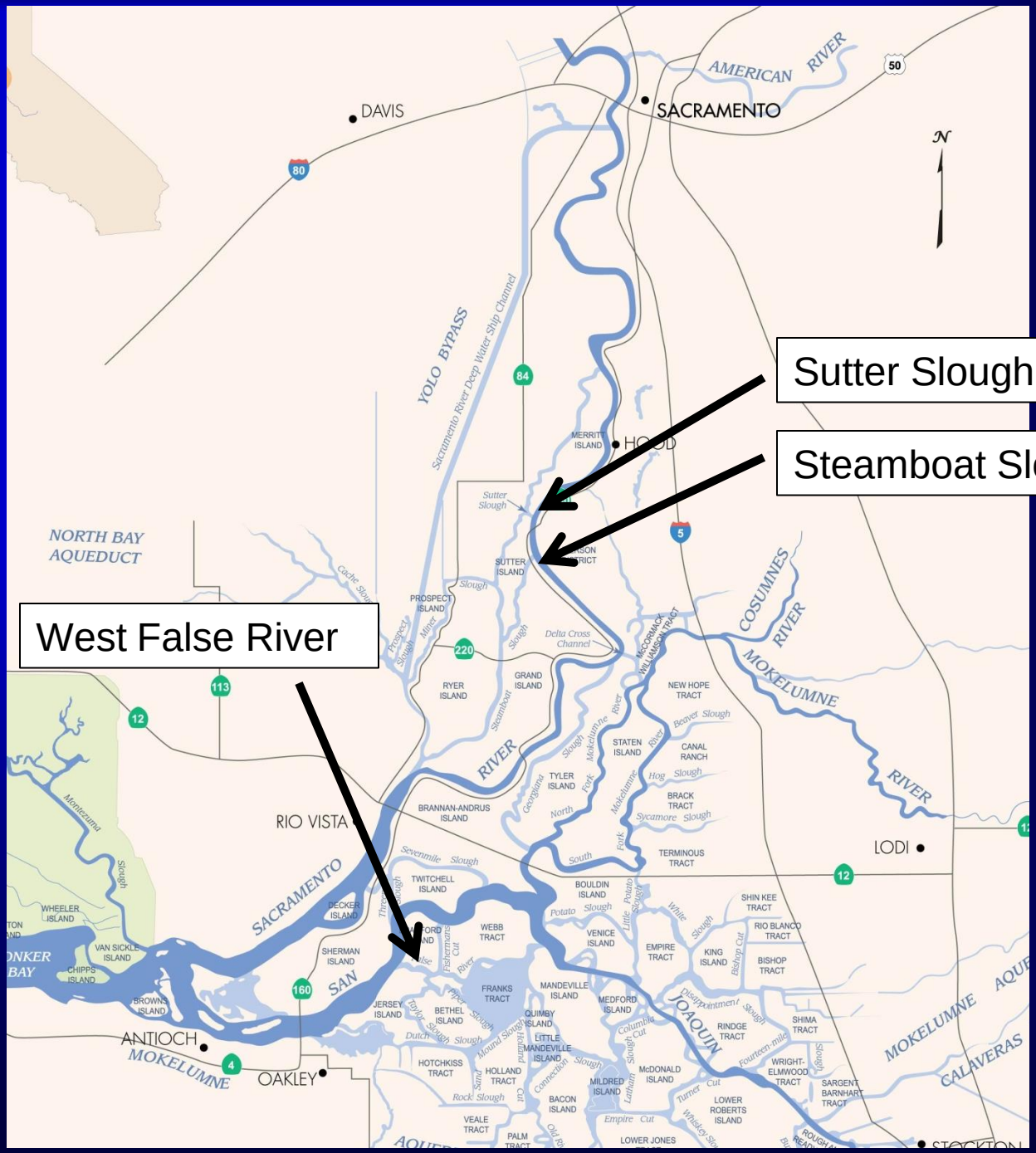
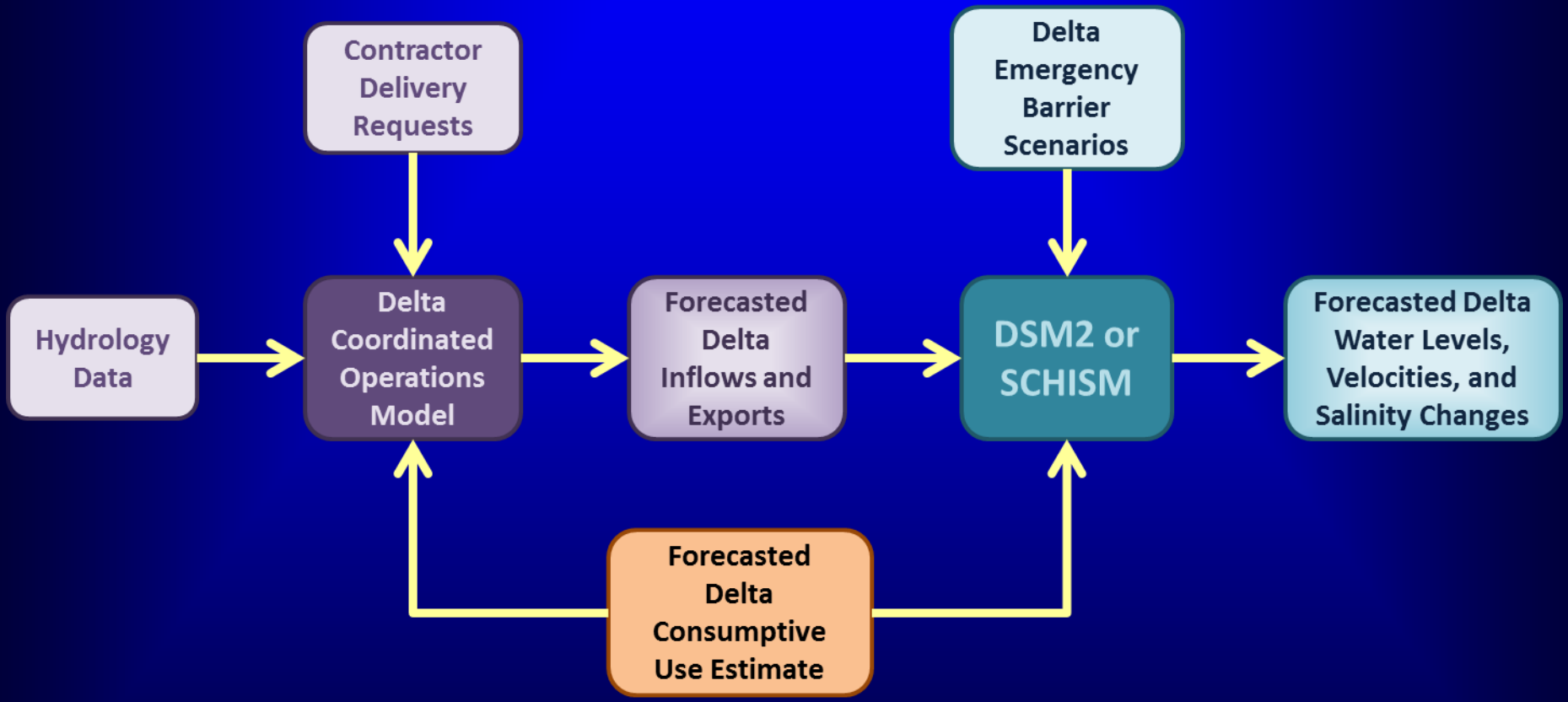

Screen/Design
Explain
Build
Monitor
Evaluate
Drought Modeling and Data Analysis
DSM2
Bay-Delta SCHISM

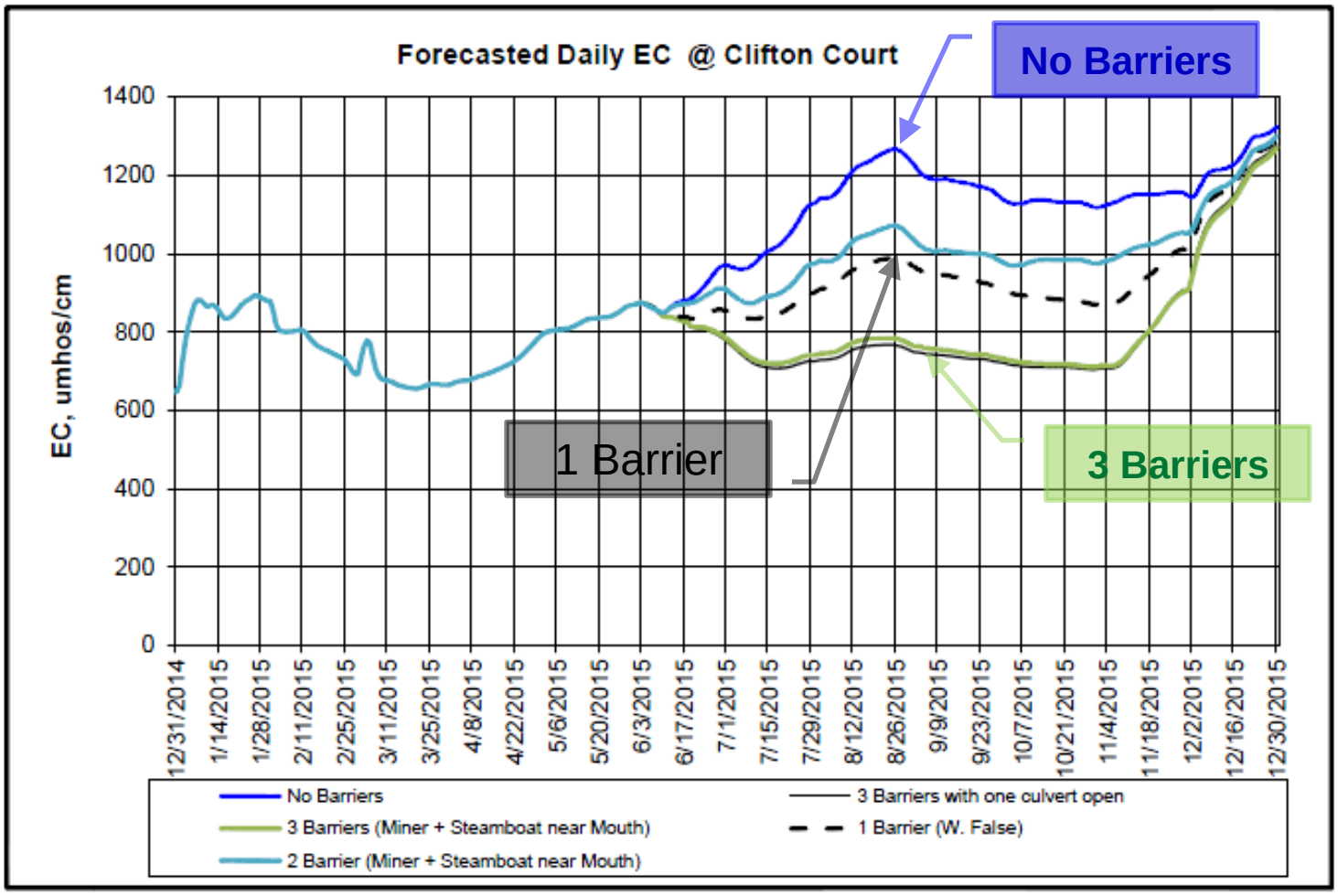
Locations Under Consideration



Forecast Modeling Process



Water Quality Results



Source: Initial Study/Proposed Mitigated Negative Declaration, Emergency Drought Barriers Project, January 2015

Water Cost Analysis Results (TUCP July Delta Outflow)

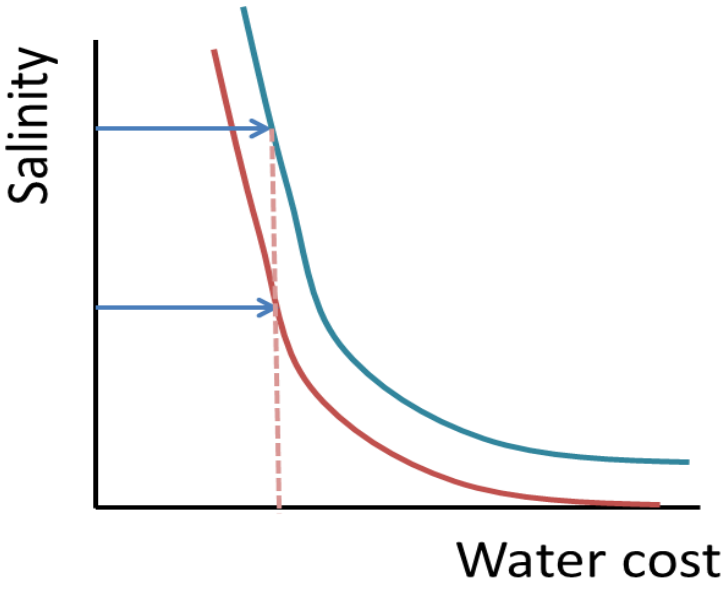
Objective	Without Emergency Barrier	Emergency Barrier	NDO Difference (positive indicates water savings with barrier)
Emmaton	4080 cfs	4000 cfs	80 cfs
Threemile Slough	3430 cfs	3360 cfs	70 cfs
NDO Difference (positive indicates water savings with modified objective)	650 cfs	640 cfs	

Note:

- TUCP: Temporary Urgency Change Petition.
- Results above were under the modified Rio Vista outflow condition.

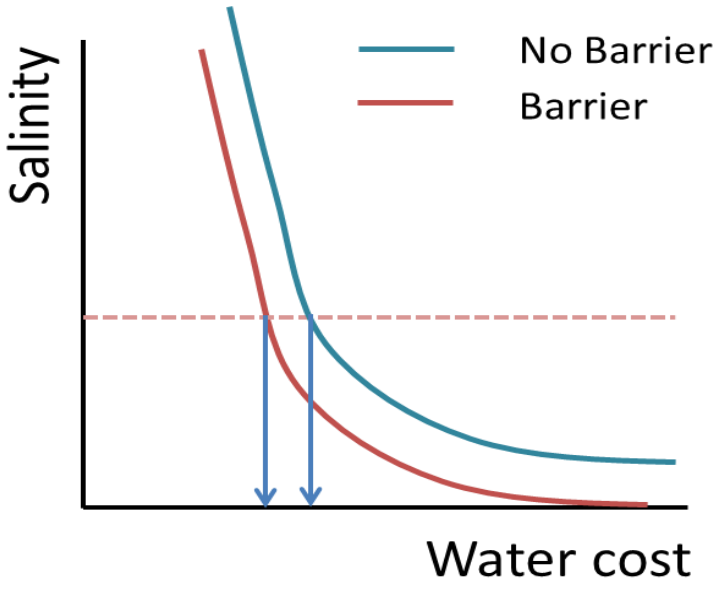
Water Cost Saving and Salinity Relationship

Fixed Flow



Large salinity change for fixed flow pattern

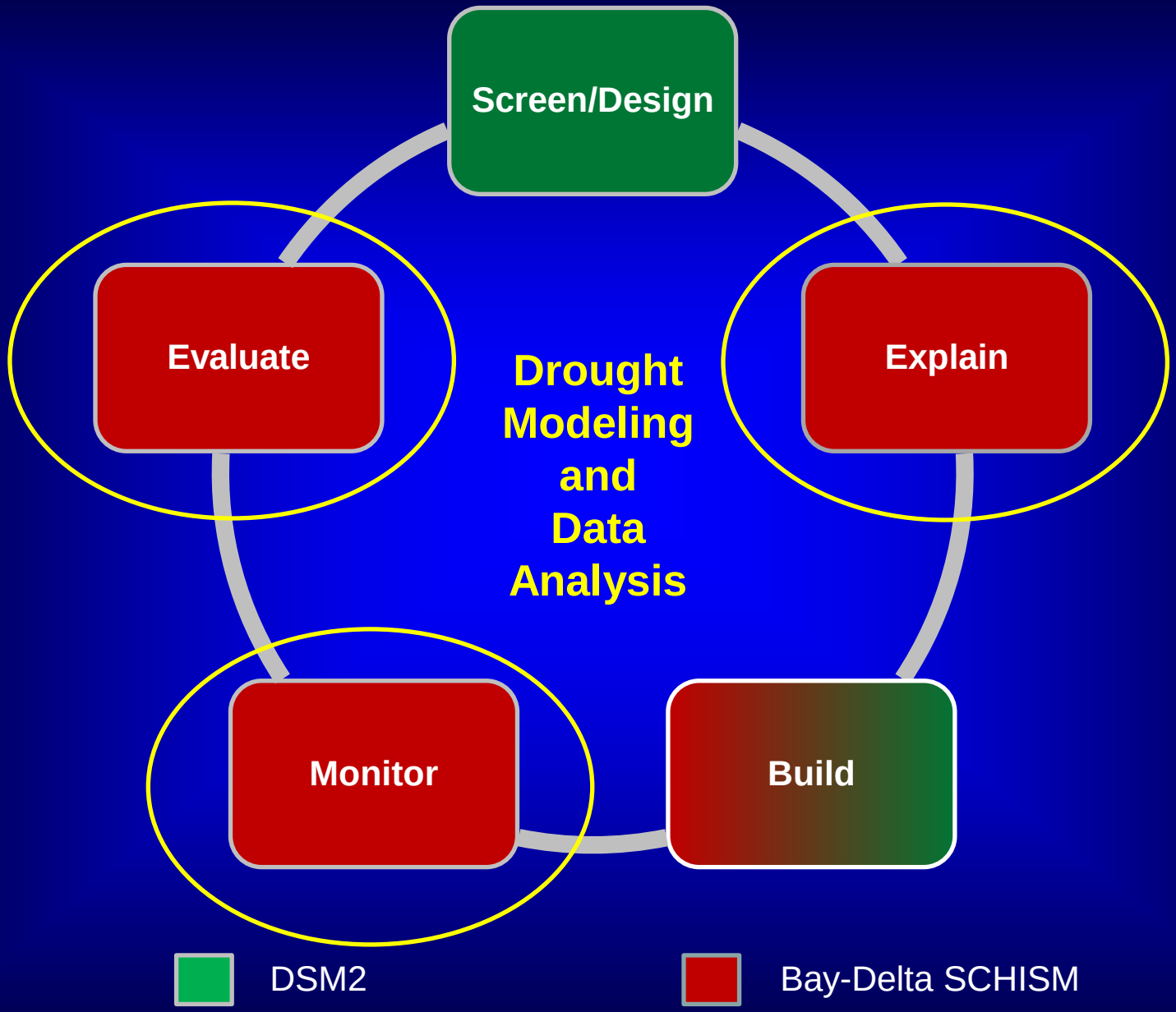
Fixed Salinity Constraint



Small water cost savings for fixed salinity constraint

Acknowledgements

- Operations and Maintenance
  - James Edwards, Reza Shacheraghi, Siqing Liu, Dan Yamanaka, Aaron Miller.
- Delta Modeling Section
  - Eli Ateljevich, Bob Suits, Nicky Sandhu, Tara Smith.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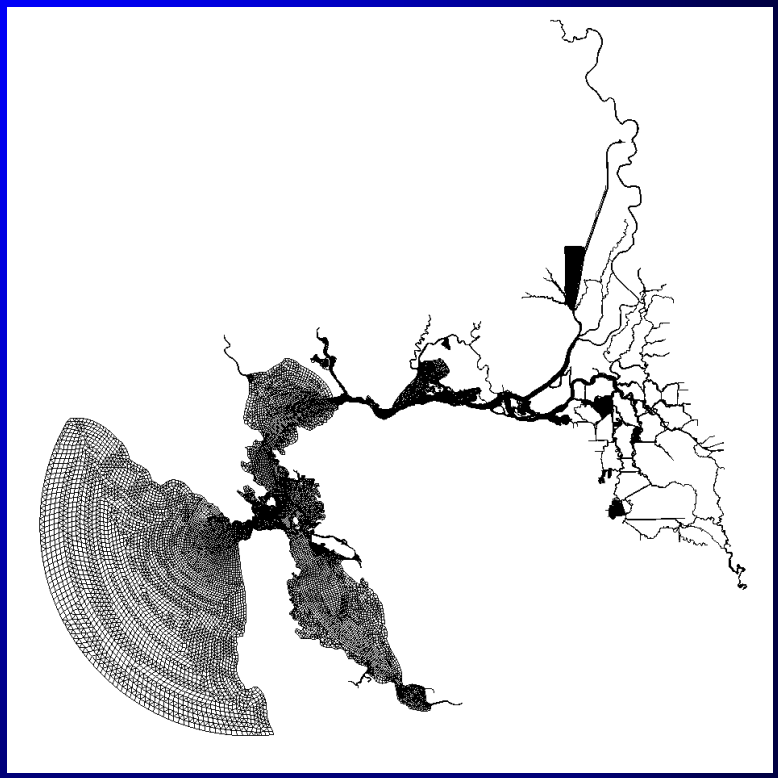
Bay-Delta SCHISM

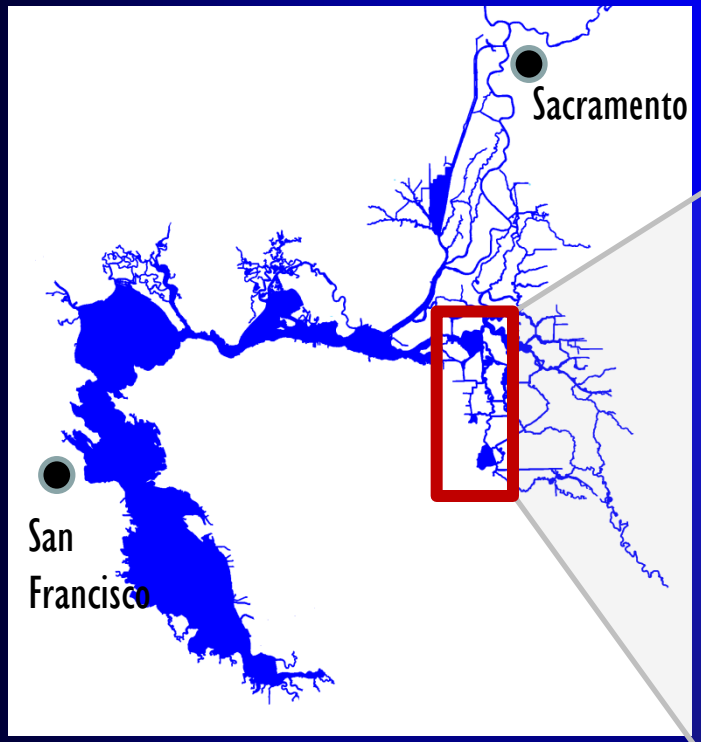
SCHISM

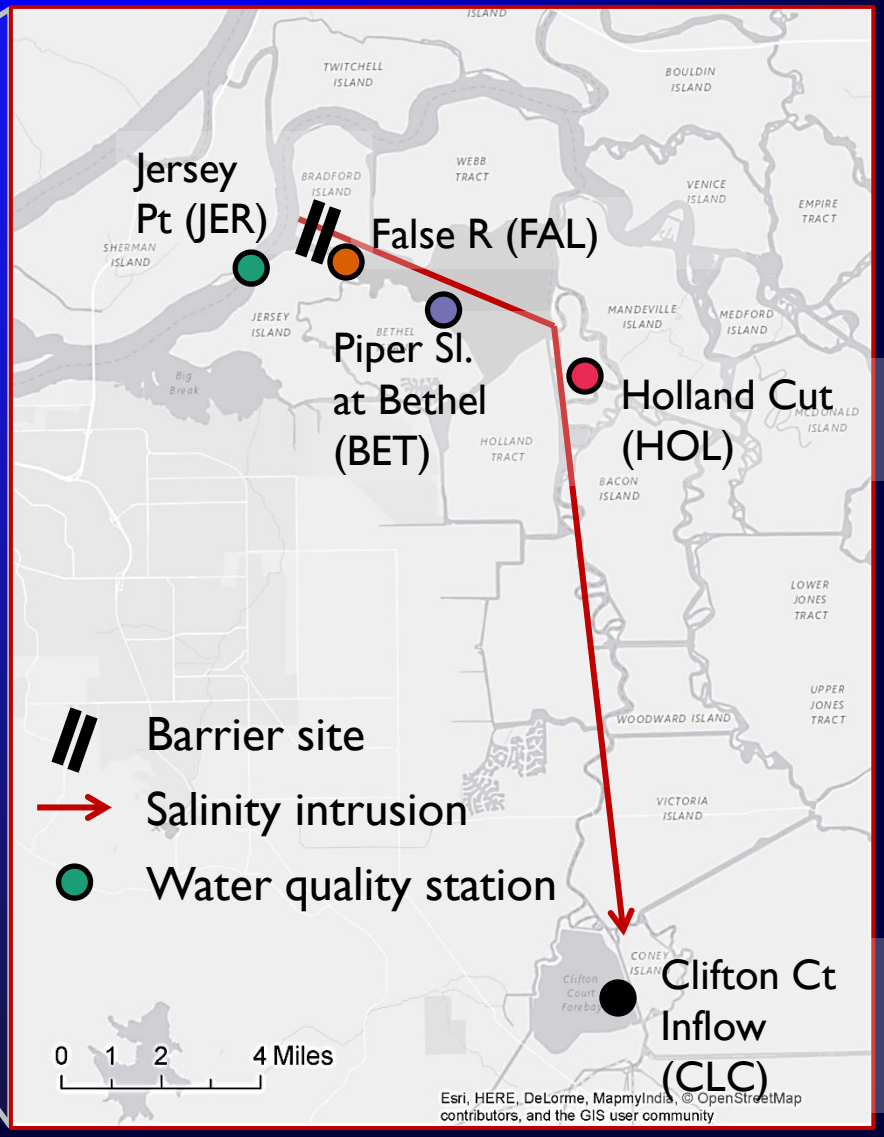
- Bay-Delta SCHISM
  - 3D
  - Farallones to Knights Landing and Vernalis
  - 3 years of production use
  - Flow, salinity, temperature …



http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/models/bay_delta_schism/
http://ccrm.vims.edu/schism/

Salinity Propagation



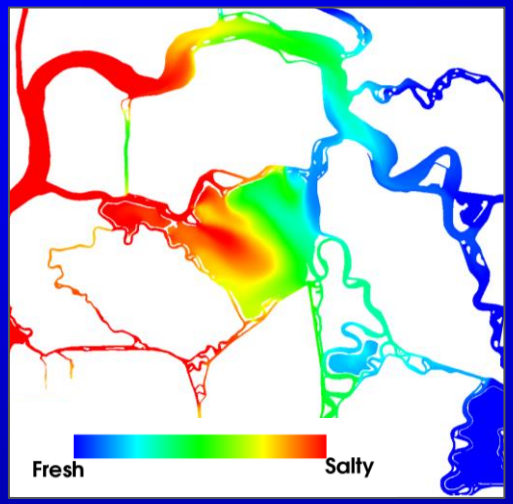


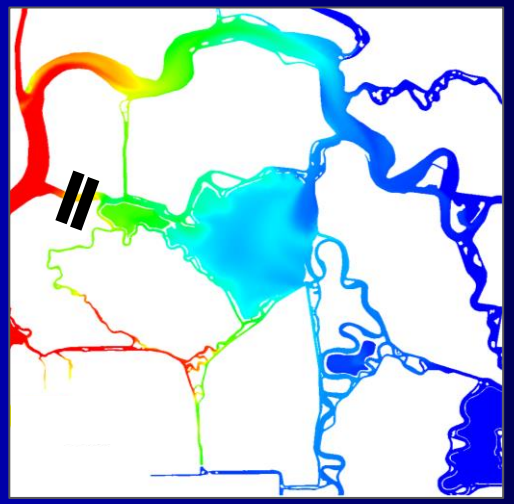
Tidal Pumping: Salinity

No Barrier

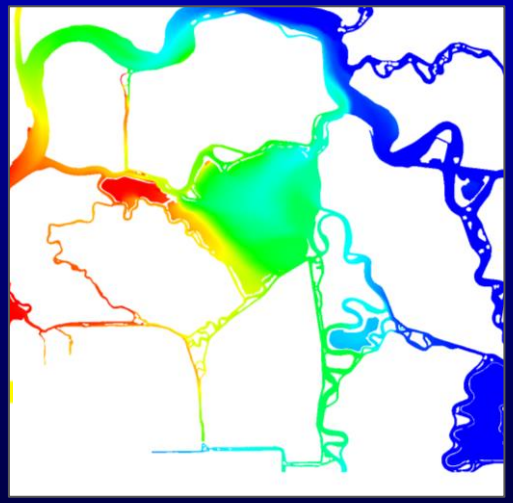
Barrier

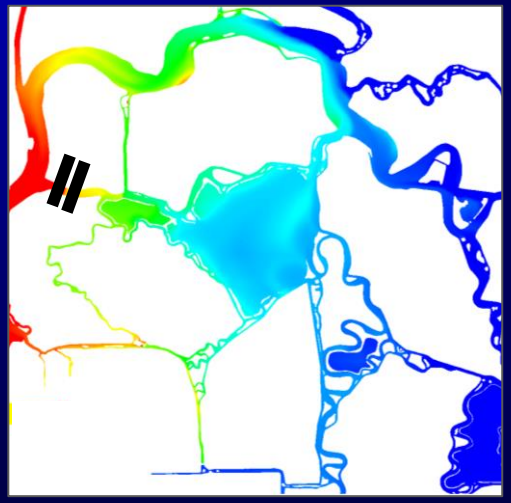
Flood





Ebb

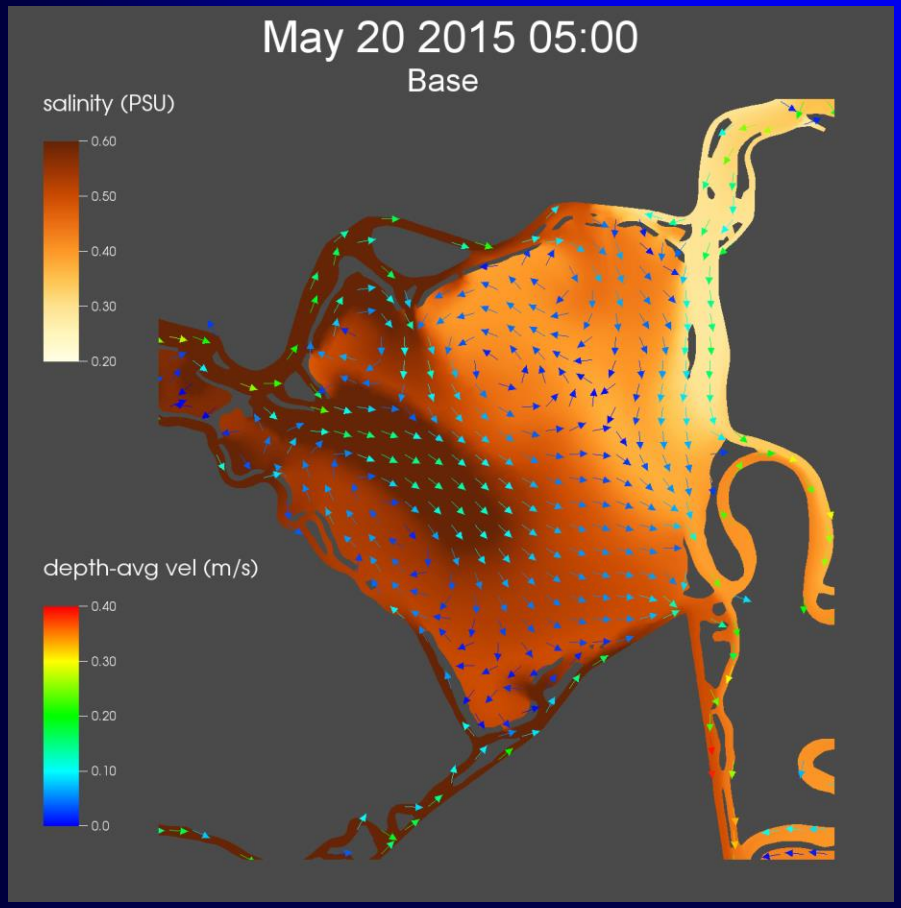


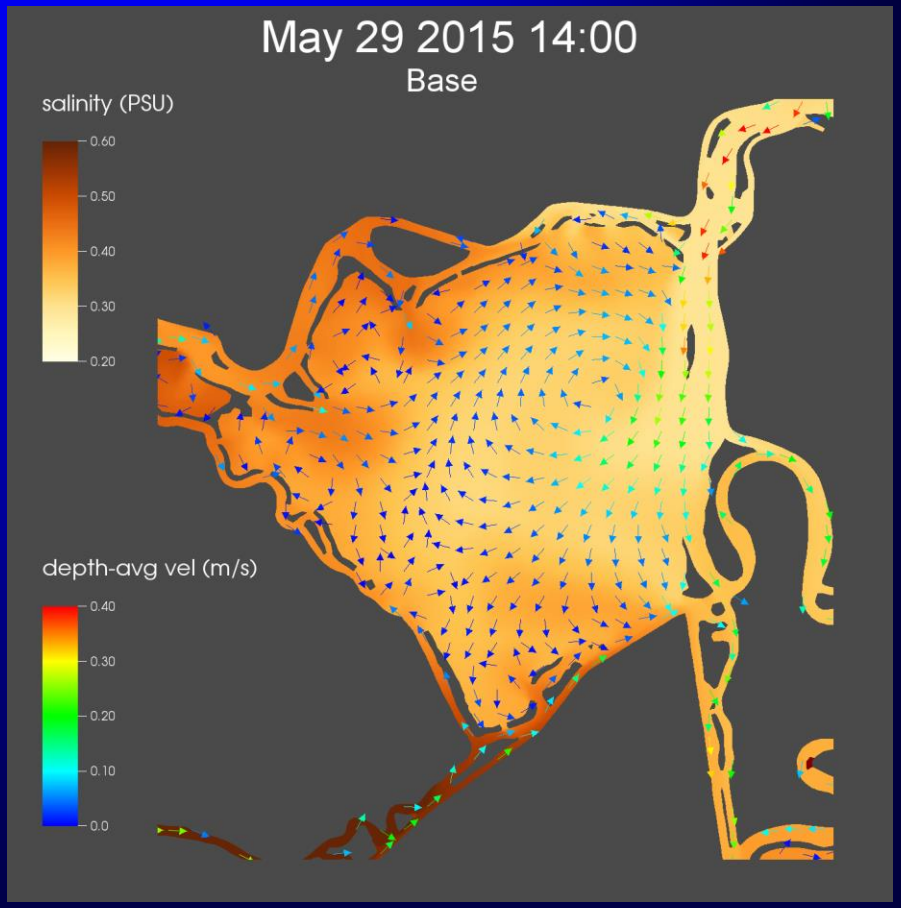


Bay-Delta SCHISM Model, Low NDOI Forecast

Mixing @ Franks Tract

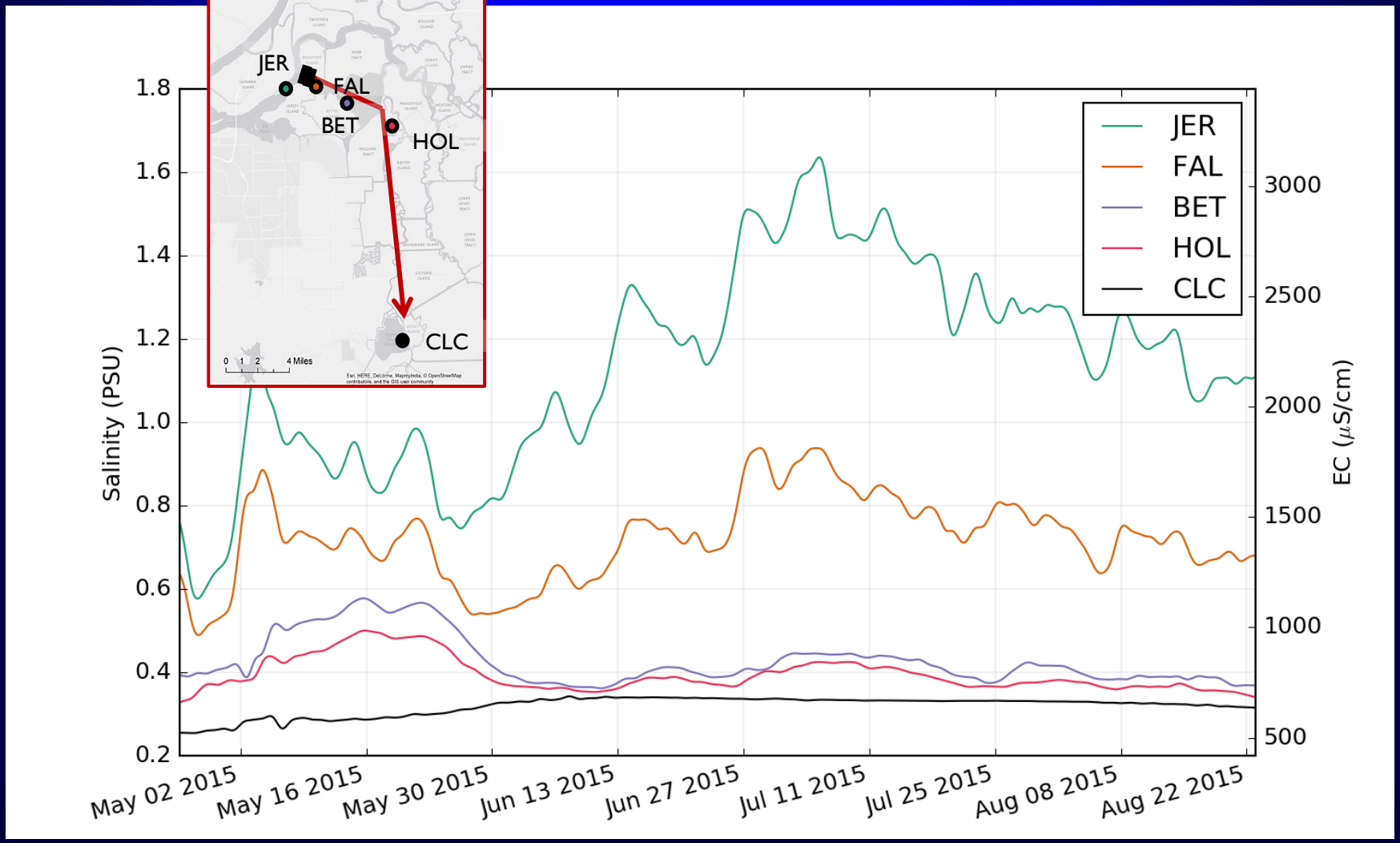
The barrier changes mixing pattern.





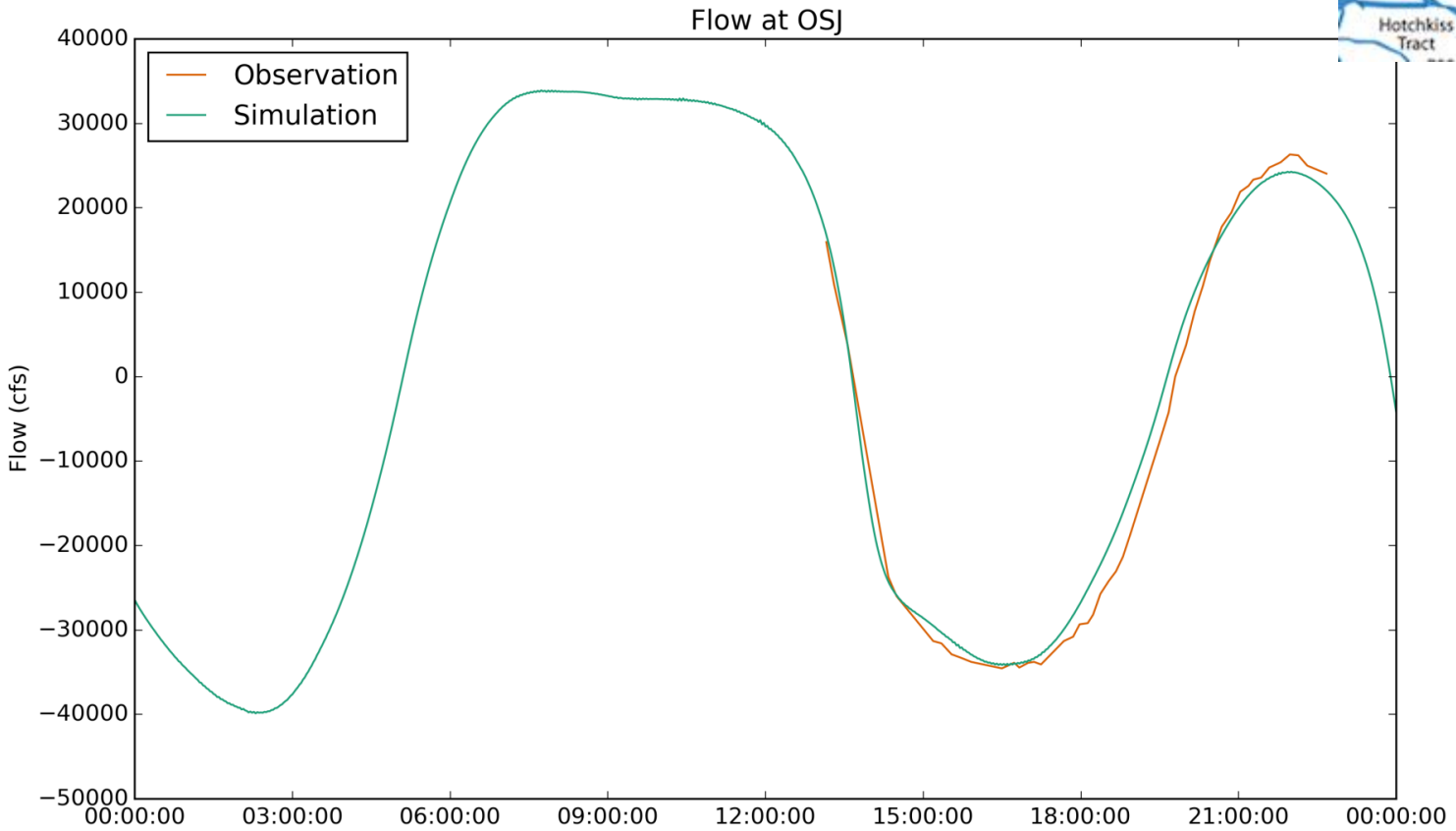
Salinity through the Corridor

JER and BET are decoupled.



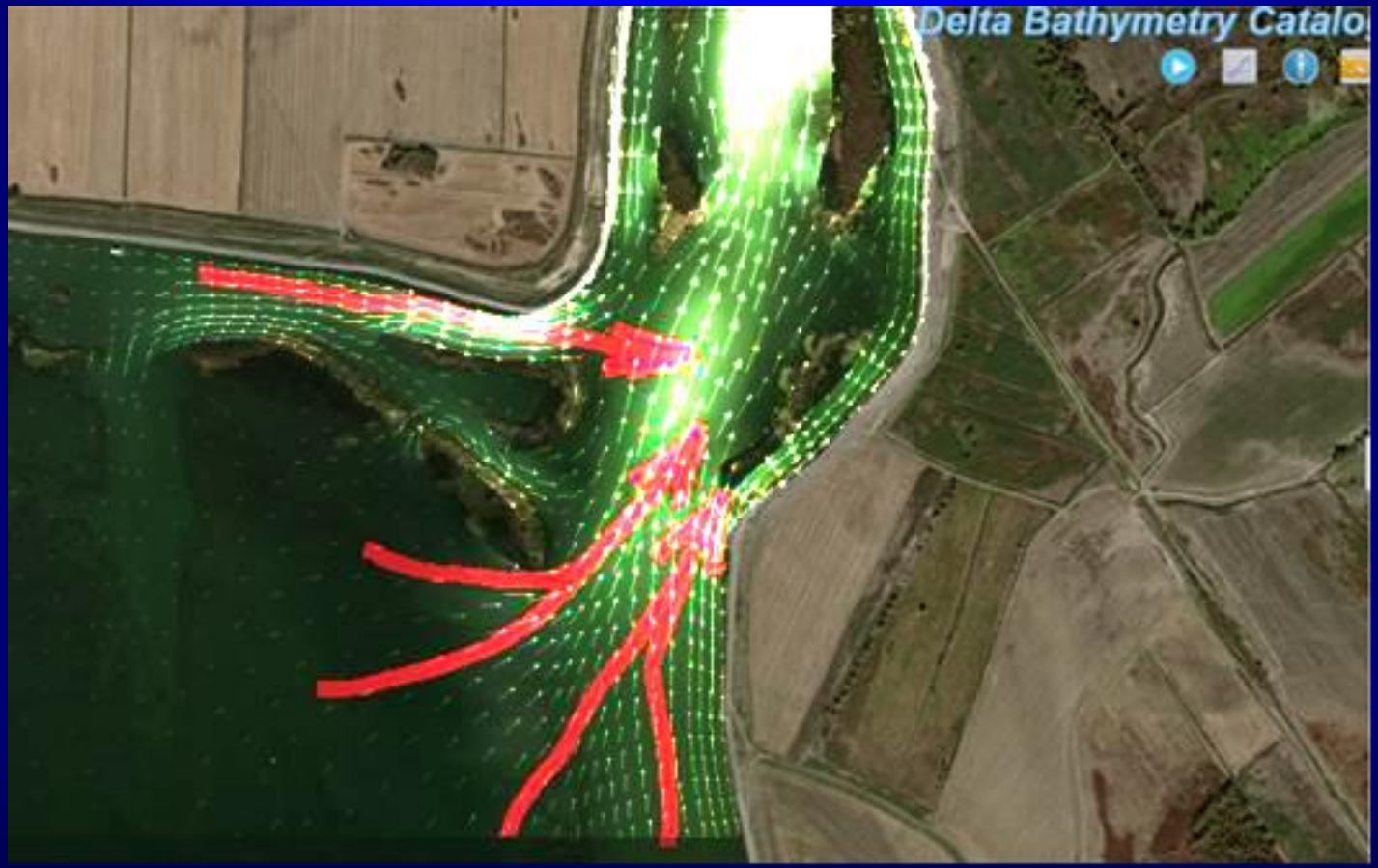
Monitoring: Flow Measurement

Model can provide insight for monitoring.



Monitoring Hotspot

Franks Tract and the Old River

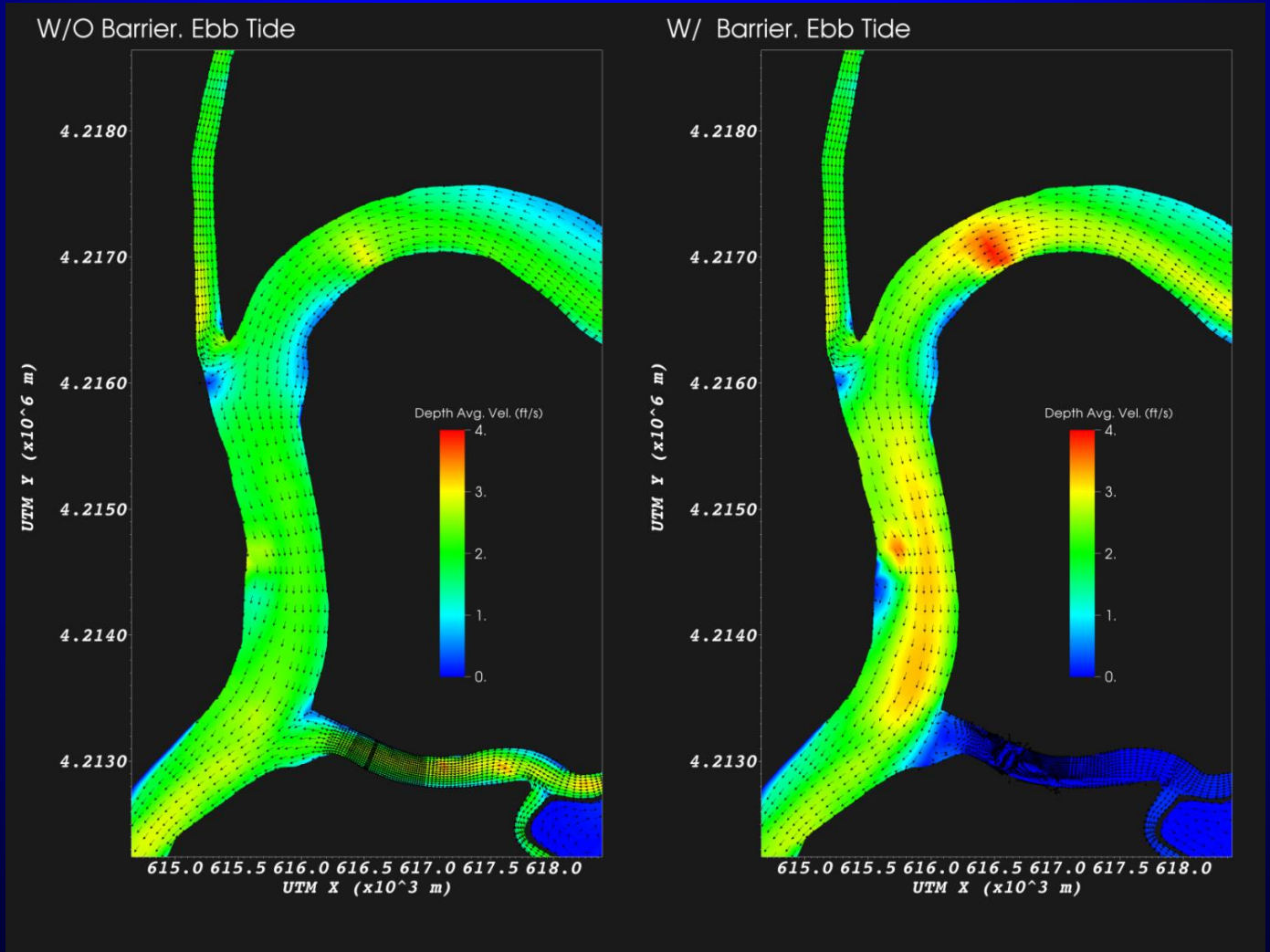


Red: Field observation, White: Model

Change of Velocity

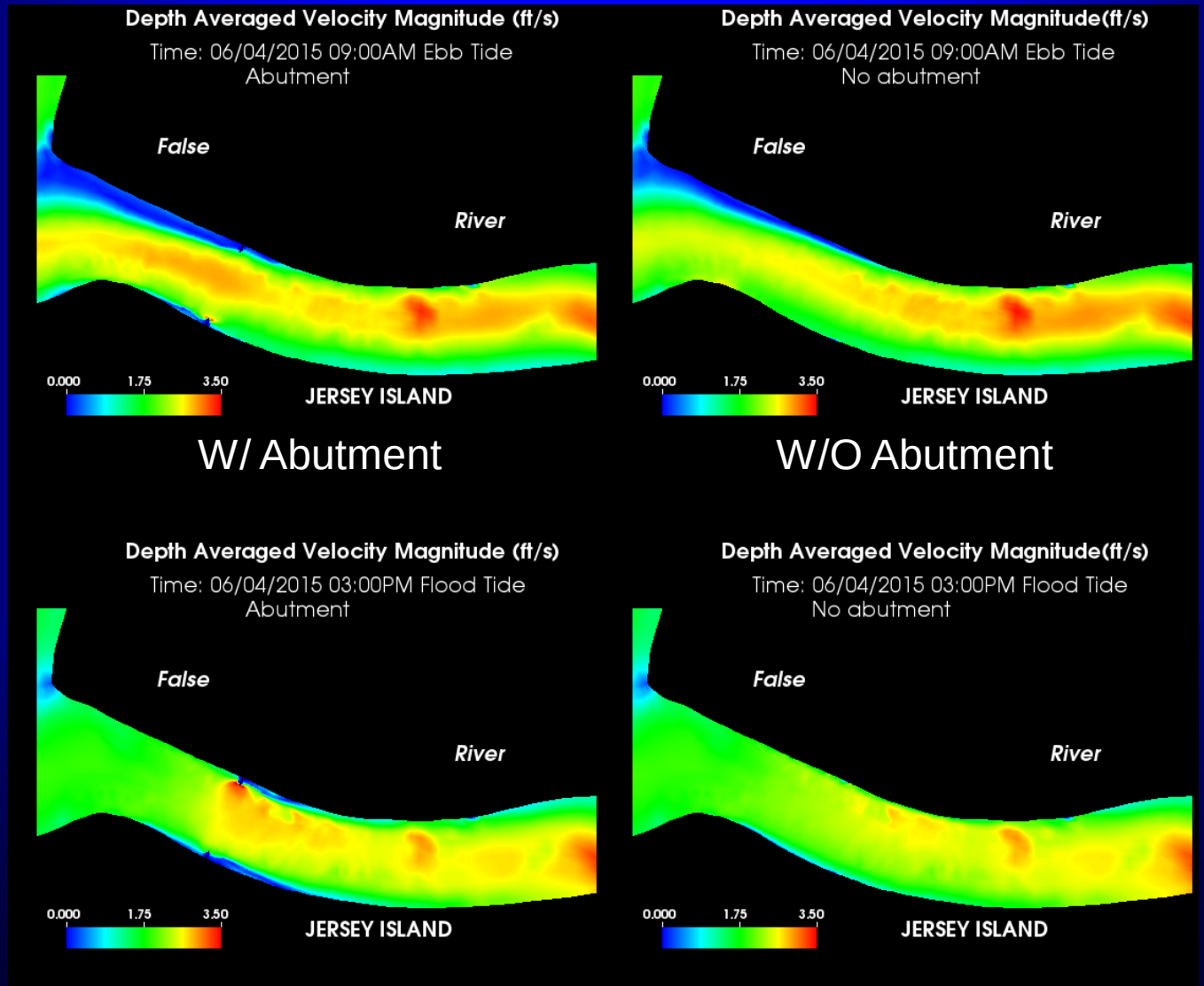
Around Bradford

Model can estimate changes in velocity by a project.



Abutment: Flow Pattern

Model can estimate local changes in flow.



What we learned

- Drought condition = Unique
  - Unusually low pumping
  - Salt Intrusion
    - Emergency Drought Barrier: Timing
    - Mixing
  - Uncertainty

- Values of 2D & 3D
  - Estimation/Hindcast

Acknowledgements: SCHISM

- Delta Modeling Section
  - Eli Ateljevich, Jon Shu, Rueen-Fang Wang
- Virginia Institute of Marine Science
  - Joseph Y. Zhang