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The USGS and the Gulf of Mexico

Supporting the Vision of the Gulf of Mexico Alliance

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The U.S. Geological Survey (USGS) is deeply committed to the Gulf of Mexico and its many ecosystems. Through a network of science centers in the five Gulf Coast States, as well as other science centers throughout the Nation, USGS applies its biological, geological, hydrological, and mapping expertise to provide unbiased scientific findings to decisionmakers and its partners, such as those in the Gulf of Mexico Alliance.

The Gulf of Mexico Alliance (*www.gulfofmexicoalliance.org/*) is a partnership of the States of Alabama, Florida, Louisiana, Mississippi, and Texas, with the support of 13 Federal agencies. The Alliance's overall goal is to significantly increase regional collaboration to enhance the ecological and economic health of the Gulf of Mexico. The States have identified six initial priority issues that are regionally significant and can be effectively addressed through increased collaboration at local, State, and Federal levels: water quality, restoration and conservation, environmental education, habitat identification and characterization, nutrient reduction, and community resilience. The following are examples of USGS work, according to these priorities.

Water Quality for Healthy Beaches and Shellfish Beds

The Alliance's goal for water quality is to provide critical water-quality information to Gulf of Mexico resource managers, in near-real time where appropriate, to help protect human health at beaches and to help ensure healthy shellfish-growing waters. The USGS monitors freshwater inflow and provides real-time data on the Web (*http://waterdata.usgs.gov/nwis*).

Other USGS water-quality topics include the following:

- Coastal hydrology
- Harmful algal blooms
- Freshwater quality and availability
- Beach health
- Paleo-oceanography
- Ocean acidification
- Hydrates
- Salt spray
- Contaminant uptake
- Mercury contamination
- Invasive species
- Fishes

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Wetland and Coastal Restoration and Conservation

The Alliance's restoration and conservation goal is to increase coordination among the Gulf States and local, Federal, business, and nonprofit partners to better conserve and restore coastal wetlands and other vital habitats throughout the Gulf of Mexico.

To assist in meeting the restoration and conservation goal, USGS studies the following:

- Wetland loss
- Coastal restoration
- Sedimentation
- Mississippi River
- Sand resources
- Windfield modeling
- Posthurricane impacts on habitats and species
- Resilience of restored wetlands to storm surge

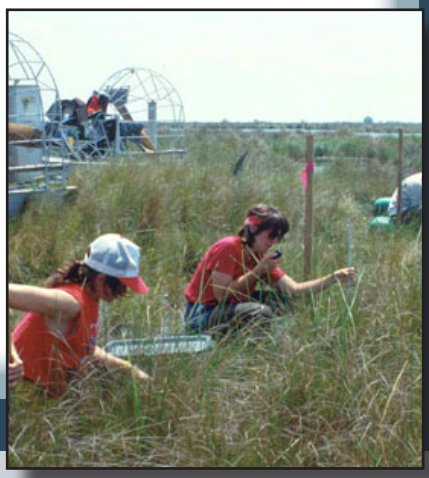
Environmental Education

The Alliance's goal for environmental education is to increase both awareness and stewardship of Gulf Coast resources through targeted education projects and public awareness. The USGS serves on the steering committee of this priority issues team and has created a comprehensive environmental education digital library (clearinghouse) focused on the six Alliance priority issues. The digital library constitutes the bulk of the Gulf of Mexico Alliance Environmental Education Network Web site (*www.nbii.gov/gomaeen*).

The USGS has several offices that perform outreach related to the Gulf with activities such as Science and the Media seminars, job shadowing, classroom presentations, and special events like National Wetlands Day.

More information can be found at the following Web sites:

- The Central Southwest and Gulf Coast NBII node (*www.nbii.gov*)
- National Wetlands Research Center (*www.nwrc.usgs.gov*)
- LaCoast, an outreach Web site of the Louisiana Coastal Wetlands Conservation and Restoration Task Force (*http://lacoast.gov*)
- USGS Northern Gulf of Mexico Science Coordination (*http://ngom.usgs.gov/gomsc/index.html*)
- Florida Integrated Science Center (*http://fisc.er.usgs.gov/*)
- Alabama, Florida, Louisiana, Mississippi, and Texas Water Science Centers (*http://water.usgs.gov/*)



Identification and Characterization of Gulf Habitats

The Alliance's goal for habitat identification is to identify, inventory, and assess the current state of and trends in priority coastal, estuarine, nearshore, and offshore Gulf of Mexico habitats to inform resource management decisions. The USGS performs research to improve our understanding of ecosystems and to predict ecosystem change, especially in light of climate variability and change.

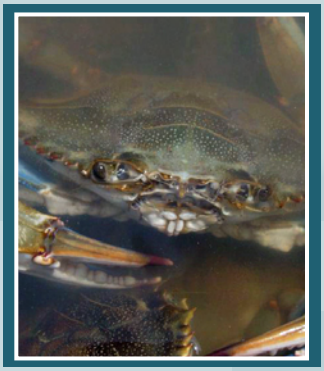
Research topics include the following:

- Development of data integration tools such as PHINS (Priority Habitat Information System; see box)
- Coastal processes
- Ecosystems and populations
- Large-scale landscape change
- Subsidence
- Ecosystem modeling
- Sea-level rise
- Mangroves and seagrasses
- Barrier islands
- Wetlands including coastal forests
- Tracking bird migration with radar
- Sea turtles
- Exotics and invasive species

Data Integration: PHINS

The Priority Habitat Information Network System (PHINS) is a State and Federal partnership intended to provide users with habitat information and geospatial data supporting the Gulf of Mexico Alliance (*http://ecowatch.ncddc.noaa.gov/habid_public*). The data integration system consists of a digital library (*http://dl.cr.usgs.gov/gomex/*), developed by the National Wetlands Research Center, and a map viewer (*http://phins.sam.usace.army.mil*). The digital library is a Web-based access and delivery system for data, reports, imagery, presentations, and synthesis products related to the Gulf of Mexico Alliance. The map viewer generates online maps from data stored at participating agencies.

Reducing Nutrient Inputs to Gulf Ecosystems



The Alliance's goals for nutrient reduction are to develop nutrient criteria management tools to reduce nutrient pollution to Gulf of Mexico coastal waters and to work to ensure that Gulf Coast rebuilding efforts incorporate innovative practices and technologies that reduce the potential for nutrient pollution to coastal ecosystems.

USGS research related to these goals includes such topics as the following:

- Hypoxia
- Nutrient trends
- SPARROW (SPAtially Referenced Regressions on Watershed Attributes; *http://water.usgs.gov/nawqa/sparrow/*)

Coastal Community Resilience and Hazard Mitigation

The Gulf of Mexico Alliance has identified two main goals for community resilience, a new priority issue: (1) to share and collaborate on lessons and experiences, and (2) to begin the cross-State dialog about how to move from response after a natural disaster to resilience.

Hazard mitigation in the USGS includes the following:

- Storm surge, inundation, and windfield modeling
- Resilience of restored wetlands to storm surge
- Posthurricane impacts on coastal wetlands, bottomland hardwoods, and exotic species
- Coastal studies using lidar (laser identification detection and ranging) technology
- Data integration and management tools such as PHINS (Priority Habitat Information Network System; *http://dl.cr.usgs.gov/gomex/search1.aspx*); EDEN (Everglades Depth Estimation Network; *http://sofia.usgs.gov/eden/*), and digital evaluation models (DEMs)
- Web sites for coastal information such as SOFIA (South Florida Information Access Web site; *http://sofia.usgs.gov/*), LaCoast (*http://lacoast.gov/*), and EDEN (Everglades Depth Estimation Network)
- Hurricane Web sites: Hurricanes and extreme storms (*http://coastal.er.usgs.gov/hurricanes/*) and Hurricanes: Powerful Agents Shaping the Coast (*www.nbii.gov/gulfhurricanes*)

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