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

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November 19, 2013
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
Peat = Build up of partially decomposed plant material in waterlogged areas.
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
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
Hydrologic Restoration

We are reducing salt water intrusion, improving water quality in the sound and reducing vulnerability to wildfires.
Point Peter Road
Water Control Structure

Upstream
Structure
Upstream Salinity

![Graph showing salinity changes over time, with data points on 1/8/11, 1/28/11, 2/17/11, 3/9/11, 3/29/11, 4/18/11. The graph compares Pre-Structure and Post-Structure salinity levels. The peak salinity is observed on 3/9/11.]
Pains Bay Fire (2011)

USDA Forest Service FORWARN Model

- 45,294 acres
- Lasted 120 days
- Cost $14,000,000
Field Surveys
LiDAR
Drainage Study
Draft Water Management Plan
Recommended Actions
Review and Prioritize
Final Water Management Plan
Installation of Structures
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
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
Water Level at Lake Worth Road

![Graph showing water depth over time from March to September 2013. The x-axis represents the months from March to September 2013, and the y-axis represents water depth in meters (m NAVD88). The water depth fluctuates throughout the period.]
Water Level and Salinity: Lake Worth Rd without a check valve
Water Level and Salinity: Point Peter Road with a check valve
Lake Worth Road
Ditch vs. Groundwater

![Graph showing water depth and salinity over time](image-url)
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

TNC
- Chuck Peoples
- Aaron McCall
- Kate Murray
- Brian Boutin
- Becca Benner
- Mike Horak
- Katherine Skinner

US Fish & Wildlife Service
- Mike Bryant
- Scott Lanier
- Dennis Stewart
- Brian van Druten

North Carolina Forest Service

Funding Kindly Provided By:
- Duke Energy
- TNC-NOAA Community-based Restoration Program
- SARP-NOAA Community-based Restoration Program
- FAF-NOAA Community-based Restoration Program
- Albemarle-Pamlico National Estuary Program
- Wildlife Conservation Society Wildlife Action Opportunities Fund
- Grady-White Boats
- Private donations