Sentinel Sites: Using NOAA's National Estuarine Research Reserve System for Climate Change Research, Monitoring, and Education

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Climate Change, Natural Resources, and Coastal Management Workshop

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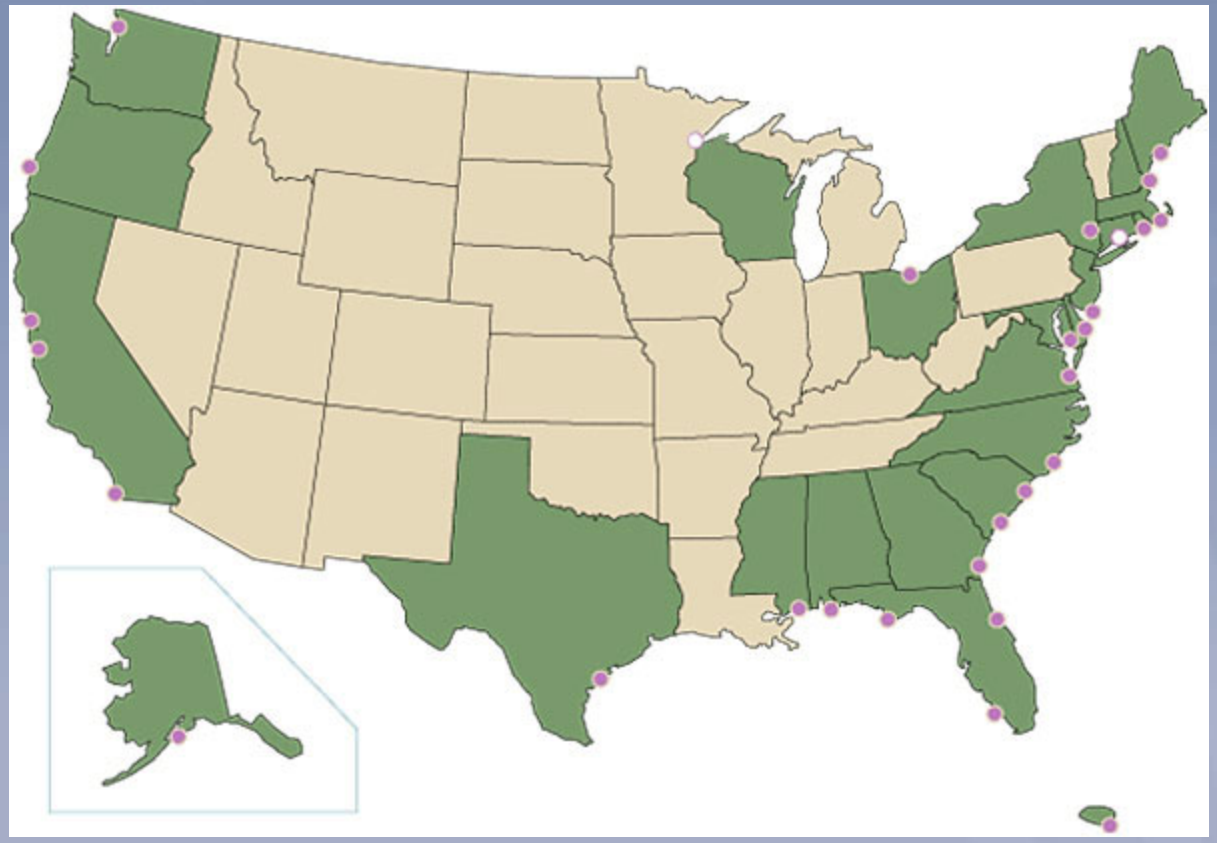
NOAA's National Estuarine Research Reserve System



Over a million acres protected for long-term research, education and training, and coastal stewardship

NERRS Climate Change Strategy Goals

Contribute to scientific understanding

Monitor ecosystem changes

Assess impacts on human and estuarine communities

Assess capability for adaptation and mitigation

Provide education and training for public awareness and behavior change

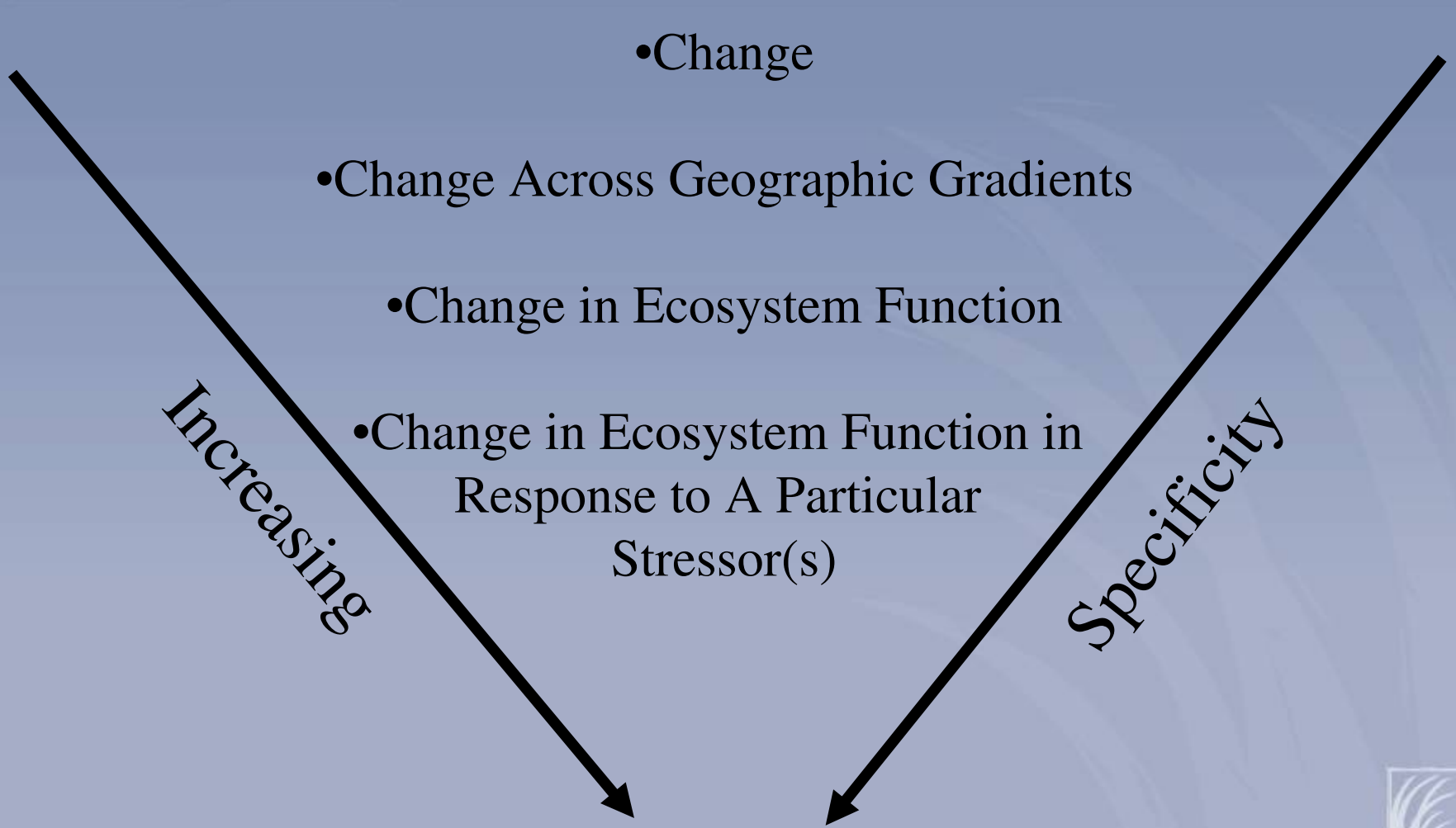
The Coastal Habitat Climate Change Knowledge Gap

- Climate Change Impacts on NOAA Trust Resources is lacking
- Geospatial infrastructure and capacity to monitor local changes in land/water interface is insufficient
- Habitat response, including migration and resilience, in the face of sea level rise is unclear
- Degraded coastal habitats will mean greater threats to coastal communities
- Effective management and planning tools incorporating both inundation and habitat models are rare

Issue-Driven Sentinel Site Network: Sea Level Rise Initiative

- Place-Based approach to concentrate resources and infrastructure
- Orient towards tools and applications for management decisions
- Integrate geodetic and tidal data and tools with habitat information and ecosystem models
- Understand and mitigate ecological impacts of Sea Level Rise

Sentinel Site For:



Sentinel Site Network Characteristics

- Easily observable
- Repeated Measures
- Consistency
- Diversity of habitat types and gradients
- Sensitivity to stressors of interest may be unknown
- Response patterns to stressors may not be understood

NERRS System Wide Monitoring Program (SWMP)

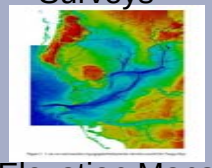
An Integrated Approach

SOLUTION: Integrate Ecosystem and Geospatial Monitoring Capacity In Order to Develop Better Management Practices

Tide Stations

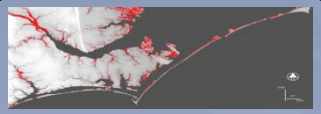
CORS

Surveys



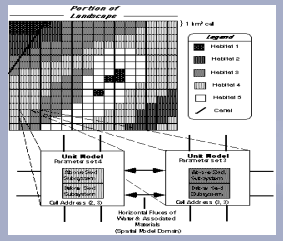
Elevation Maps

Geospatially Enhanced Ecosystem Monitoring



Inundation Maps

Habitat Maps



Integrated Ecosystem Models

Revised Management Plans

New Management Tools & Training

Healthier & Resilient Coasts

National Water Level Observation Network (NWLON)

Provides:

- **Water Level**
- **Wind Speed/Direction**
- **Barometric Pressure**
- **Air/Water Temp.**
- **Conductivity/Temp**

Temporary Tide Stations

Continuously Operating Reference Stations (CORS) Network

- 1200+ National CORS
- 190+ Cooperative CORS

Surface Elevation Table (SET) Technology

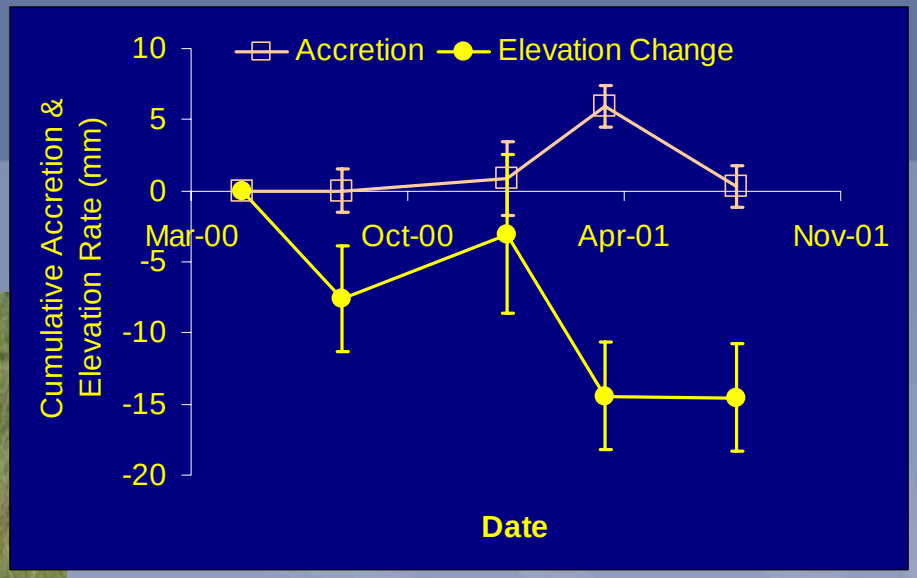
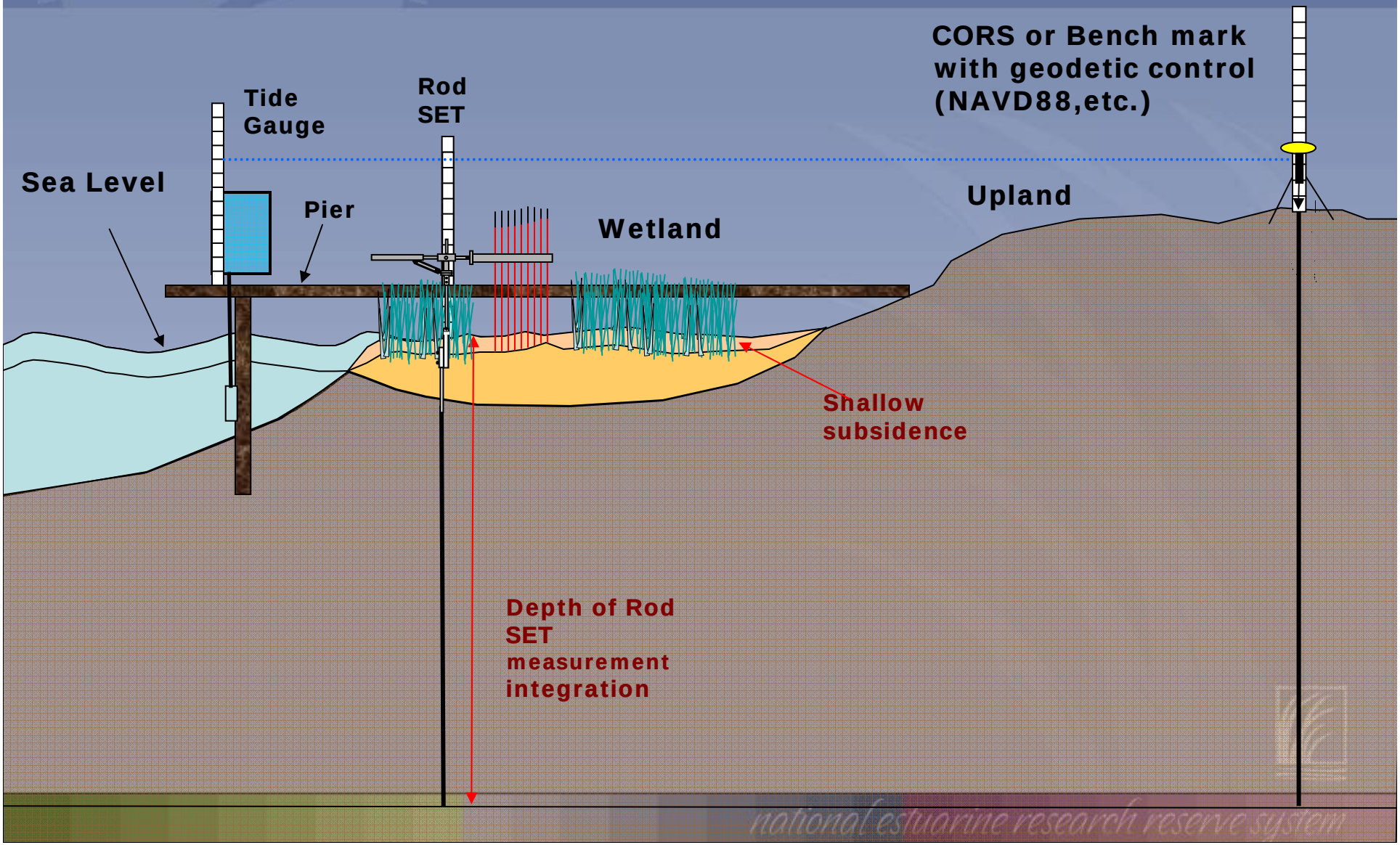


Photo courtesy Don Cahoon USGS

Monitoring coastal land elevation relative to local sea level

Understanding processes leading to the formation and maintenance of coastal elevation

Total Relative Sea Level Rise = Eustatic SLR + Regional Subsidence + Shallow Subsidence



Sentinel Site Network Status

- **Tier 1 Reserves:** Comprehensive spatial infrastructure in place, habitat monitoring program has been linked to the National Spatial Reference System.
- **Tier 2 Reserves:** Expanded habitat monitoring program developed, spatial infrastructure partially in place.
- **Tier 3 Reserves:** Monitoring Program expansion and infrastructure installation in the planning stage.
- **Tier 4 Reserves:** Interested in exploring the development of the sentinel site program in the near term.

NATIONAL ESTUARINE RESEARCH RESERVES

A network of 27 protected areas

Reserves by Tiers

1. Wells, Maine
* 2. Great Bay, New Hampshire
3. Waquoit Bay, Massachusetts
* 4. Narragansett Bay, Rhode Island
* 5. Hudson River, New York
* 6. Jacques Cousteau, New Jersey
* 7. Delaware
8. Chesapeake Bay, Maryland
9. Chesapeake Bay, Virginia
* 10. North Carolina
11. North Inlet-Winyah Bay, South Carolina
12. ACE Basin, South Carolina
13. Sapelo Island, Georgia
14. Guana Tolomato Matanzas, Florida
15. Rookery Bay, Florida
16. Apalachicola, Florida
* 17. Weeks Bay, Alabama
18. Grand Bay, Mississippi
* 19. Mission-Aransas, Texas
20. Tijuana River, California
21. Elkhorn Slough, California
* 22. San Francisco Bay, California
23. South Slough, Oregon
* 24. Padilla Bay, Washington
25. Old Woman Creek, Ohio
26. Proposed—St. Lawrence River, New York
27. Kachemak Bay, Alaska
28. Jobos Bay, Puerto Rico

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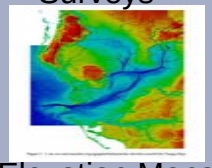

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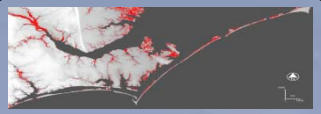

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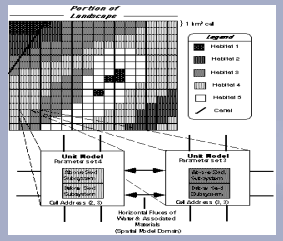

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Coastal Training Program

- "Customizable Training Workshop" for land use planners focused on actions to address impacts
  - Identify areas of risk
  - Establish planning priorities
  - Create adaptation strategies
  - Coordinate with other entities
- 2 Pilot Workshops in March in Washington state
- Presentation materials available on the NERRS website by July

Thank You

David Kennedy, NOAA Office of Ocean and Coastal Resource Management

Whitley Saumweber, NOAA Estuarine Reserves Division

Cathy Angell, Padilla Bay NERR

William Whitesmith, Consultant

Questions or Comments?

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