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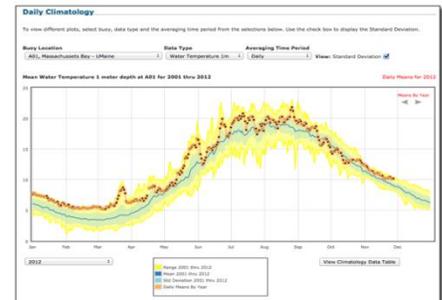
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New Ocean and Weather Climate Display

NERACOOS has developed an interactive [ocean and weather climate display](#) using the last decade of buoy data in the region. The new climatology tool allows you to see what recent conditions look like compared to the average of the last decade. Users can also toggle between stations, data types, time periods and create a table of the data that is being used in the plots.

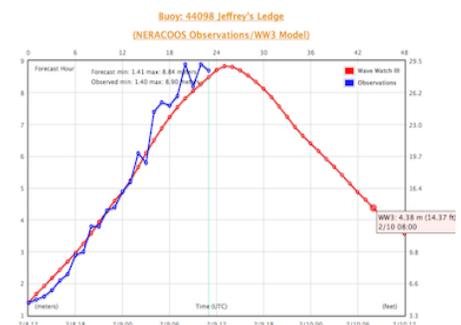
The data in the display comes from NERACOOS supported buoys and from the Northeast Fisheries Science Center eMOLT program, which monitors bottom water temperatures in the region. Additional data will be added to the tool as it becomes available. We'd like to hear what you think about this display and answer any questions you have. Contact us at info@neracoos.org.



NERACOOS Provides Critical Information and Support During Winter Storm Nemo and Superstorm Sandy

NERACOOS worked hard to keep weather and ocean information flowing throughout Winter Storm Nemo and provided support to multiple regional National Weather Service (NWS) forecast offices. NERACOOS hosted daily webinars with three regional NWS Forecast Offices as the storm developed and impacted the northeast. These briefings brought together ocean modelers of the NERACOOS Northeast Coastal Ocean Forecast System (NECOFS) with regional weather forecasters to look at coastal erosion and inundation forecasts. Coastal flooding in Massachusetts Bay was a major focus of the discussions. "The exchange of information was great and it was cool to host the first webinar as we drove back from the Gloucester Maritime Summit" said Ru Morrison, Executive Director of NERACOOS

In the Gulf of Maine, wind speeds reached 70 mph and wave heights were greater than 30 feet. The NERACOOS website was a critical source of information and saw traffic increase three times the normal traffic level throughout the storm. NERACOOS staff also provided frequent storm updates on the NERACOOS Facebook page. Harold Johnson from the Portland Press Herald wrote on his [Undercurrents blog](#) that the NERACOOS website "gives you access to dozens of New England weather stations, both coastal and out in the Gulf of Maine, that broadcast nicely packaged data to your screen, updated around the clock."



During the storm, some buoys went offline due to loss of power and internet on shore and Buoy M, which normally is moored in Jordan Basin of the Gulf of Maine broke free and came adrift. The University of Maine is preparing for a cruise to recover the drifting buoy, which is still operating and sending back data including its position and measurements from sensors as deep as 800 feet below the surface.

Superstorm Sandy

On the 29th of October 2012 hurricane Sandy combined with a cold front and developed into Superstorm Sandy. The storm affected most of the U.S. eastern seaboard and resulted in at least 146 casualties and an estimated \$70B in damages. Throughout the formation and landfall of Sandy, NERACOOS provided critical real-time data and predictions that helped improve forecasts, hazard warnings, preparation and emergency response. The NERACOOS buoys in the Gulf of Maine remained operational throughout the storm collecting and delivering critical weather and ocean information. The Long Island Sound buoys also remained operational throughout the storm, but data feeds went down due to power outages on land. The central Long Island Sound buoy measured maximum wind speeds of 77 mph and maximum wave heights of 21 feet. These are the highest waves in Long Island Sound recorded in the past decade of observing.

The NERACOOS website was a critical and reliable information source throughout the storm, as apparent in the eight fold increase in web traffic. John Cannon from the NWS forecast office Gray, Maine reported "the close relationship that NERACOOS and a front line office such as NWS GYX has was really important. I received quick responses in real-time for data requests during the storm, making the support from NERACOOS and others terrific!"



NERACOOS is reviewing "lessons learned" from both of these major weather events and is now planning the implementation of backup systems to assure that observations and predictions will be delivered 24/7 throughout future storms and extreme events. For more details on NERACOOS response to Superstorm Sandy see our [Sandy webpage](#).

New Tide Gauge to Benefit Seacoast New Hampshire

A state-of-the-art tide gauge has been installed at Hampton Harbor, N.H. This new tide gauge will provide critical water level information to help emergency responders, managers, weather forecasters, coastal planners and others prepare and respond to the impacts of coastal storms and rising sea levels. The water level data from this gauge will be available in near real-time on the NERACOOS website once the gauge has been surveyed in and the data has been verified. The tide gauge will also provide critical information for the development of a coastal flooding prediction system in and around the towns of Hampton, Hampton Falls and Seabrook. The prediction system will deliver forecasts 2-3 days in advance for emergency managers and responders to prepare for the storm. This system is being developed by NERACOOS modeling partners at the University of Massachusetts at Dartmouth and the Woods Hole Oceanographic Institution. For more details about the tide gauge and forecast system, please see the [tide gauge press release](#).

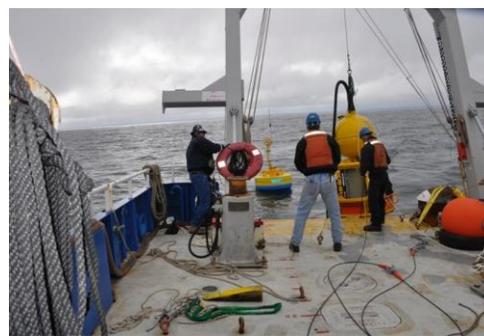


High-tech Sensors to Detect Harmful Algal Blooms

Every spring and summer harmful algal blooms, commonly referred to as red tides, naturally occur in the Gulf of Maine. One impact is that shellfish become toxic, and can cause serious illness or even death in human consumers. The size of these blooms and the degree to which they impact the shell fishing industry depend on a complicated mix of weather, ocean and biological conditions. This summer, state managers will have a new source of information to help them as they make decisions about testing shellfish, closing, and re-opening areas to shell fishing.

Scientists from the Woods Hole Oceanographic Institution will be deploying two high-tech buoys off the coast of Portsmouth, NH this spring and summer. Each of these buoys will carry an [Environmental Sample Processor \(ESP\)](#), which is a robotic instrument capable of detecting the toxic cells of the New England red tide organism, a microscopic algae called *Alexandrium*, in the water. These instruments will also be measuring the amount of toxin in the water. The information collected from these buoys will provide an early warning of harmful algal bloom activity and will help state managers predict where and when shellfish may become toxic. Currently, managers can only measure toxins in shellfish near shore, and have no way to know the number of toxic cells that are "upstream" in coastal waters, or even lurking offshore, waiting to be carried to shore by favorable winds. The ESP data will provide additional information to help state managers determine the timing and location of closures of shellfish beds and when harvesting can safely resume. The ESP data will also be used in numerical models that are used to provide forecasts of the toxic blooms. Advanced warnings will help states efficiently use the limited resources available for operating mandatory shellfish monitoring programs, which enable public health protection and the safeguarding of important economic resources. A long-term vision of the ESP project (funded by the NOAA MERHAB program) is to have multiple ESPs moored at key locations along the coast in a network that can provide information for the entire region and that also can improve the predictive capability of the forecast models.

For more information about harmful algal blooms in the Northeast please see the [Northeast PSP website](#).



Integrated Ocean Observing System Summit

NERACOOS staff and regional partners joined over 200 other representatives of the US Integrated Ocean Observing System (IOOS) community in Herndon, VA in November 2012 to develop a strategy for the next decade of US IOOS. For over four days, workshop participants reviewed the progress achieved over the last decade, validated the need for an integrated observing system, and identified opportunities for growth in the coming ten years. The first result of this effort is the US IOOS Summit Declaration, which has been signed by over 150 of the summit attendees. The reports from the summit are still being finalized and will be made available on the [IOOS Summit website](#).

Observing System Update

The NERACOOS observing system partners have been busy managing the operations and maintenance of buoys and sensors through Superstorm Sandy and Winter Storm Nemo. Overall, the system has performed well during these extreme events and has collected critical data throughout the storms.

The University of Maine's Physical Oceanography Group completed the fall turnaround of the NERACOOS buoys in the Gulf of Maine in late October 2012. The buoys and instrumentation are being cleaned up and refurbished for turnaround scheduled for early May. Ocean temperature and salinity sensors have been sent back to the

manufacturer for recalibration. As described in the Winter Storm Nemo article, Buoy M01 did break from its mooring on February 9, 2013 and plans are presently being made to retrieve the mooring and all its instrumentation. Plans for the redeployment of buoy M01 will be made after the buoy is recovered.

Daily and monthly averages of most of the standard meteorological and oceanographic measurements (air temperature, wind speed, wind gust, barometric pressure, ocean temperature, salinity, and density) for the Gulf of Maine buoys have been computed and are available on the new NERACOOS ocean and [weather climate display](#) described in the Ocean And Weather Display article above. Mean conditions for the past eleven years of data from the array are also available. Additional variables (including wave height, period, and surface current speed) as well as weekly and seasonal averages should be available later this spring.

The University of New Hampshire (UNH) team re-deployed the CO2 buoy near the Isles of Shoals, as part of a national network designed to monitor ocean acidification. Members of the UNH team have been able to make a couple trips recently to the CO2 Buoy aboard the R/V Gulf Challenger. While on the site, the buoy was inspected and validation samples were collected. The UNH Coastal Marine Lab station continues to collect and serve biogeochemical, optical and meteorological data on schedule. The Great Bay buoy was recovered for the winter in early December and the UNH team plans to redeploy it by May 1, 2013. The Great Bay buoy has been receiving extensive upgrades to the onboard data management computer, the real-time telemetry system and land-based computer systems. This refit will help to ensure robust environmental monitoring in the Great Bay Estuary for several years to come.

The buoy system in Long Island Sound operated and maintained by the University of Connecticut collected data throughout Superstorm Sandy and Winter Storm Nemo. The data collected during these storms will help scientists better understand these storms and will improve the prediction of future storms. The delivery of buoy data to the web went down for periods during the storms due to land-based power failures resulting in lost communications with the buoys. The Eastern Long Island Sound buoy will be deployed in mid-February and is now equipped with a current profiler in addition to the weather and water quality sensors.

NERACOOS Annual Meeting

On December 5th, NERACOOS held its annual meeting at the Seacoast Science Center in Rye, NH. In attendance were over 60 stakeholders from many sectors including local, state and federal government, private industry, academia, and non-governmental organizations. Dr. Hauke Kite-Powell of the Woods Hole Oceanographic Institution presented the keynote address, titled "Making the Economic Case for Ocean Observing." Following the keynote presentation, a panel of NERACOOS stakeholders talked about how they and their industry use and value NERACOOS information. The panel included Fire Chief Chris Silver from Hampton Fire and Rescue, Dr. Bruce Bailey from AWS Truepower, Matthew Lyman from CT Department of Energy and Environmental Protection, Dr. Don Anderson from Woods Hole Oceanographic Institution, and Lieutenant Nathaniel Robinson from the U.S. Coast Guard.

At the meeting, an award was presented to Dr. Frank Bohlen, Dr. James O'Donnell, and the Long Island Sound Integrated Observing System at the University of Connecticut for their dedication and outstanding work in ocean observing. Dr. Ru Morrison, NERACOOS Executive Director and Zdenka Willis, IOOS Program Director, presented on the successes and future of NERACOOS and the U.S. IOOS, respectively. The presentations from this meeting are available on the [NERACOOS Website](#).



NEOSEC Ocean Literacy Summit a Big Success

NERACOOS helped design and co-sponsor the 2012 NEOSEC Ocean Literacy Summit, which was held in November at the University of Rhode Island. The summit was a great success despite it occurring right after Superstorm Sandy. The summit highlighted Ocean Literacy Principle #7: *The ocean is largely unexplored*, and brought together approximately 180 people from around New England that are involved and interested in formal and informal ocean education. Highlights of the two-day event included a "Gallery of Exploration" and speech by NOAA Deputy Administrator Dr. Kathryn Sullivan, keynote address by ocean explorer Dr. Robert Ballard, and a multi-disciplinary panel of explorers focused on the question "why should we explore". Attendees chose from 15 concurrent sessions, each of which featured a scientist and educator as co-presenter. Many NERACOOS partners were speakers and/or attendees. The summit provided a great opportunity to highlight how NERACOOS is and could be used in the classroom to engage students about the ocean. One attendee noted the summit this year was a "truly useful and energizing event". The [education](#) section of the NERACOOS website has been updated and now includes resources from the summit, including speaker presentations.



NOAA Deputy Administrator Dr. Kathryn Sullivan spoke at the Ocean Literacy Summit on Thursday, November 1. Photo by Maureen Dewire.

Upcoming Meetings and Events

February 28 - March 3, 2013, [Maine Fishermen's Forum](#), Rockport, Maine

March 9, 2013, Build-Your-Own-Drifter, [Educator Professional Development Workshop](#), Woods Hole, MA

March 6-8, 2013, [IOOS Regional Association Spring Meeting](#), Washington, D.C.

March 26, 2013, [Maine/New Hampshire Port Safety Forum](#), Augusta, Maine