Building Sea-level Rise Resilience and Water Management Capability at Alligator River NWR and Dare County Bombing Range

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The Nature Conservancy of North Carolina
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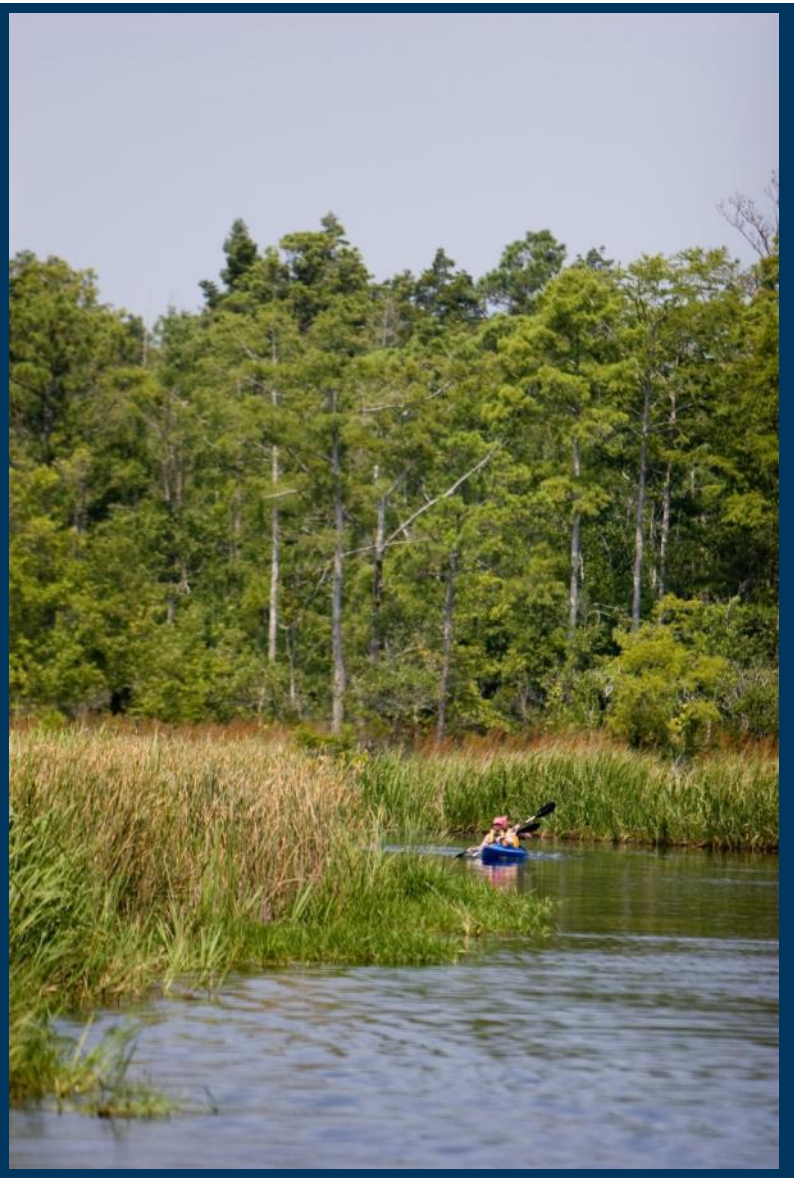
Outline for today's talk

- Climate change challenges and adaptation approaches at ARNWR
- US Fish and Wildlife & US Air Force: Finding common peat to stand on
- Projects in the works



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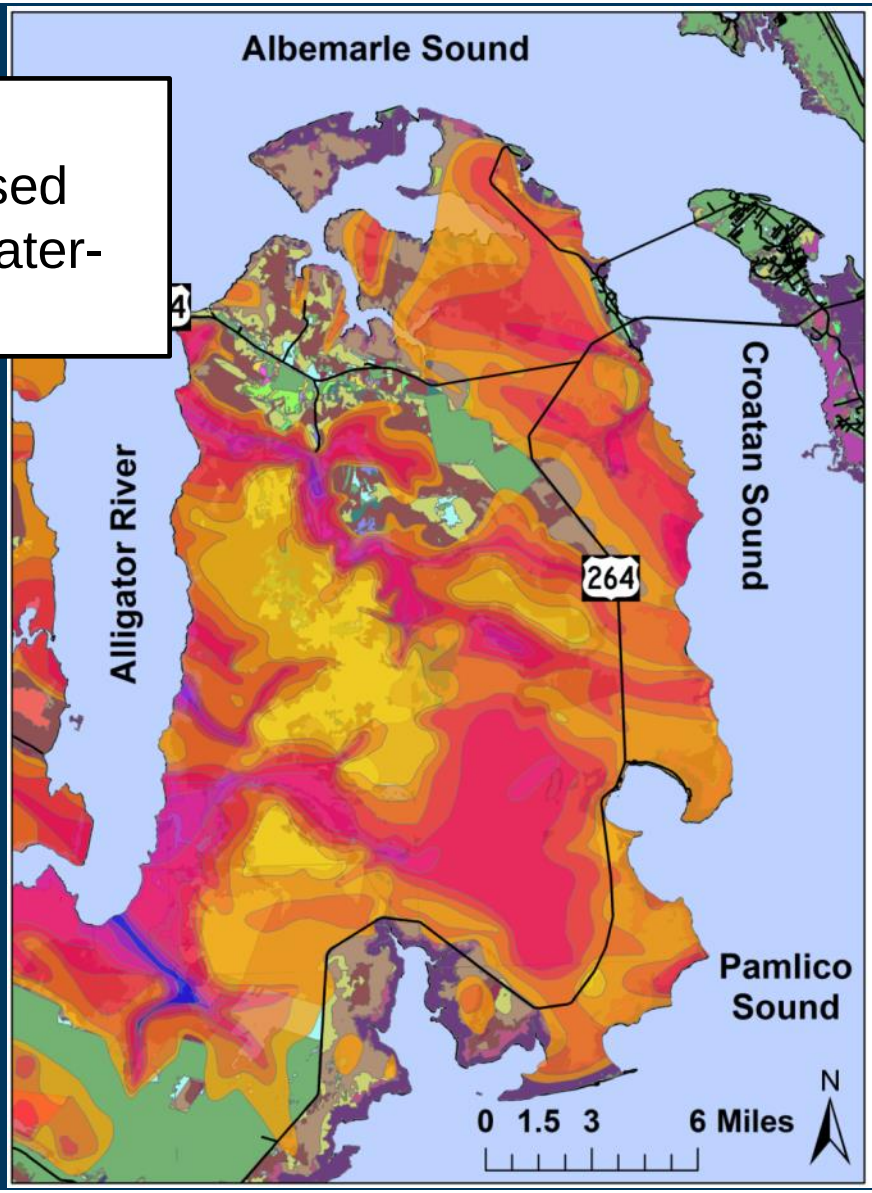
Wetland Mosaic

- Pocosin
- Swamp forest
- Pine flat
- Hardwood flat
- Riverine swamp forest
- Estuarine shrub/scrub
- Fresh marsh
- Brackish marsh

Peat = Build up of partially decomposed plant material in water-logged areas

Peat Depth (ft)

0 7 14



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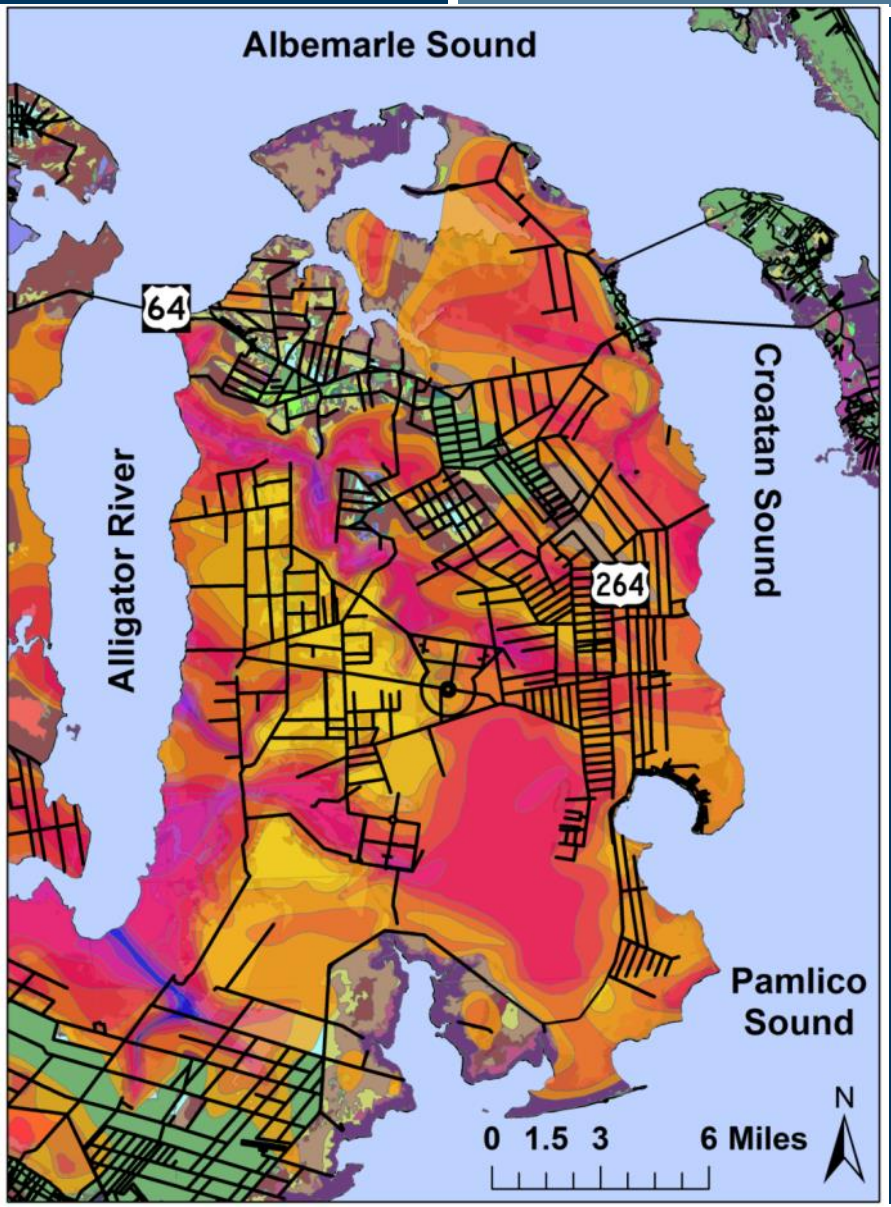
Ditching and Drainage



Ditches

- Dries out peat soil, breaks down
- Subsidence
- Salt water moves in toward inner swamps (salt water intrusion)

Roads

- Reduce water movement across the surface of the ground
- Can create ponding effect

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Climate Change Challenges

- Sea-level rise
  - Low elevation
  - Oregon Inlet SLR ~ 3 mm/yr
- Salt water intrusion/incursion
  - Stressed, transitioning plant communities
  - Increased porewater salinity
  - Peat decomposition
- Increased storm severity/frequency
  - Shoreline erosion
  - Storm surge

What are TNC's Approaches?

Albemarle-Pamlico Climate Change Adaptation Project

Oyster Reef Restoration

Hydrologic Restoration

Wetland Plant Community Enhancement

Carbon Storage Feasibility

Ecosystem Services Analysis

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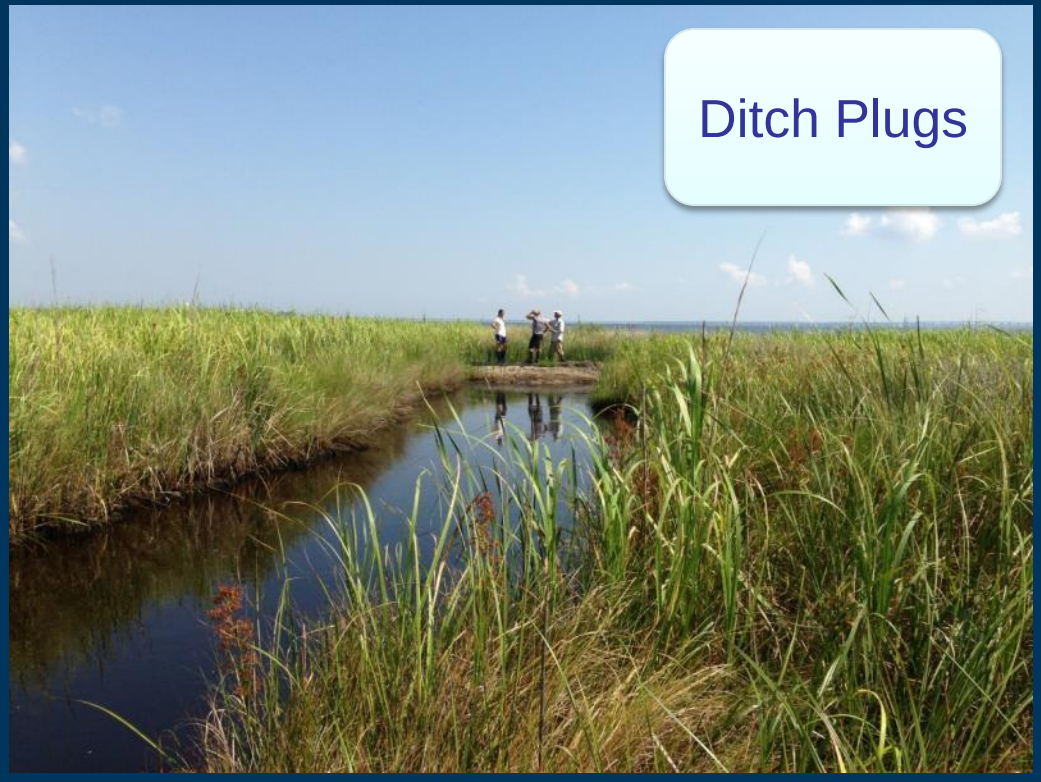
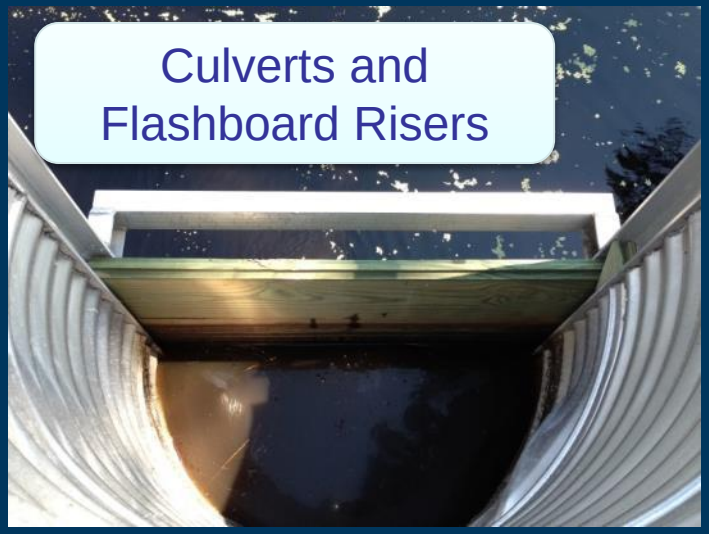
Hydrologic Restoration

We are reducing salt water intrusion, improving water quality in the sound and reducing vulnerability to wildfires.



Ditch Plugs



Culverts and Flashboard Risers

Check Valves

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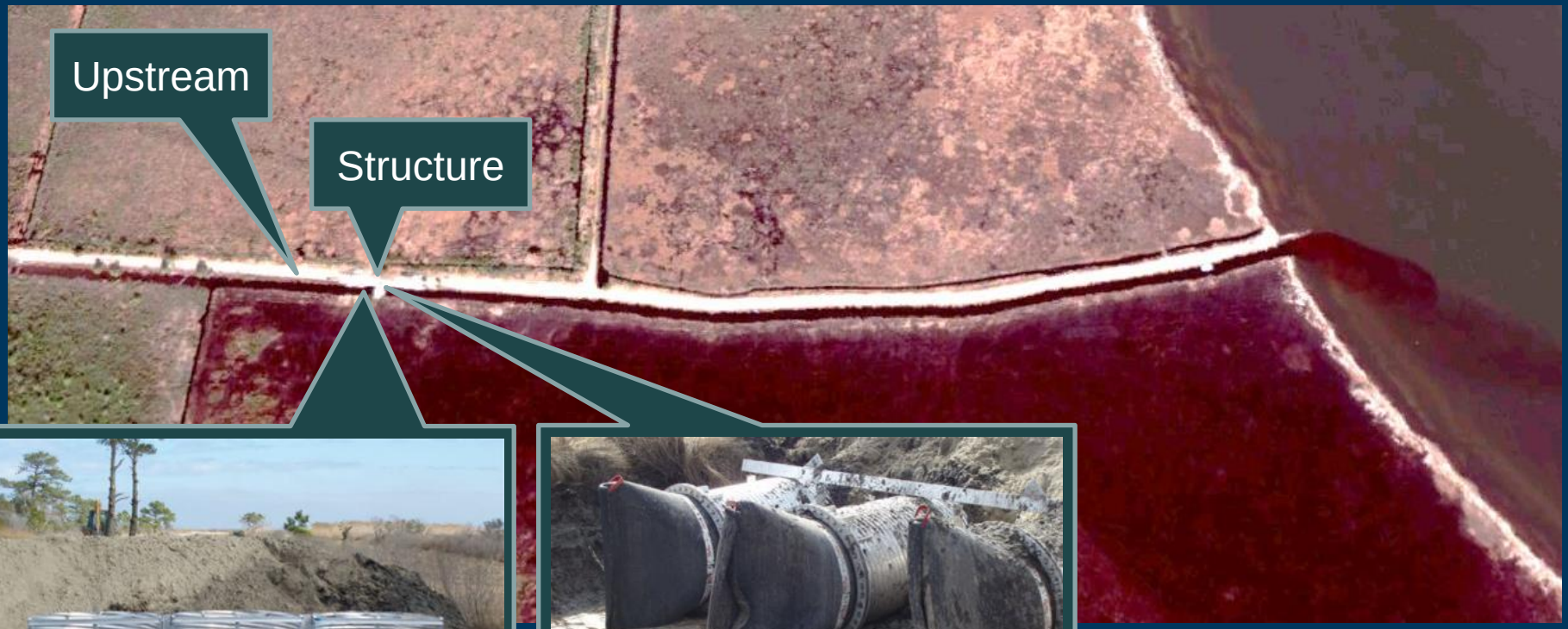
Point Peter Road
Water Control Structure



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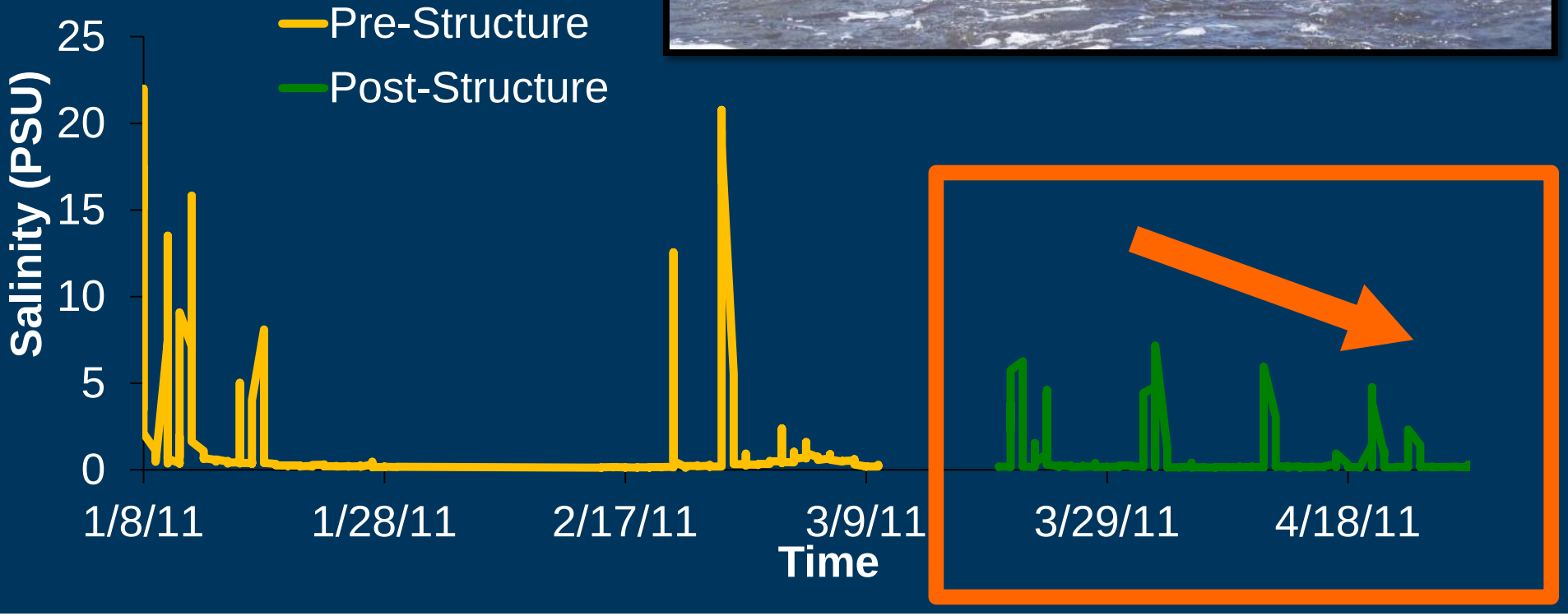
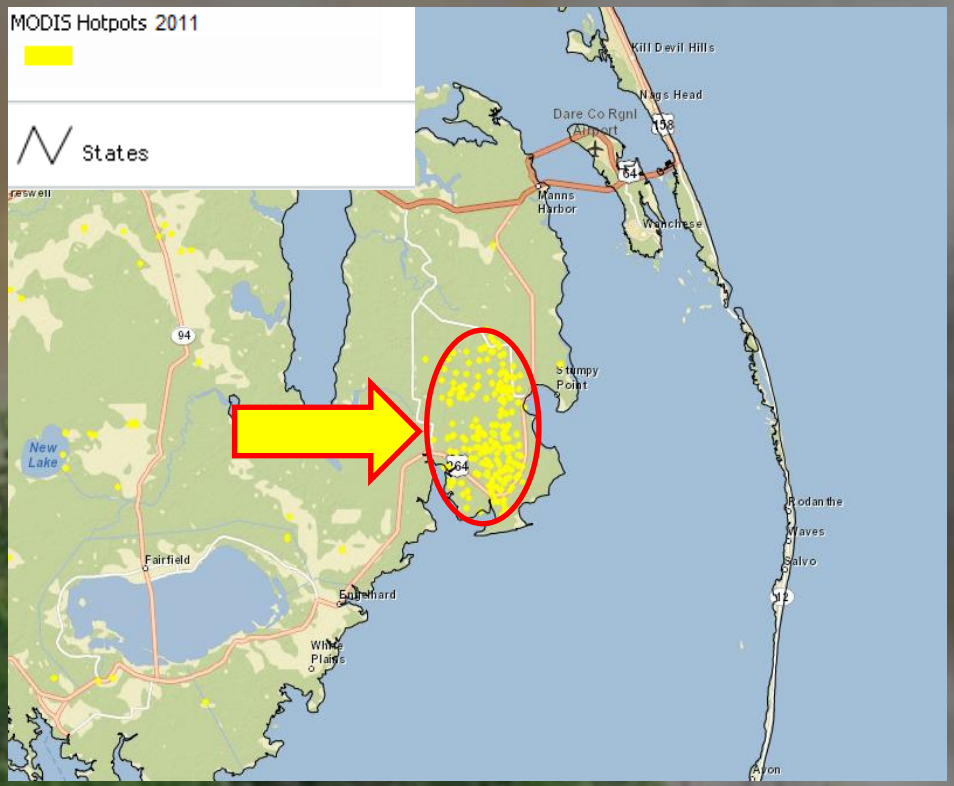
Upstream Salinity



Pains Bay Fire (2011)

USDA Forest Service FORWARN Model



- 45,294 acres
- Lasted 120 days
- Cost $14,000,000

R. Schakelford, NCFS


A. Hux, NCFS


A. Hux, NCFS

A. Hux, NCFS

A. Hux, NCFS

C. Pickens

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ARNWR & DCBR
Water Management Capability

- ✓ Field Surveys
- ✓ LiDAR
- ✓ Drainage Study
- ✓ Draft Water Management Plan
- ✓ Recommended Actions
- ✓ Review and Prioritize
- ✓ Final Water Management Plan
- ✓ Installation of Structures

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Major Goals for Plan Improving Water Holding Capacity

- Improve water holding capacity across the landscape
  - Add ability to control water level within a hydrologic unit
  - Reduce wildfire vulnerability
  - Improve ecological conditions
- Improve conveyance of water
  - Be able to direct water where needed more efficiently
  - Support prescribed burning as appropriate

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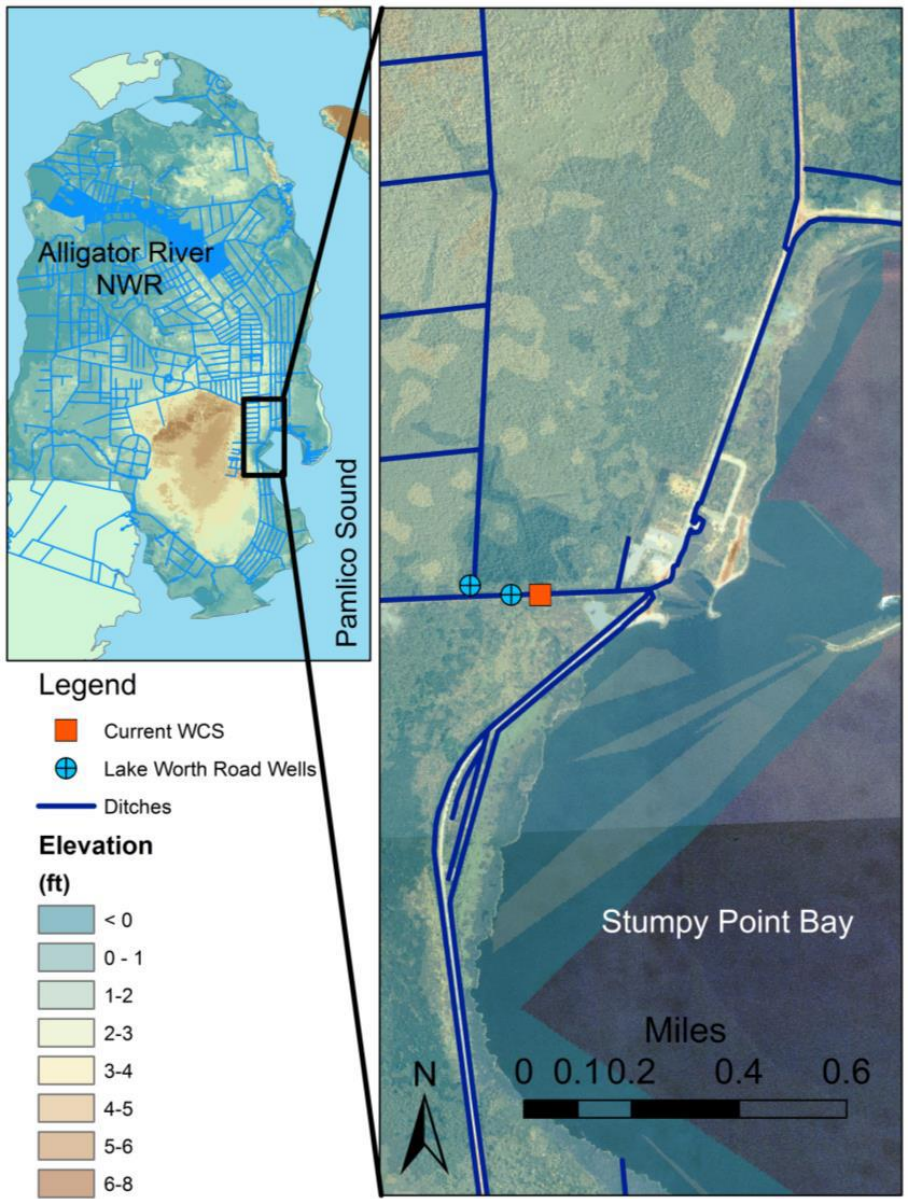
Lake Worth Road
Proposed Water Control Structure



- Major source of salt water intrusion
  - Water data evidence
  - Plant community evidence
- Structure is expected to support overall water management plan

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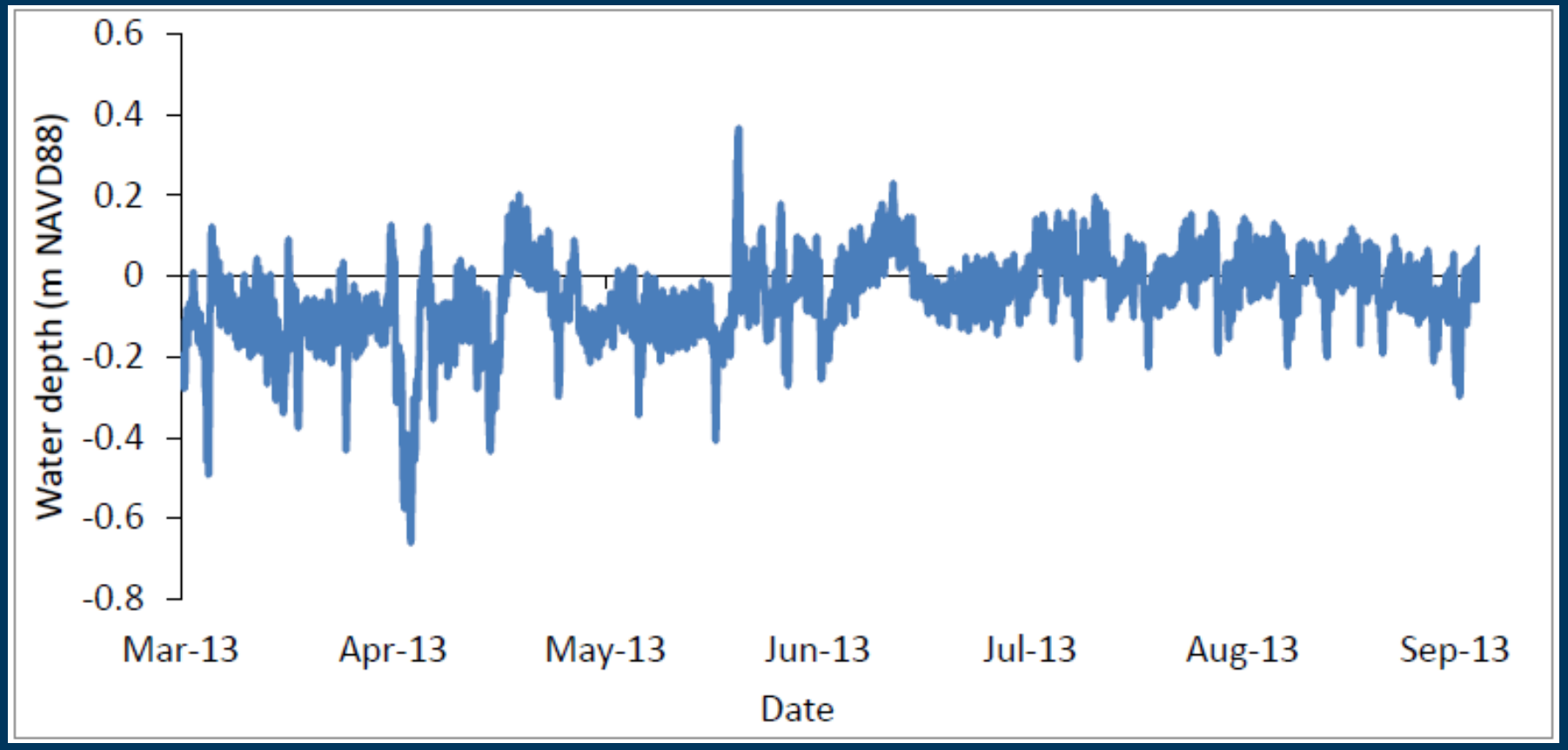
Water Level at Lake Worth Road



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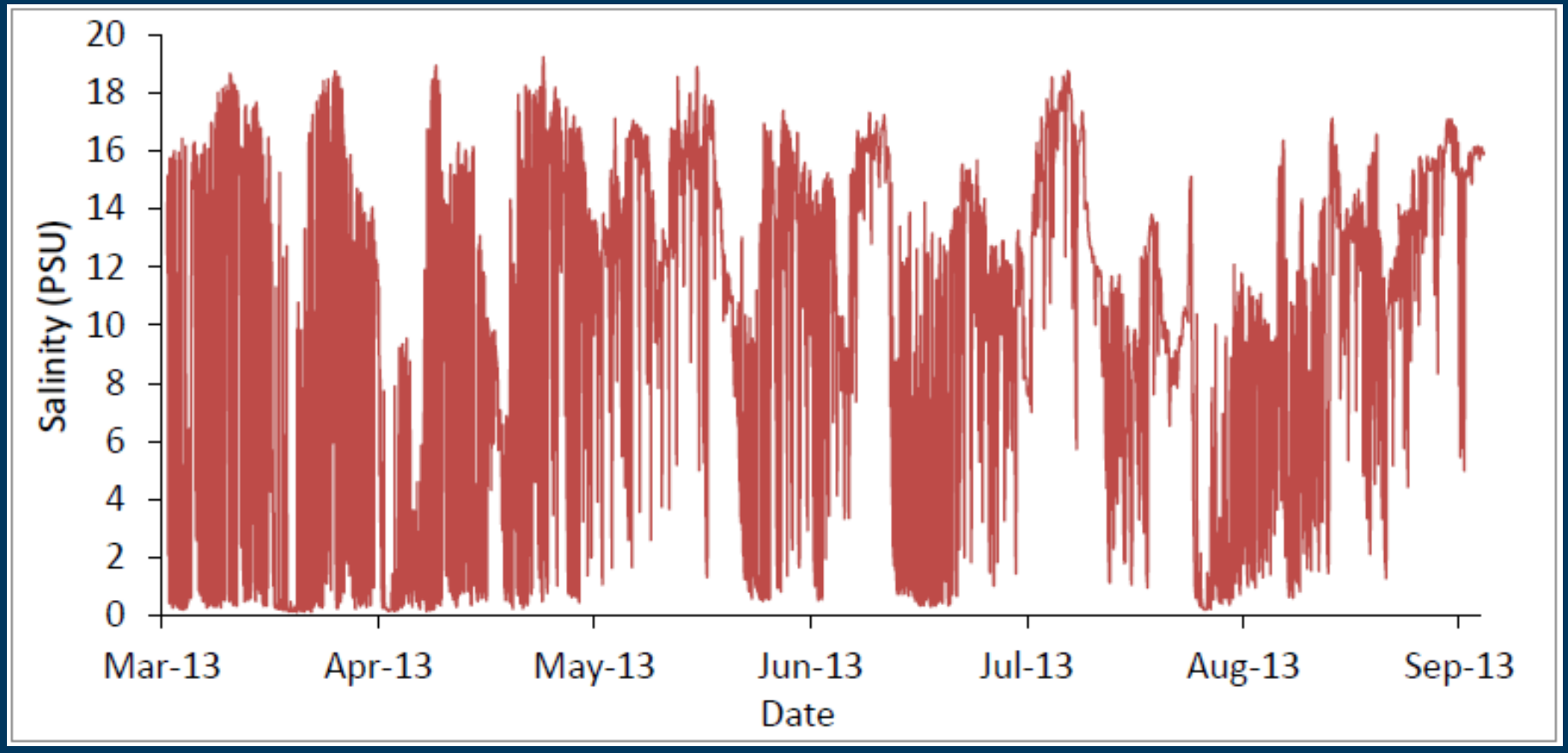
Salinity at Lake Worth Road



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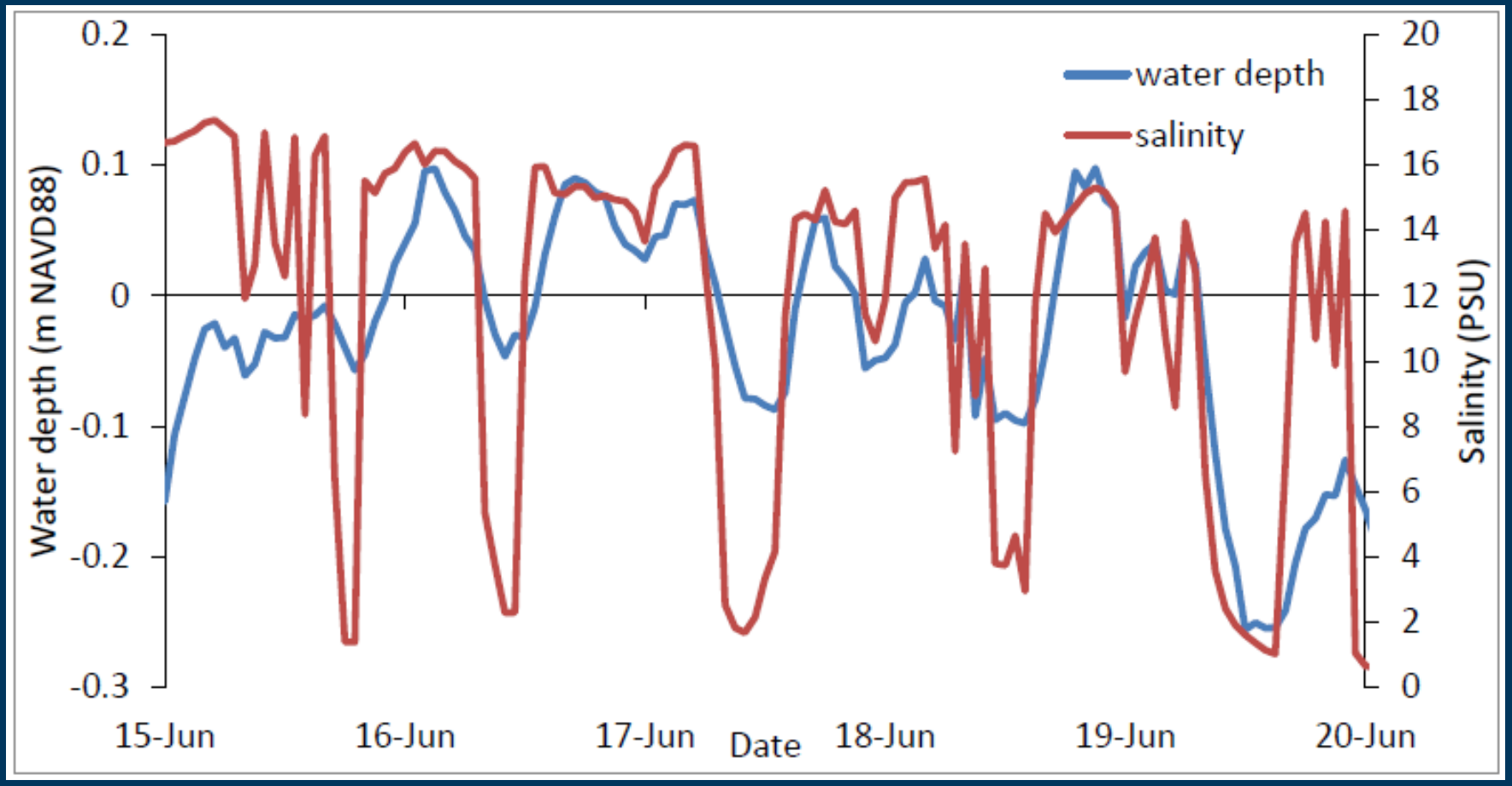
Water Level and Salinity:
Lake Worth Rd without a check valve



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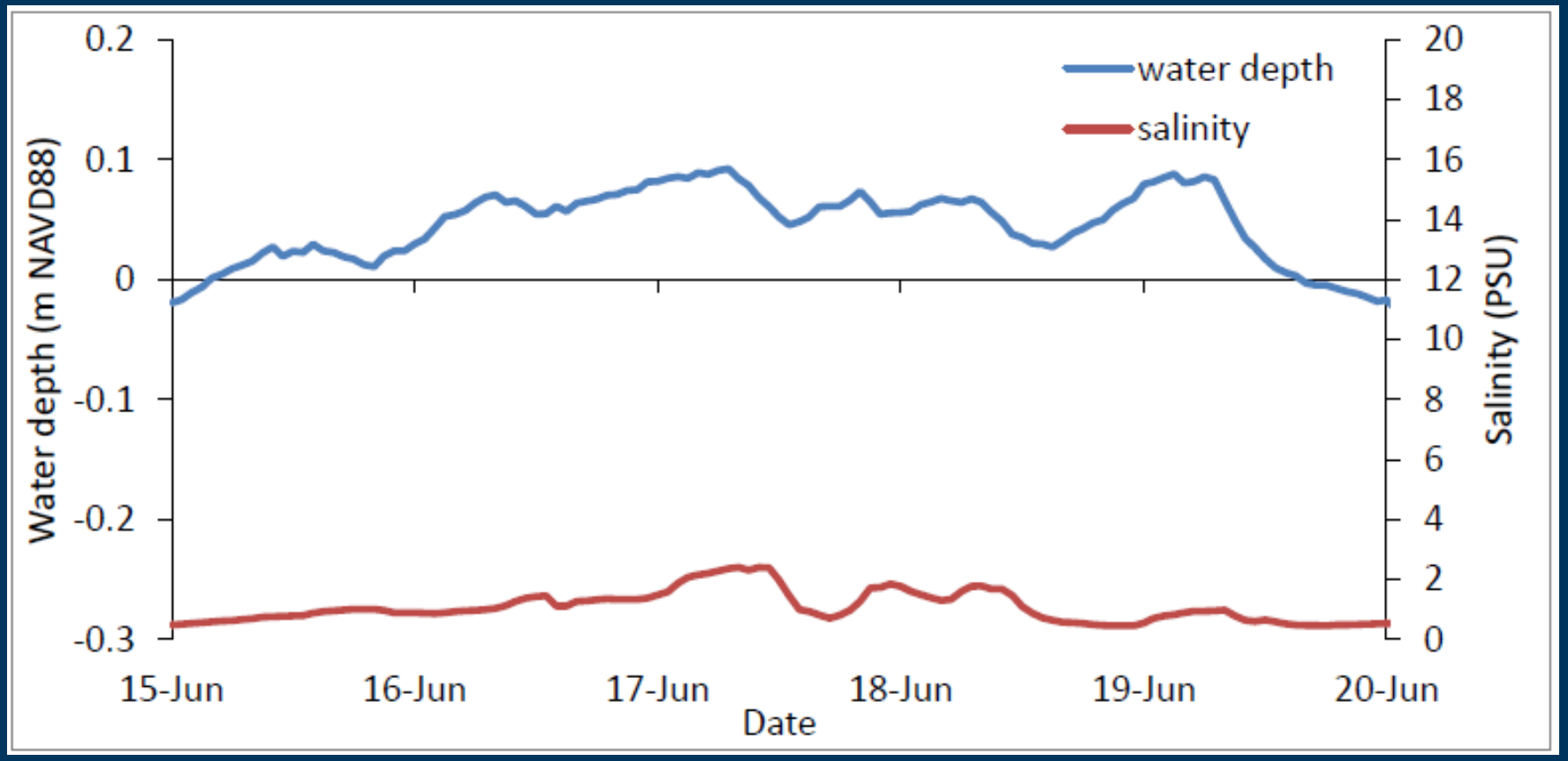
Water Level and Salinity:
Point Peter Road with a check valve



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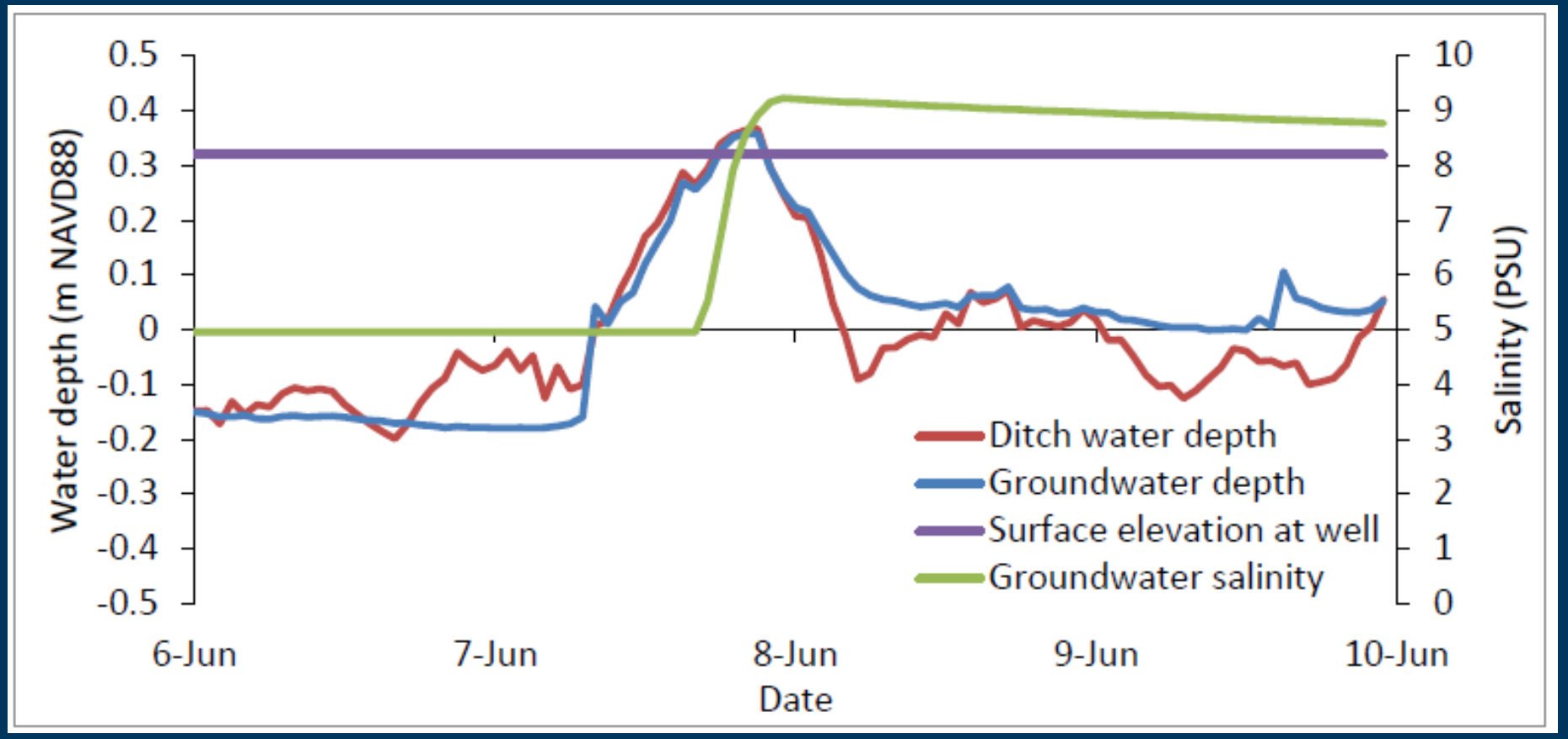
Lake Worth Road
Ditch vs. Groundwater



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Expected Outcomes for a Water Control Structure

- Reduce salt water intrusion
- Help protect non-salt-tolerant plant species
- Provide the capacity to keep water levels high during drought/fire season
- Provide fresh water option for wildland firefighting

Acknowledgments

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