



IOOS® in Action: Enhancing Lives of American Citizens

Improving Safety, Economy, and Environment

Overview:

Emergency managers making evacuation decisions amid an approaching storm, farmers deciding what crops to plant, and coastal communities concerned about sea level rise all need the same thing - reliable and timely access to multiple data sources about emerging threats to enable wise choices in an uncertain world. The Integrated Ocean Observing System (IOOS) is a federal-regional partnership working to provide new tools and forecasts to improve safety, enhance the economy, and protect our environment.

Integrated ocean information is now available in near real time, as well as retrospectively. Easier and better access to this information is improving our ability to understand and predict coastal events - such as storms, wave heights, and sea level change. Such knowledge is needed for everything from retail to development planning. For example, earlier and more accurate forecasts mean a store manager can make more informed decisions about whether to ship hurricane supplies or beach towels to his shop for a coming season.



Climate Change: IOOS data help managers predict distributions of living marine resources and the health of essential fish habitats amid changing climates and conditions so they can take action to protect our environment. Photo: Spotted seal, Bering Sea.

Predicting Severe Weather:

Compatible, easily accessible data from multiple sources are increasing understanding of how oceans drive storms to enable earlier, more accurate weather predictions so people can get to safety before disaster strikes. For example, Northeast fishermen use IOOS weather and water data to make informed decisions about when it is safe to head to sea, while Puerto Rico's Department of Natural Resources relies on IOOS derived shoreline maps to plan for and respond to storm surge, flash floods, and sea level rise.

Forecasting Hazards:

Integrated ocean data are enhancing scientific ability to forecast environmental changes and hazardous events, so decision makers can take targeted action, such as closing a beach to avoid illnesses caused by blooms of harmful algae.

Hourly ocean temperatures, currents, and other data also alert west coast oyster growers and east coast shellfish harvesters to conditions that trigger toxic algae outbreaks, which can make shellfish unsafe to eat.

Improving Search and Rescue:

IOOS is introducing state-of-the-art technology that allows exciting new abilities to track ocean currents in near real time and thus aid search and rescue crews in mapping the probable path of people lost at sea. In fact, the US Coast Guard estimates it can at least double its success rates in finding these victims using such data.

Monitoring Water Quality:

Combined marine data will improve the ability of coastal communities to monitor water quality and protect public health with early warnings. The Great Lakes region puts this effort into action by maintaining and expanding a network of water-quality monitoring buoys that report water temperature, conductivity, pH, turbidity, and dissolved oxygen. These data are used to create E. coli predictions for swimming beaches, among other things.

Optimizing Marine Operations:

IOOS provides tools mariners can use to optimize shipping routes for increased fuel efficiency and faster deliveries. For example, IOOS paired currents data from radar systems with existing wave data into a new user-friendly website providing tankers with up-to-date sea conditions as they enter the Port of Long Beach, one of our nation's busiest ports. This information reduces the risk of accidents in such high-traffic areas. IOOS also provides supplemental data to NOAA's Physical Oceanographic Real-Time Systems (PORTS®). PORTS supplies bridge clearance data to inform mariners when the heaviest ships can safely navigate narrow channels, thereby increasing cargo loads moving through a port and translating into millions of dollars in goods being more efficiently distributed.



Smarter Agriculture: Compatible, easily accessible data are increasing understanding of how oceans drive storms to enable earlier, more accurate weather forecasts. Longer-term predictions will allow farmers to know ahead of time what kind of crops to plant (drought resistant or water dependent) and when to harvest (before a freeze or after).

Enhancing Oil Spill Response:

IOOS enables tracking of oil spills and other pollutants so responders can minimize harmful impacts. San Francisco Bay's *Cosco Busan* oil spill in November of 2007 is one example. Hourly information on surface currents provided emergency personnel with spill location and flow direction to enhance response time.

Minimizing Rip Current Deaths:

Rip currents cause an estimated 100 deaths per year, second only to floods as deaths from weather-related disasters. Scientists in the Carolinas and Hawaii are working to increase the number of wave observations and advance wave forecast models to improve warnings and safety alerts.

Boosting Homeland Security:

Ocean observations can detect and track ships to improve security of our ports and harbors. IOOS is installing receivers on buoys in the southeast to increase vessel tracking coverage. Wind, wave, current, and tide data are critical for detection in today's maritime domain awareness system.

Predicting Human Health:

Ocean observations are improving scientific ability to detect and mitigate outbreaks of disease and other harmful conditions. For example, researchers recently developed a system for predicting cholera outbreaks using satellite monitoring of marine environments. Data showed that epidemics follow seasonal increases in sea temperatures and phytoplankton levels. The tiny organisms increase in number as water temperatures rise and bring the cholera pathogen to drinking water supplies. This finding could lead to early warnings for similar ocean health threats that are common in the US.

For More Information:

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