

Northeastern Coastal Stations Alliance intertidal temperature data, Summer 2016

Hannah Webber, Schoodic Institute at Acadia National Park and Caitlin Cleaver, Hurricane Island Foundation

Call to action

"In the Gulf of Maine sea level and coastal ocean temperatures are presently rising at rates far greater than the global average....Changes are observed at seasonal, interannual, and longer time scales and may be associated with greenhouse gas emissions and global warming. They compound long-standing stresses caused by human activities such as fishing and coastal development.

These changes will affect the region’s ecosystem services.

It is imperative the changes be observed and reported in order to inform marine resource decision-making, whether in regard to fisheries, aquaculture, tourism, industrial impacts, coastal land development or any other activities that use or impact Northeast ecosystems.

The information must come from a coordinated system for data collection, access, analysis and interpretation."

From: Integrated Sentinel Monitoring Network for Change in Northeast U.S. Ocean and Coastal Ecosystems. Executive Summary, 2016.

A role for coastal field stations alliance

The Northeastern Coastal Stations Alliance (NeCSA) is a newly formed network of field stations spanning the Gulf of Maine. NeCSA’s main foci are leveraging the potential for collaborative data collection and data sharing across the stations and enhancing training opportunities and public outreach to communicate the implications of environmental change in the Gulf of Maine.

There are 12 field stations in NeCSA—from the Isles of Shoals on the Maine-New Hampshire border to Bon Portage Island in Nova Scotia. The stations range in capacity, structure, and mission. All are committed to using and leveraging existing resources (locations, personnel, equipment) to contribute coupled abiotic and biotic data to each other and the larger community to understand change in the Gulf of Maine.

The field stations have a role to play in observing and reporting changes in the Gulf of Maine and recognize that doing so in a coordinated manner will increase the usefulness of data contributed.

As NeCSA coalesces we ask ‘What is within our capacities as individual field stations to contribute data, in a coordinated effort, to address Gulf-wide questions? How can we leverage our locations and infrastructures to contribute to understandings of changes in the Gulf of Maine?’”

Testing field station capacity to contribute data

Developing data collection and sharing efforts that fit within different capacities and can be sustained over time requires methodical buildup and iteration.

In 2016, from June 15 to September 10, ten NeCSA stations deployed Onset® TidbiT® v2 Temp Data Loggers in the intertidal zone using standardized protocols. Onset® TidbiT® v2 Temp Data Loggers (Tidbits) were used as they are already in use at two of the field stations and are also used at other sites in the Gulf. The Tidbits were programmed to collect hourly temperature data--wtare and air. At the end of this pilot study the stations uploaded data to a common data repository.

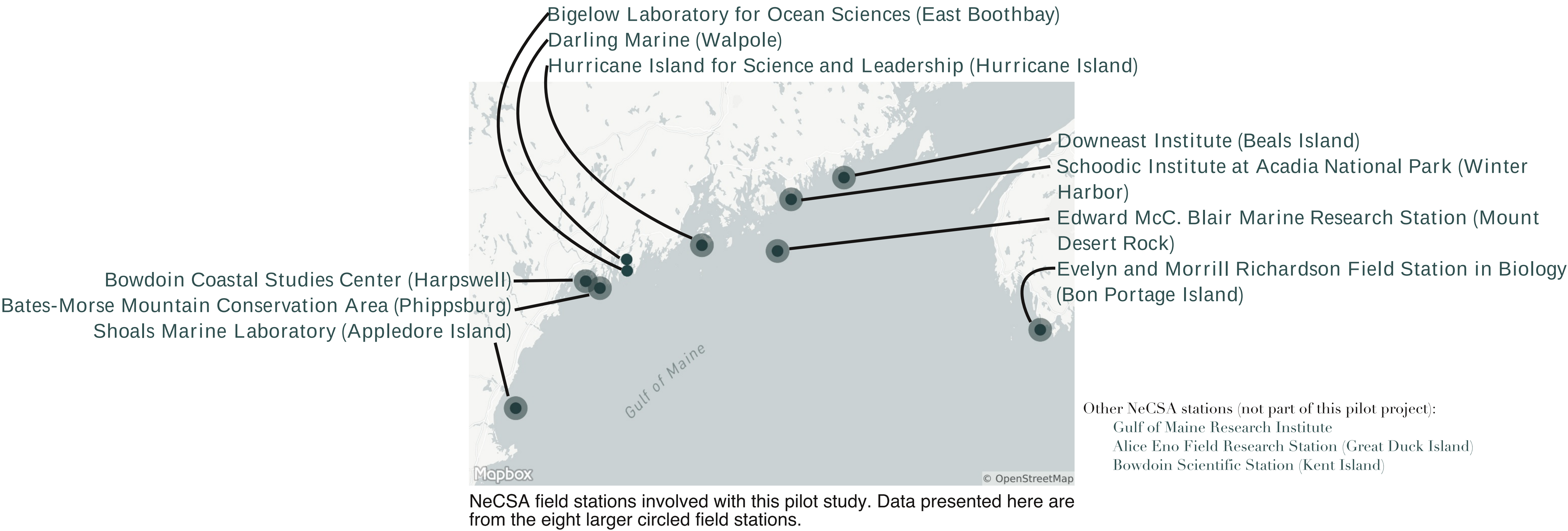
There were two goals for this project.

1. To collect and share intertidal temperature data from field stations along the Gulf of Maine,
2. To understand network infrastructure and needs to successfully scale this data collection pilot into a larger data collection effort (for additional abiotic and biotic parameters).

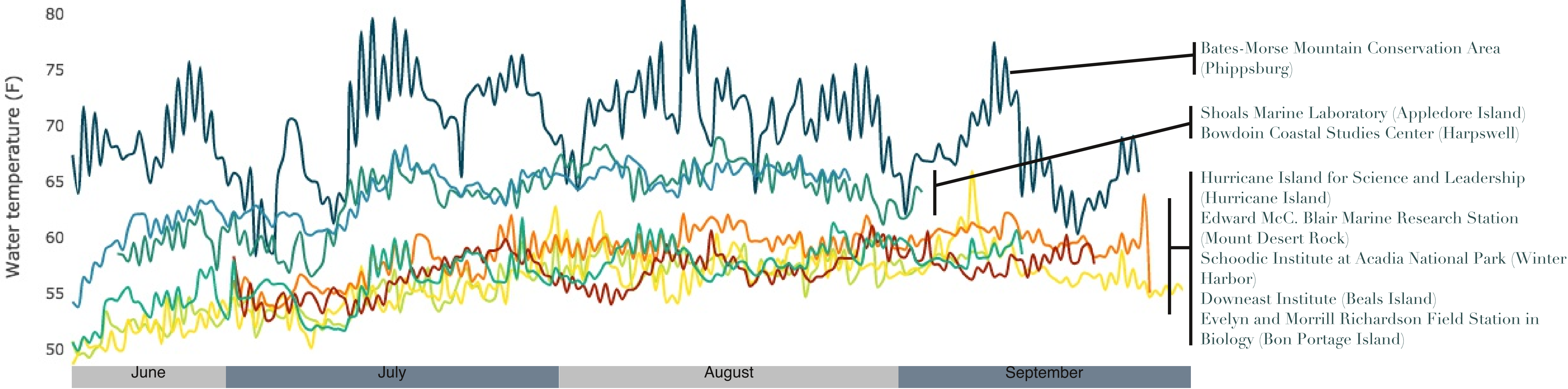
Acknowledgements

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Northeastern Coastal Stations Alliance (NeCSA)



Gulf of Maine intertidal water temperature (high tide only, F): three distinct clusters



What have we learned?

Temperature:

For sites with Tidbits installed in rocky intertidal locations the water temperatures at high tide echo patterns etsablished by larger oceanographic currents--the Eastern Maine Coastal Current, Western Maine Coastal Current, each delivering different 'rivers' of water to the different parts of the Gulf. The Bates-Morse Mountain tidbit is located in a salt marsh and presents an excellent opportunity to study effects of temperature in a system unlike all the rest of the stations (all other tidbits are in rocky intertidal).

Process:

Installing Tidbits took no more than 2 hours for each station, install dates were different for each station--all Tidbits were programed to start recording data on June 15. There was some data clean-up to remove data for the Tidbits installed after June 15. The workflow for data sharing and associating metadata (latitude and longitude, Tidbit serial number, install date) to temperature data needs refinement.

Network:

NeCSA is committed to contributing data to help anser the Integrated Sentinel Monitoring Newtork's Call to Action, and to leverage our coastal locations to collect coupled abiotic and biotic data. Developing a protocol and materials for autonomous temperature data collection required time and refinement. As NeCSA moves into more labor-intensive data collection (for biota) it will be very important to streamline every aspect of data collection and data management. The stations all have a mission to educate and train as well as to collect data. Thus, standardized training and quality assurance checks on method and data will need to be established. Existing examples--PISCO (the Partnership for Interdisciplinary Studies of Coastal Oceans), and the National Park Service's Vital Signs monitoring can be useful models for data collection NeCSA. It will be important moving forward, however, that these models be adapted to meet the needs of this network across the diverse oceanscape of the Gulf of Maine while not losing the scientific rigor that is necessary to understand change in this region.

