Understanding Future Sea Level Rise Impacts on the Coastal Wetlands in the Apalachicola Bay Region of Florida’s Gulf Coast

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Components

- Modeling of Sea Level Rise (SLR) on coastal wetland systems
- Anticipated SLR impacts on infrastructure and cultural resources
- Potential SLR impacts on vulnerable species
- Development of locally-relevant adaptation strategies
- Public attitudes and tradeoffs surrounding simulated changes in ecosystem services
Overall Findings

- Apalachicola region is susceptible to sea level rise.
- Coastal wetlands will change dramatically.
  - forested wetland will be lost
  - salt and brackish marsh habitats will increase
- Habitat-dependent species will be proportionally impacted.
- Reductions in riverflow will increase the impacts of Sea Level Rise.
- Sea Level Rise will significantly impact developed land, infrastructure and cultural resources.
- Based on a public opinion poll, residents of Franklin County are concerned about how natural resources, commercial marine species and local community attributes will be impacted by sea level rise.
- Specifically, water quality, water quantity and wildlife habitat were the top natural resources of concern.
Year 2025 (1 meter Sea Level Rise over next century)
Year 2050 (1 meter Sea Level Rise over next century)
Year 2075 (1 meter Sea Level Rise over next century)
Year 2100 (1 meter Sea Level Rise over next century)
Sentinel Site Development at the Apalachicola NERR (SET installation and Local Geodetic Control Network)

February 23rd, 2012
What is a Sentinel Site?

A location or set of locations within the coastal zone that can represent habitat or species response to sea level changes (or other climate change impacts).

What is needed?

- Highly accurate local geospatial infrastructure
- Consistent instrumentation and methodology for obtaining water quality characteristics
- Permanent vegetation transects across the intertidal gradient to monitor biological characteristics and vegetation community response
- Local erosion and accretion data – Surface Elevation Tables
Site Selection

- Dominant marsh type
- Most impacted by SLR and changes in river flow.
- Recent study found that the freshwater marsh/floodplain swamp ecotone is indicative of the extent of high salinity waters during drought conditions.
St. Mark’s Distributary
East River Distributary
What are Surface Elevation Tables?

Surface Elevation Tables (SETs) measure change (erosion and accretion) in marsh substrate.

Erosion, accretion and subsidence information are needed to model the potential effects of sea level rise.
SET Installation
Elevation Survey

CORS locations

NWLN Station

[Map showing CORS locations and NWLN Station]
Benchmarks

From DSWorld application within Google Earth

(Downloaded from NGS website). Lower Apalachicola River and lower river marshes area.

Key:
CORS stations are shown as pink stars. GPS control is shown as pink triangles. First order control is shown in blue. Second order control is shown in red. Third order control is shown in black. Horizontal control is shown with triangles. Vertical control is shown with squares.
Finding Usable Benchmarks
Finding Usable Benchmarks

APALACHICOLA, FL
L45 - 1934

LOOKING SOUTH
Benchmark Installation
SWMP and other monitoring locations
March 31st, 2011– Conference call with Nina, Galen, Dave Newcomer (FL state advisor NGS). GOMA funds become available for SET installation and survey

May 18th and 19th – EESLR Management Committee meeting at the Reserve. It is decided to use project money to install SETs (6) at Dr. Morris’ sampling site near old Eastpoint office.

June 8th – benchmark search

July 8th – Vegetation Monitoring/SET locations marked

July 15th – Vegetation Monitoring/SET locations marked

July 21st – Vegetation Monitoring/SET locations marked

Week of August 29th – funding is approved to contract DEP’s Bureau of Survey and Mapping to install SETs and perform GPS survey. New benchmarks were installed along N. Bayshore drive and at old Eastpoint office to be used in leveling Dr. Morris’ SETs.

Week of September 12th – SET installation

Week of October 10th – Leveling of Dr. Morris’ SETs, leveling of ANERR SETs and leveling of benchmarks to be used on Little St. George Island

December 2011- all SETs installed and surveyed.
Next Steps

Winter 2011
  • Learn how to monitor the SETs
  • Establish vegetation monitoring transects
  • Identify all species of vegetation
  • Level between SETs and vegetation transects

Spring - Summer 2012
  • Install groundwater monitoring wells
  • Vegetation monitoring (probably visit a few times)
  • Look into feasibility of installing water quality monitoring equipment adjacent to the site
Species Range Expansion