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Sentinel Site Quarterly

North Carolina
Sentinel Site Cooperative

Happy Summer 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 Whitney Jenkins.

Be Part of the Quarterly!

This newsletter was a priority item that came out of the 2013 Research and Monitoring Coordination workshop as a way to communicate and collaborate among Sentinel Site partners in North Carolina.

Have an interesting project related to the Cooperative? Let us know!

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Decade-long Investigation of Surface Elevation changes in North Carolina Marsh

As sea-level rises, coastal marshes are in danger of drowning or eroding. Marsh viability depends, in part, on the relative trends in marsh surface elevation and sea-level. Shoreline stabilization methods such as offshore stone sills may affect this relationship. Long-term monitoring of surface elevation is necessary to evaluate the effect of stone sills on marshes and model the response of marshes to changes in sea-level rise.

Changes in elevation and vegetation following the 2002 stone sill installation and marsh restoration next to NOAA's Beaufort Laboratory on Pivers Island

Surface elevation changes were monitored at seven sites in Carteret County, NC using 29 Surface Elevation Table (SET) stations installed between 2004

and 2007 by researchers from the National Centers for Coastal Ocean Science (NCCOS). SETS were located in restored marshes behind offshore stone sills and in natural marshes. Most natural sites exhibited a zero or negative net change in elevation, particularly at the marsh edge. For the current local rate of sea-level rise (~ 3 mm y-1), our data suggests that natural fringing marshes may be endangered. In contrast, sills appear to increase marsh surface elevation change to an average rate of approximately 4 mm y-1. Longer-term data are needed to understand how increases in marsh surface elevation behind sills affects vegetation, fishery utilization, and, ultimately, marsh function.

Project partners include NCCOS, North Carolina Coastal Reserve and National Estuarine Research Reserve, and NOAA Restoration Center.

For more information, contact Carolyn Currin.

From our Sister Cooperative in the Hawaiian Islands -

Addressing the Vulnerabilities of Anchialine Pools to Climate Change

Hawai'i is famous for its beautiful and rare ecosystems. Unfortunately, the unique and varied environments that help make Hawai'i beautiful also increase its vulnerability to climate change. With finite land resources and many species found nowhere else on Earth, small changes can have profound effects in Hawai'i. A closer look at anchialine pools provide insight into the vulnerability of ecosystems in Hawai'i to climate change impacts.

Anchialine pools are land-locked pools of brackish water fed by both subterranean connections to the ocean and fresh groundwater. The pools in are home to several endemic species. Seven species that call anchialine pools home are listed as candidate threatened or endangered, and the pools hold cultural significance to native Hawaiians.

Since 2011, the Hawaiian Islands Sentinel Site Cooperative (Cooperative) has addressed the vulnerabilities of anchialine pools to climate change, specifically to sea-level rise by connecting scientists and managers and addressing manager needs. The Cooperative includes four sites: Midway Atoll and French Frigate Shoals located in the Northwestern Hawaiian Islands, He'eia on the island of O'ahu, and a portion of the West Coast of Hawai'i Island where anchialine pools are found. As sea-levels rise, the pool's chemistry can change due to overtopping from the ocean and changes in subterranean sea-levels that disrupt the delicate ecosystem.

The red spots are shrimp that live in the pools.

While managers are dealing with a host of issues, such as invasive species, they lack the necessary information to prepare for climate related issues. For example, the elevation of anchialine pools is not a common dataset that is easily accessible, yet this information is critical in determining climate change vulnerability levels for specified areas. To address this gap, the Cooperative created a broad partnership across NOAA, other federal agencies, and local nonprofits to identify pools and record GPS-based elevation points near them. The data collected was used to model pool vulnerability to sea-level rise. The Cooperative continues to facilitate strategic partnerships between groups and organizations who may have worked independently of one another.

A pool found in the lava fields on Hawai'i Island.

It is believed that anchialine pool species can, incredibly, migrate to other pools through lava rocks, providing an opportunity to potentially save these incredible and unique ecosystems. The Cooperative's continued work with pool managers and other partners is helping move this important work forward, simultaneously identifying potential adaptive measures that hold the key to confronting challenges caused by climate change.

Thanks to Doug Harper with NOAA's Pacific Services Center for this article.

Sentinel Site Program Partners with Sea Grant to Fund Cooperative Coordinators

The NOAA National Sea Grant Office and the Sentinel Site Program have partnered together to put out a request for proposals that offers funding for half-time Sea Grant extension positions to serve as Coordinators of the existing Sentinel Site Cooperatives. Identified as a gap from the

beginning of the Cooperative, it is hoped that the Coordinator will support the transfer of climate science-related information among Cooperative participants and ensure that such information is made accessible to a wide range of users and stakeholders in the affected Cooperative region. The NCSSC supported North Carolina Sea Grant in the development of a proposal in response to this RFP. A funding decision is expected this fall.

Sentinel Site Program Chair to Visit Cooperatives

This summer, Sentinel Site Program Chair, Jim Sullivan, will visit Cooperatives and attend local meetings to build support for the Sentinel Site Program. Jim's first stop with be at the Disaster Response Center in Mobile, AL where he will be meeting with the Northern Gulf of Mexico Sentinel Site Cooperative (SSC), following a Regional Collaboration Team meeting. His second stop will be in Annapolis, MD at the Chesapeake Bay Office to meet with Cooperative members, followed by a visit down to Norfolk/Hampton Roads, VA, where frequent flooding and sea-level rise are of concern.

North Carolina is Jim's third stop for the August Southeast and Caribbean Regional Team Meeting and to meet with the N.C. SSC's Core Management Team. And lastly, Jim will travel to Clearwater, FL in September for National Sea Grant week to continue to build the successful partnership that allowed for Sea Grant extension staff to serve as half-time Coordinators at each of the five Cooperatives (see article above with more details).

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.