

## IOOS® in Action: Gulf of Mexico Region

### Improving Lives and Livelihoods in the Gulf of Mexico

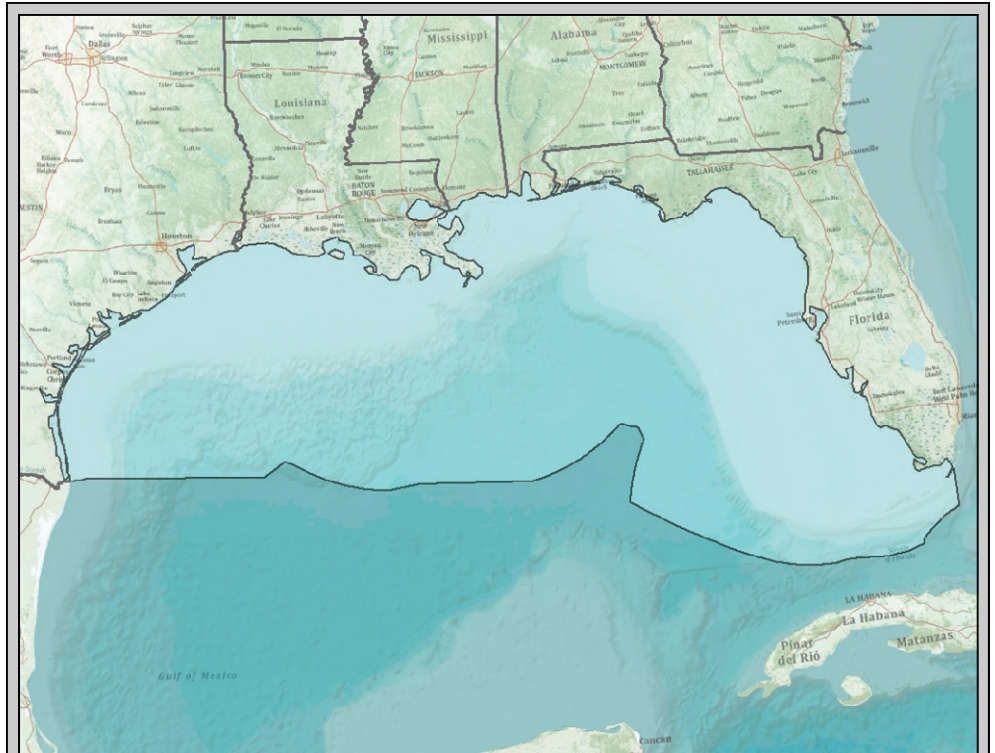
**Overview:**

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 Gulf of Mexico Coastal Ocean Observing System (GCOOS) is an IOOS region that provides coastal and ocean information to those who live, work and play on the Gulf of Mexico. The region includes the coastal states from Florida to Texas and all U.S. Gulf waters.

Many kinds of users seek to understand this environment, manage its ocean and shoreline resources and safely use its waterways, shipping lanes and recreational assets.

GCOOS is a system of systems enhanced through data integration from many operational elements, operated by separate entities, and funded through a variety of sources. The region is working to augment existing measurements to provide high-quality, integrated marine and estuarine data, information, and products about the northern Gulf of Mexico coastal region and related ecosystems.



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**Oil Spill Mitigation:**

GCOOS developed a Data Portal to seamlessly integrate information from numerous data providers, making data easy to discover and acquire. This proved useful after the 2010 Deepwater Horizon oil rig explosion, when NOAA’s Office of Response and Restoration needed data and forecasts of winds and currents to predict where oil would travel.

Prior to the event, the Data Portal project made non-federal data and models immediately available in real-time and in IOOS formats, so the Office of Response and Restoration spent no time on data discovery, access, and formatting.

**Water Quality and Ecosystems:**

Harmful algal blooms (HABs) and hypoxia (low dissolved oxygen) negatively impact water quality and, consequently, ecosystems, public health, and commerce. While HABs and hypoxia have different sources of initiation, both involve excessive algae growth—HABs through the growth of a species to levels that prove harmful to resources or people, and hypoxia through algae decomposition and subsequent depletion of dissolved oxygen in the water. Both take a toll on ecosystem function and suppress tourism and shellfish industry revenues. Both occur nearly every year in the Gulf.

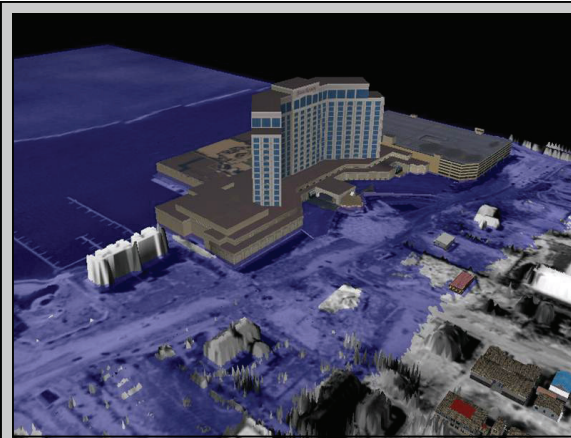
The northern Gulf hypoxic zone is the largest in the nation and the second largest human-influenced area of coastal water hypoxia in the world. GCOOS is working closely with scientists and managers to develop systems to predict, detect, track and forecast HABs and hypoxia. GCOOS is leading efforts to bring together researchers, resource and public health managers, and educators from the U.S. and Mexico to plan and implement a HAB integrated observing system that will unite disparate data sets and information into a comprehensive whole.

**Coastal Hazard Mitigation:**

Many hurricanes and intense storms make landfall along Gulf of Mexico shores. The region also experiences relative sea level rise rates that exceed the international average. These facts require area coastal communities to enhance their resiliency to storm surge inundation and flooding from both of these natural hazards.

GCOOS contributes to minimizing the risk of damage and loss of lives and property by providing timely information to the NOAA National Hurricane Center. GCOOS non-federal information is immediately available for use in models to improve predictions of storm tracks, surges, and intensities, without the need for modelers to discover, access, or format data. The Data Portal project resulted in tools that both improve public understanding of natural processes that produce coastal hazards, and enhance safety through increased ocean and climate literacy.

Augmentation of GCOOS through the addition of new observing assets should promote community-level economic stability by avoiding unnecessary, costly evacuations through improved predictions.

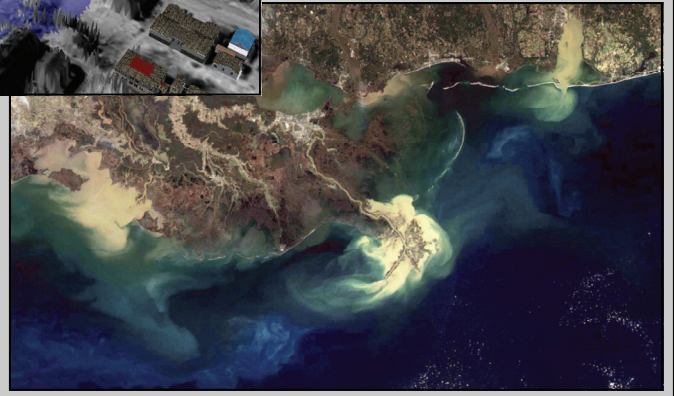


Above: Surge models and water level data inform a visualization demonstrating high water levels in Biloxi, Mississippi, after Hurricane Katrina in 2005.

Credit: The Visualization Center at the University of Southern Mississippi Center of Higher Learning.

Below: This satellite image reveals high concentrations of river sediments entering the northern Gulf of Mexico through (left to right) Atchafalaya Bay, the Mississippi "bird-foot" delta, and Mobile Bay.

Credit: Earth Scan Laboratory, School of the Coast and Environment, Louisiana State University.



**Protecting Resources:**

The Gulf of Mexico region includes the largest tonnage port in the Western Hemisphere and seven of the top ten U.S. ports by trade, thus contributing billions of dollars to the economy. GCOOS provides real-time observations and predictions necessary for safe, efficient ship movements in and out of these ports. One novel use of port information came in 2010 and again in 2011, when GCOOS data provider, the Texas Coastal Ocean Observation Network, partnered with the Gulf Intracoastal Canal Association (GICA) to implement a water temperature forecasting tool to protect recreational fish species.

Cognizant of the danger that barge traffic in a section of Texas' Intracoastal Waterway poses to cold-stressed fish, GICA members voluntarily sacrificed \$7,000 per tow to protect the resource. GICA collaboration with scientists at the Conrad Blucher Institute at Texas A&M University-Corpus Christi and conservationists from the Coastal Conservation Association Texas led to pooling of financial and

human resources to mitigate game fish mortalities. The partnership exemplifies the missions of U.S. IOOS and GCOOS to use data and tools to produce information, deliver that information to decision makers in a timely manner, and make and implement decisions that promote sustainable use of resources.

**For More Information:**

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