September 2014 Volume 2, Issue 3

Sentinel Site Quarterly

North Carolina
Sentinel Site Cooperative

Happy Fall from the N.C. Sentinel Site Cooperative!

The North Carolina Sentinel Site Cooperative (NCSSC) was established in 2012 as part of a NOAA-wide effort to provide coastal communities and resource managers with information on the potential impacts of sea-level rise on coastal habitats.

For more information about anything in this newsletter, contact Jennifer Dorton.

Be Part of the Quarterly!

This newsletter is a way to communicate and collaborate among Sentinel Site partners in North Carolina. Our goal is to keep you informed about the research, upcoming events, and opportunities within the NCSSC. The Fall Quarterly is full of great information that we are excited to share with you.

If you have an interesting project or event related to the Cooperative, Let us know!

In This Issue

Quick Links

NOAA Sentinel Site Program

North Carolina Sentinel Site Cooperative

Research & Monitoring Coordination Workshop Report

Sentinel Site Quarterly Volume 2, Issue 2 (previous Issue)

Meet Jennifer Dorton, the new NC Sentinel Sites Cooperative Coordinator

The North Carolina Sentinel Site Cooperative would like to welcome Jennifer Dorton as the Cooperative's new coordinator! This part-time position is funded through a partnership between the NOAA National Sea Grant Office and the Sentinel Site Program. Since 2004, Jennifer has worked at UNC Wilmington on the NOAA-funded Coastal Ocean Research and Monitoring Program,led the NOAA in the Carolinas efforts for five years, and been a valuable team member for N.C. Sea Grant. Additionally, Jennifer is a current member of the NCSSC Water Level Subcommittee and participated in the Research and Monitoring Coordination Workshop. She is well-suited to this new role as Coordinator and will be an asset to the Cooperative. Please feel free to contact Jennifer and welcome her to the NCSSC: dortonj@uncw.edu.

Jim Sullivan, NOAA Sentinel Site Program Chair, visits the NC Sentinel Sites Cooperative

During the week of August 4, the NCSSC had a special visitor - Jim Sullivan, the NOAA Sentinel Site Program chair. Jim, who visited most of the other Cooperatives this summer, came to Beaufort to connect with the NCSSC partners and Management Team, and attend the NOAA Southeast and Caribbean Regional Collaboration Team (SECART) annual meeting. The NCSSC was invited, along with other local organizations, to present at the SECART meeting. This presentation included an overview of the NCSSC's past and future projects. SECART has been a big supporter of the NCSSC, funding both the March 2013 Research and Monitoring Coordination workshop and the development of the Clearinghouse, which is housed within the NC Coastal Atlas. Also during this time, the North Carolina Coastal Reserve & National Estuarine Research Reserve hosted Jim, NCSSC partners, and SECART members on a boat trip around the Rachel Carson Reserve, which is the foundation of the NCSSC.

North Carolina Coastal Atlas Partnership -

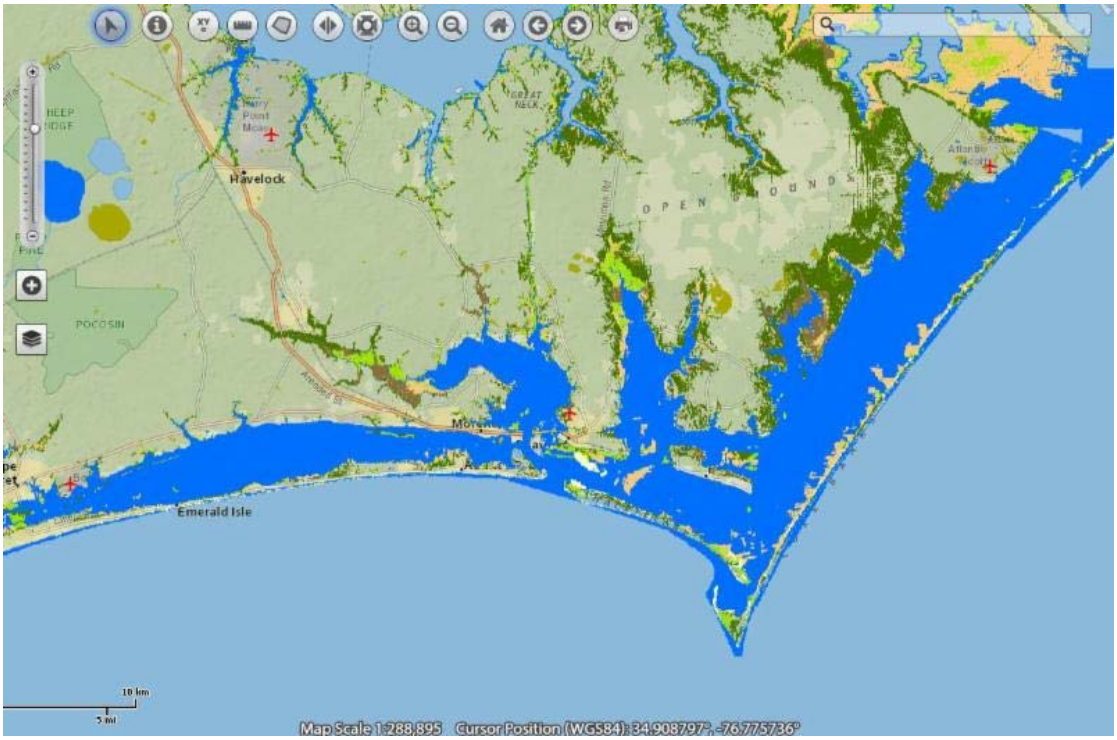
Providing Data and Mapping Capabilities for Research and Management

The North Carolina's Sentinel Site Cooperative boundary includes extensive areas of low elevation and expansive wetlands, and it is a prime location for studying salt marsh and other wetland response to sea level rise. The North Carolina Coastal Atlas Partnership has added new map layers that can facilitate the exploration of possible future responses of wetlands to the coastal processes of erosion, accretion, and sea-level rise. Additionally, the North Carolina Coastal Atlas can be used to map estuarine shorelines and wetland types, and view aerial imagery. These datasets are valuable assets for floodplain mapping and ecological research.

The "Marsh Migration" map layers simulate marsh and ecological changes that may accompany rise in sea level. The maps incorporate output from the Sea Level Affecting Marshes (SLAMM) computer model which is based on recent observations of the Ecological Effects of Sea Level Rise Research Program. The model takes into account trends in tide gauges, regional subsidence, marsh growth and sediment accretion, and shoreline erosion rates. These observations and models are combined to simulate responses of wetlands to future sea-level rise and storm conditions. The scenarios include a map of today's "baseline" wetlands as well as future potential changes based on 40cm, 60cm, 80cm, and 100cm or sea-level rise. These maps illustrate that processes observed today and in the recent past by scientific and casual observations alike portend further changes for the future.

Visit the North Carolina Coastal Atlas: http://www.nccoastalatlas.org/

To learn more about the Potential Marsh Migration Thematic Map and related wetlands data, visit: http://www.nccoastalatlas.org/maps/by-title/wetlands-habitat-and-threats#layers



Screenshot from the North Carolina Coastal Atlas marsh migration map showing ecological changes for at 40cm future sea level rise.

Gulf of Mexico Sentinel Sites Cooperative - Improving Predictions of Sea Level Rise Impacts to Oysters and Wetlands

The northern Gulf of Mexico benefits from a wealth of natural resources that include extensive marshes, oysters, and pine savannahs. These resources support vibrant recreation and commercial fisheries, and serve to protect and maintain coastal communities. However, these coastal ecosystems are highly

vulnerable to the effects of hurricane storm surge and sea level rise due to low elevation and a flat topography. Understanding how future conditions will impact these resources is critical for informed ecosystem management, restoration, and conservation.

In 2010, NOAA initiated the Ecological Effects of Sea Level Rise (EESLR) - Northern Gulf of Mexico through the University of Central Florida and University of South Carolina in order to develop tools that can predict future impacts to marshes, oysters, and shorelines. The project covers the northeast Gulf, from the Florida panhandle to Mississippi and focuses on three National Estuarine Research Reserves and serves as a core science component of the Gulf of Mexico Sentinel Site Cooperative.

A key feature of these predictive tools is the ability to incorporate 'dynamic' processes to examine sea level rise impacts on storm surge flooding and ecosystems. Many existing predictive tools use a 'static', or bathtub, approach to sea level rise. However, the EESLR team is incorporating hydrodynamic processes, such as waves and tides, before examining effects. Results from an initial application of this approach examined past, present, and future Hurricane Katrina storm surge and highlighted the variety of factors that create a non-linear, dynamic response of coastal regions to sea level rise and storm surge. For example, changes in coastal topography resulted in 80 percent higher flooding over projected sea level rise in some regions while other regions had more than a 100 percent decrease in flooding relative to the static approach.

This dynamic hydrodynamic modeling approach now serves as the foundation for a coupled marsh-hydrodynamic modeling tool. The team has deployed a series of 'marsh organ' experiments at each of the NERRs that provide information on how marsh plants will respond to varying water levels. Data from the marsh organs is being combined with water quality, sediment cores, and other data to develop a species and region- specific biological model. The coupled modeling tool will provide insight the future productivity of marshes under varying sea level rise scenarios. A similar effort is underway for oysters.

To facilitate the application of project results, the EESLR team has worked with local and regional coastal managers since the start of the project. This management advisory team provides guidance on needed science and is helping to ensure that developed tools address management questions and needs. Ultimately, the project will provide the tools needed to conduct forward-looking assessment of ecosystem effects of sea level rise. For more information, please visit: http://www.coastalscience.noaa.gov/projects/detail?key=162.

NOAA Funding Announcement -

2015 Ecological Effects of Sea Level Rise Program

Please see the NOAA Funding Announcements: 2015 Ecological Effects of Sea Level Rise Program.

This federal funding opportunity is focused on advancing SLR and inundation predictive capabilities and is an extension of the NOAA Ecological Effects of Sea Level Rise (EESLR) program. This opportunity is open to a wide range of potential applicants. Details on the EESLR program and the funding announcement itself can be found at http://www.coastalscience.noaa.gov/research/climate/sea_level_rise.

This funding opportunity is intended to advance predictive modeling capabilities and address management-related needs within the Sentinel Sites Cooperatives. There are five individual Sentinel Site Cooperatives around the country, one of which is the North Carolina Sentinel Site Cooperative. The goal of the NCSSC is to leverage resources across organizations and integrate the multiple efforts within the NCSSC geography to provide better information to help stakeholders address the challenges associated with sea-level rise and coastal inundation. The NCSSC Implementation Plan describes the intent and path forward for the N.C. Cooperative for the next five years. Additionally, the NCSSC hosted a Research and Monitoring Workshop in 2013 where participants prioritized monitoring and research gaps within the NCSSC geography and identified mechanisms for filling these identified needs.

The five Cooperatives have commonalities within their specific identified information gaps and science needs and these are relevant to the EESLR program and highlighted in the RFP:

- Models and Prediction
    - Sea level rise modeling and projections at the regional and local level;
    - Storm surge, wave impacts, and coastal inundation, including extreme events predictions and flood probabilities; and,
    - Spatial analysis and visualization, including SLR effects on habitat and improved digital elevation models.
- Applied Research
    - Sea level change as a result of increasing variability in rainfall;

- Synthesis of existing SLR research and data;
- Susceptibility of critical species to SLR and potential impacts; and
- SLR vulnerability assessments.

If you are interested in submitting a proposal to NOAA and would like to partner with the NCSSC, please contact Jennifer Dorton.

NOAA Funding Announcement - 2015 Climate Program Office

NOAA's Climate Program Office (CPO) is announcing the Federal Funding Opportunity for Fiscal Year 2015. Pending final budget appropriations, CPO expects approximately $15.5 million will be available through the announcement, and anticipates nearly 100 new awards between $50,000 to $200,000 each.

CPO supports competitive research through four major programs: Climate Observations and Monitoring (COM); Earth System Science (ESS); Modeling, Analysis, Predictions, and Projections (MAPP); and Climate and Societal Interactions (CSI). Through this Announcement, CPO's programs are seeking applications for 10 specified competitions in FY 2015.

The CSI opportunity specifically requests proposals for the Coastal and Ocean Climate Applications (COCA) program. For 2015, COCA is soliciting proposals for: Supporting Resilient Coastal Communities and Ecosystems in a Changing Climate.

COCA Research Priorities:

- Develop tools, methodologies, guidance, and/or trainings to build the capacity of coastal decision makers to use climate related data and information to address the following:
- Extreme weather and climate events.
- Identify and assess key public health impacts of climate variability and change on coastal communities
- Identify and assess the key science, data, and information needs for coastal community and ecosystem adaptation to build resilience to future events.
- Improve understanding of how climate variability and change will impact the spatial and temporal variation of ecological risks to human health (e.g. harmful algal blooms, existing and emerging water-borne and vector-borne diseases, water quality and quantity, etc) within the coastal zone.

COCA is particularly interested in projects that partner with or build off of the following efforts:

A. Sea Grant climate extension projects
B. NOAA Sentinel Site Program
C. NOAA Ecological Forecasting Roadmap activities
D. Center for Disease Control (CDC) Climate-Ready States & Cities Initiative
E. CDC Environmental Health Tracking Program

You can submit a proposal for this RFP even if you did not submit a Letter of Intent. Full applications are due October 20, 2014.

For more information, visit the CPO website. If you are interested in partnering with the N.C. Sentinel Site Cooperative on a COCA proposal, please contact Jennifer Dorton.

The NOAA Sentinel Site Program leverages existing research and monitoring resources to ensure resilient coastal communities and ecosystems in the face of changing conditions. The program's place-based approach focuses on issues of local, regional, and national significance that impact habitats and species managed by NOAA as well as surrounding coastal communities.