



Got Data!

Needs for Monitoring and Partnering in a Changing Climate

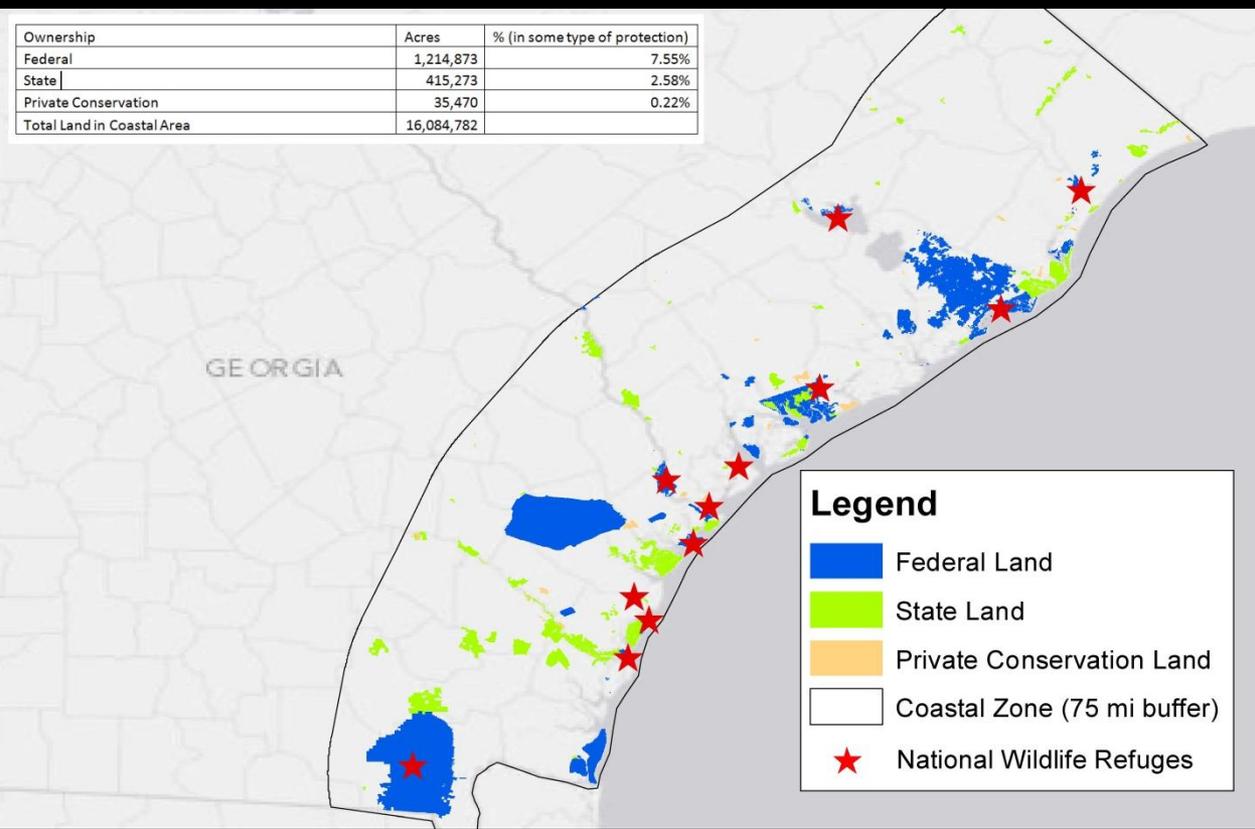


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Climate Connection Workshop
September 13, 2012



Protected Coastal Lands in South Carolina and Georgia



- SC {
- Waccamaw
 - Cape Romain
 - Santee
 - ACE Basin
 - Pinckney Island
 - Tybee

- GA {
- Savannah
 - Wassaw
 - Harris Neck
 - Blackbeard Island
 - Wolf Island
 - Okefenokee



Climate Change Stressors and Impacts to Coastal Refuges

- Sea-level rise
 - Shoreline/beach erosion
 - Flooding
 - Habitat loss
- Saltwater intrusion
 - Harbor dredging
 - Habitat conversion
 - Impoundment management
- Drought
 - Water quality and quantity





Species Shifts and Habitat Loss

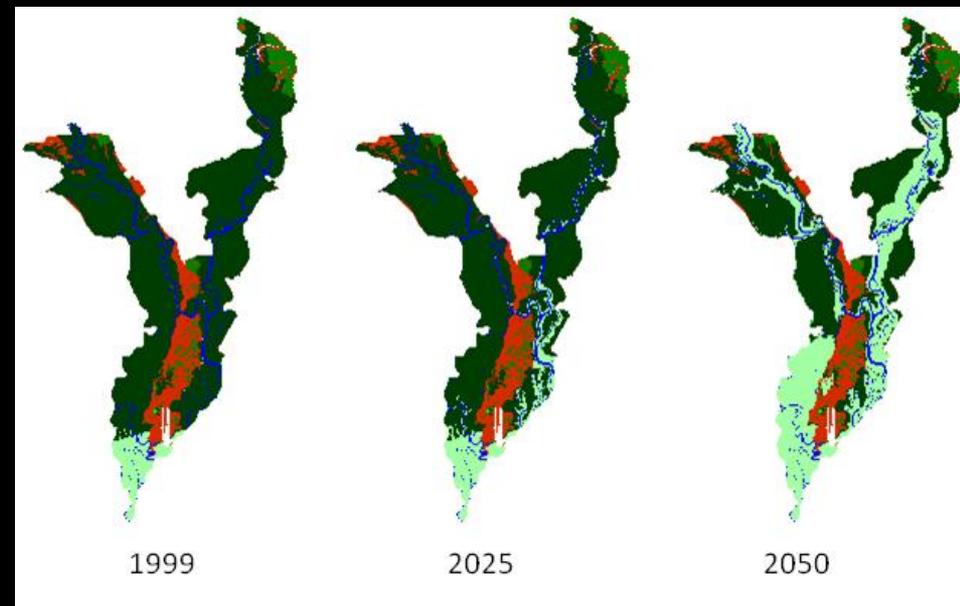
- Migratory birds are changing breeding patterns and geographic ranges
- Marsh migration – freshwater marsh and forest transitioning to brackish and saline marshes
- Aquatic species concerns with water temperature and availability changing
- Disturbance regime shifts – fire, storm events, invasives





What Our Partners Are Doing On Refuges

- USGS National Wetlands Center – Changes to forested wetlands related to climate change study on Savannah and Waccamaw NWRs
- NOAA Coastal Services Center – Improved SLAMM model by incorporating local data sets for Waccamaw NWR





What Our Partners Are Doing On Refuges

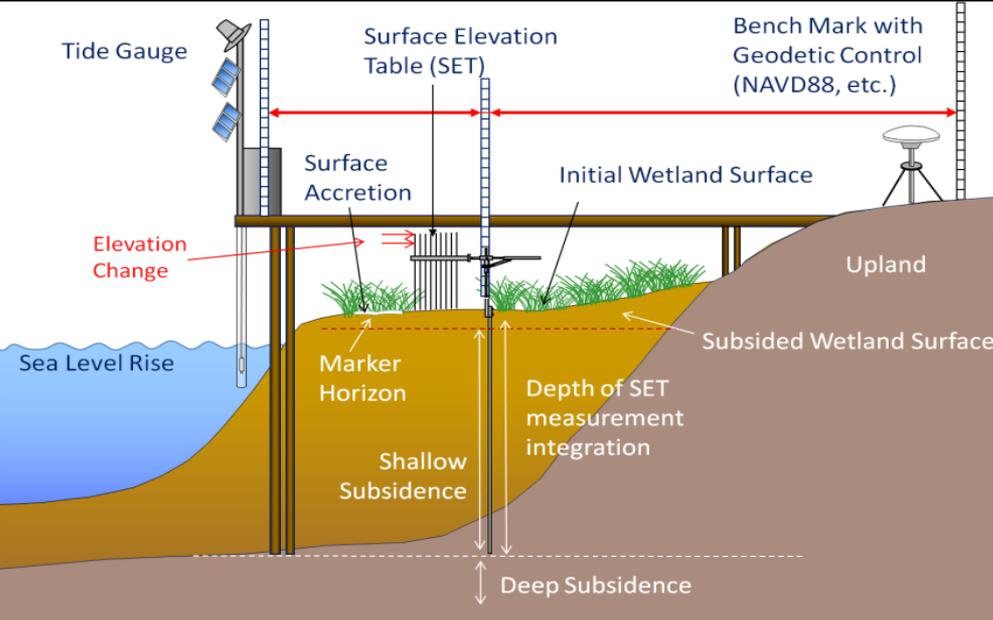
- USGS California Water Science Center— Carbon sequestration in tidal and managed freshwater marshes at Waccamaw NWR
- NERRS and SCDNR – Operates a System-Wide Monitoring Program (SWMP) station within ACE Basin NWR





What We Are Currently Doing

- Monitoring marsh elevation and relative sea-level rise
- Currently, 20 sites with three RSET stations installed on 18 coastal refuges
- Working with partners to ensure monitoring compatibility and data integration – NPS, USGS, TNC, NOAA, Refuges, South Atlantic LCC
- Refuge managers can use data locally to answer critical questions and adjust management; SALCC will use data to run and validate landscape scale models





What We Are Currently Doing

- Identifying priority water needs: Water Resource Inventory and Assessments on NWRs and Hatcheries
- Modeling habitat changes due to sea-level rise – SLAMM
- Inventory and monitor fish communities including aquatic invasive species using tools like eDNA on Savannah and Loxahatchee NWRs





What We Are Currently Doing

- Adding to current monitoring networks – NOAA Sentinel Site Program
- Building the science capacity needed to deal with climate change and other landscape scale stressors – SALCC and Climate Science Centers





Looking into the Future

- Need more science and advanced climate modeling/planning to guide decisions
- Work with partners to develop new climate change adaptation strategies
- Implement these strategies across landscape conservation cooperatives (LCCs)
- Need monitoring to understand the rate and magnitude of climate change and effectiveness of our strategies





Specific Needs for Partnering

- Baseline inventories of plants, vertebrates, and invertebrates
- Vegetation mapping at local and landscape scales
- Assessment of natural disturbance regimes – fire, storm events, etc.
- Mapping and monitoring of invasive species
- Phenology – detect shifts in species ranges and biomes
- Assessment of vulnerability of species and habitats to climate change and non-climate stressors
- Shared data storage and management



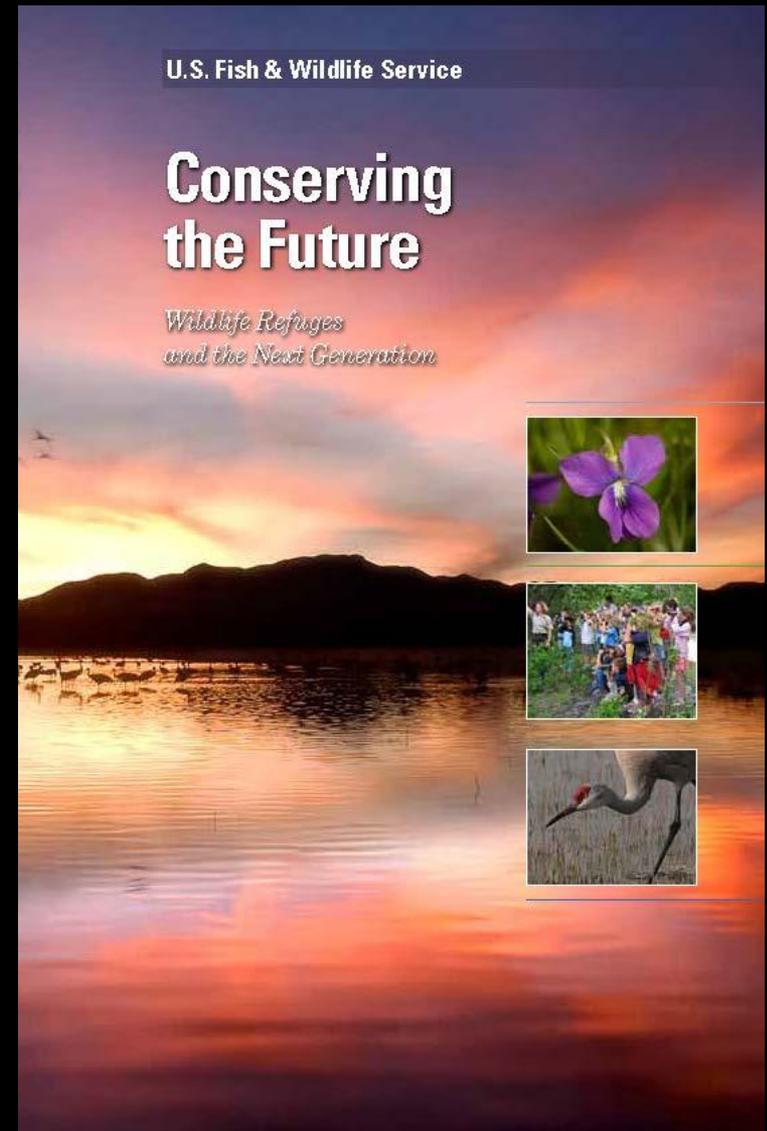
Questions?





Conserving the Future

- Impacts of a changing climate – gain conservation strength through continued and new partnerships
- Recommendations - Institutionalize a purpose-driven, nationally coordinated effort to **inventory and monitor** wildlife and habitats to obtain data that inform planning and management decisions; and develop a state-of-the-art **data management** system that can be integrated with the **broader scientific community and key partners**.





What is the I&M Network?

- A **nationally coordinated program of inventory and monitoring** on the NWRS to generate information critical to ensuring the System's ongoing contributions to the conservation of the nation's fish, wildlife and plant resources in the face of climate change and other environmental stressors
- The I&M program will document the status, assess the condition of, and detect changes in the Refuge's System's diverse fish, wildlife and plant communities, physical resources including water air and soils, and ecological processes in order **to support scientific-based conservation planning and management at multiple spatial scales**
- Plan & evaluate the effectiveness of conservation strategies in close cooperation with LCCs
- Integration of I&M data to advance conservation at multiple landscape scales
- Collaboration with other Service programs, state, federal and conservation partners