

IOOS® in Action: The Northeast

Improving Lives and Livelihoods in New England

Overview:

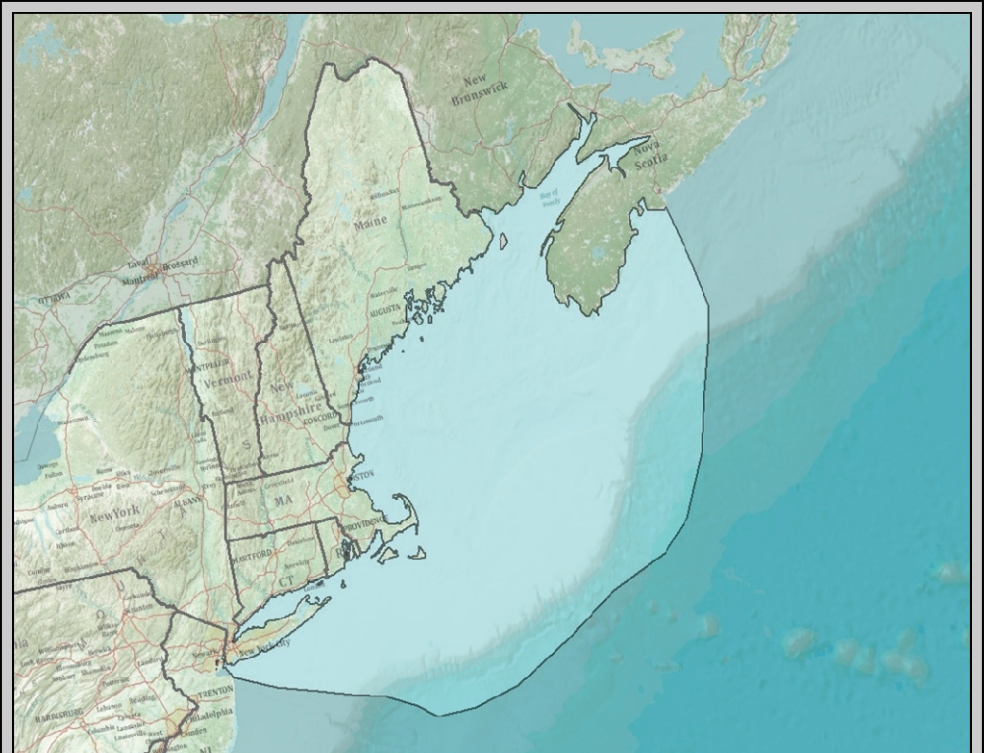
Thousands of tools – from satellites above Earth to sensors below the water – continuously collect ocean and coastal data. The Integrated Ocean Observing System (IOOS) is expanding this network of data and making it easier to access and use.

The Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS), a component of the national IOOS, spans coastal waters from the Canadian Maritime Provinces of Nova Scotia and New Brunswick to Long Island Sound.

This region provides weather and ocean data to commercial and recreational mariners determining if conditions are safe for passage and to emergency managers issuing storm warnings. The region is also advancing efforts to use these data for harmful algal bloom predictions and warnings, water quality monitoring and coastal flooding and erosion forecasting.

Predicting Red Tides:

The Woods Hole Oceanographic Institution uses NERACOOS buoy data as a navigation guide while conducting both research and red tide alert cruises in the Gulf of Maine. These data proved crucial



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in developing community response and state and federal shellfish closures during major paralytic shellfish poisoning events in 2005, 2006 and 2008 and are now used every year to predict red tides.

Scientists are working to improve detection of toxic algae which cause red tides in the region. The red tide species known as *Alexandrium fundyense* is notoriously difficult to identify and track. New technologies, like the Environmental Sample Processor (<http://www.mbari.org/esp/>), are helping researchers create an early warning system to predict potential shellfish poisoning dangers along the coast.

Supporting Marine Operations:

NERACOOS buoys and forecasts provide critical ocean and weather data and tools to mariners who rely on this information for safety and planning decisions. The U.S. Coast Guard relies on this information for planning operations.

“The forecasts are instrumental in planning both training and routine operations, especially in winter,” says Chief Warrant Officer Curtis Barthel, Commanding Officer, Station Rockland. “We are required to train in seas greater than 8 feet. So forecasts, along with current data, ensure we meet minimum wave heights, but still operate within safety parameters. I cannot

imagine operating without this buoy. We check it constantly throughout the day.”

Forecasting Weather Conditions:

NERACOOS provides information “critical” to local Weather Forecast Offices. NERACOOS buoy arrays’ real-time meteorological and maritime observations often provide the only source of current conditions. For instance, the buoys supply the only waves observations in Long Island Sound and visibility data in the Gulf of Maine. Forecasters say they “integrate NERACOOS data into forecasts and warnings operations on an hourly basis.” These observations are also “critical for forecast user validation and internal verification.”

NERACOOS model forecasts, such as those provided by the Northeast Coastal Ocean Forecast System, are also invaluable to forecasters, providing additional products not available elsewhere, such as ship icing potential. The partnership facilitates “collaborative research and the transfer of research into operations.” Model forecasts and buoy observations are also part of the front-line coastal damage and flooding warning and forecast system. Pilot projects are underway in Saco, Maine, and Scituate, Massachusetts, to provide street-level inundation forecasts with the Northeast Coastal Ocean Forecast System. A coastal erosion and splash-over tool that combines model and buoy observations routinely informs forecast coastal damage potential.

Improving Water Quality:

The NERACOOS region includes several large estuary systems with significant urban influence, such as Long Island Sound, Narragansett Bay and Great Bay, New Hampshire. NERACOOS efforts help water quality managers by



Safer Lives, Better Livelihoods: Hundreds of mariners use wind and wave data from IOOS buoys on a daily basis to decide whether to head out to sea.

providing unprecedented hourly water quality data and testing new technologies such as continuous nutrient monitoring systems. The New Hampshire Department of Environmental Services uses NERACOOS data from the coastal buoy in Great Bay and the Great Bay National Estuarine Research Reserve to inform water quality standards that help protect coastal habitats in the Great Bay Estuary. New York and Connecticut use a model to determine waste load allocations and establish Total Maximum Daily Loads to reduce hypoxia in Long Island Sound. The states use NERACOOS buoy data to assess the model’s accuracy and establish error estimates for cruise data and hypoxic area critical to informing managers on hypoxia trends. These data will help managers develop better models and monitoring programs.

Detecting Changes:

NERACOOS buoy N monitors conditions at the edge of the Gulf of Maine in the Northeast Channel where deep water flow brings in the majority of nutrients to the area.

This buoy detects important changes in properties and direction of the deep flow. Because deep currents vary in temperature, salinity and nutrients, they can affect circulation, red tides, fisheries, lobster and endangered right whale reproduction. The observations from this buoy provide a critical early warning system to fishery and coastal managers in the region.

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