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The USGS and the Gulf of Mexico

USGS and the Gulf of Mexico Alliance

The U.S. Geological Survey (USGS) is committed to mapping, monitoring, and conducting research in the Gulf of Mexico and adjacent watersheds. Through a network of science centers in the five Gulf States and across the Nation, the USGS applies its biologic, geologic, geographic, and hydrologic expertise to provide unbiased scientific findings to decision makers, particularly members and supporters of the Gulf of Mexico Alliance (the Alliance). The overarching goal of USGS Gulf Coast activities is to provide the scientific information, knowledge, and tools required to facilitate management decisions that promote restoration, increase coastal resilience, and mitigate risks associated with both artificial and natural hazards.

The Gulf of Mexico Alliance (www.gulfofmexicoalliance.org) is a partnership of the States of Alabama, Florida, Louisiana, Mississippi, and Texas. It is supported by 13 Federal agencies, including the Department of Interior, which is represented by its coastal bureaus—Bureau of Ocean Energy Management, National Park Service, Fish and Wildlife Service, and USGS. The overall goal of the Alliance is to significantly increase regional collaboration that will enhance the ecological and economic health of the Gulf of Mexico. The Alliance has identified six priority issues of regional significance that can be effectively addressed through coordinated activities at local, State, and Federal levels: water quality, habitat conservation and restoration, ecosystems integration and assessment, nutrients and nutrient impact, coastal community resilience, and environmental education and outreach.





U.S. Department of the Interior
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Water Quality

The Alliance's goal for water quality is to provide critical water quality information to Gulf of Mexico resource managers to reduce risk of exposure to disease-causing pathogens, minimize occurrence and effects of harmful algal blooms, identify sources of mercury in Gulf seafood, and improve monitoring of Gulf water resources. The USGS monitors freshwater inflow and provides real-time data on the Web (http://waterdata.usgs.gov/nwis).

Other USGS water quality research and monitoring efforts include the following:

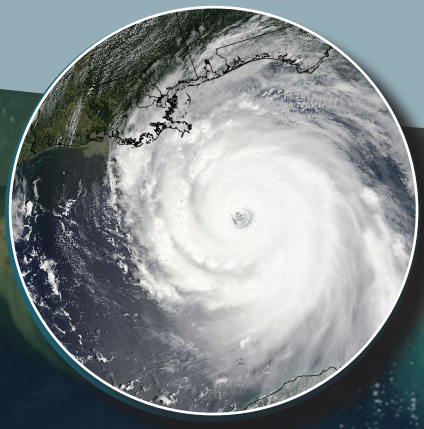
- Coastal hydrology
- Environmental history (paleoecology)
- Saltwater intrusion into coastal aquifers
- Sources and flux of contaminants, including uptake by fish and wildlife
- Harmful algal blooms
- Hypoxia

Habitat Conservation and Restoration

The Alliance's habitat conservation and restoration goals are to engage a diverse group of stakeholders to restore and conserve critical habitat, improve policies that promote conservation and restoration efforts, provide improved conservation and restoration management tools, and develop and implement an accurate tracking system to document gains and losses of Gulf habitats and ecosystem services.

Related USGS research and monitoring efforts include the following:

- Wetland loss, restoration, mitigation, and adaptation strategies studies
- Ecosystem-based, adaptive management approaches to conservation
- Ecosystem modeling and forecasting
- Sediment flux and sand resources research
- Hurricane impacts on habitats and species
- Connections and dependencies among species and habitats
- Process studies that lead to understanding resilience of natural, altered, and restored habitats



Ecosystems Integration and Assessment

The Alliance's goals for ecosystems integration and assessment are to develop regional data systems that contain environmental and economic data, establish strategic partnerships to fill environmental and ecological data gaps, and provide ecosystem decision-support tools to address priority issues within the Gulf. The USGS conducts research to improve our understanding of ecosystems and to predict ecosystem change, especially related to climate variability and change.

Related USGS research and monitoring efforts include the following:

- High-resolution topographic and bathymetric mapping
- Coastal erosion, accretion, and subsidence
- Ecosystem modeling, including sea-level rise
- Barrier island evolution
- Habitat quality, quantity, and landscape change
- Dynamics of wetlands, coastal forests, mangroves, and seagrasses as influenced by natural and anthropogenic stressors
- Invasive species
- Distribution, abundance, and population biology of fish and wildlife, including threatened and endangered species

Nutrients and Nutrient Impacts

The Alliance's goals for nutrients and nutrient impacts are to design a regional process for comparing nutrient criteria across coastal and estuarine waters, develop and implement strategies that reduce nutrient inputs and hypoxia, establish a comprehensive ecosystem approach to manage nutrient inputs and reduce impacts to coastal ecosystems, and increase the capacity of gulf coastal communities so that nutrient impacts are better managed and reduced. A key contribution from USGS research to the Alliance partners is information that improves the understanding of ecosystem structure and function. Additionally, the USGS has developed the Spatially Referenced Regressions On Watershed Attributes (SPARROW) model for the Gulf of Mexico (http://water.usgs.gov/nawqa/sparrow/gulf_findings).

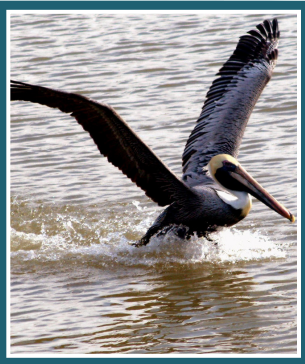
Other USGS research and monitoring efforts include the following:

- Relationships of land use, water use, nutrient sources, loading, and eutrophication
- Impacts to fish and wildlife
- Wastewater and stormwater management and nutrient-reduction strategies
- Reconstruction of historical low-oxygen or hypoxic events
- Water quality and nutrient assessment and monitoring in watersheds and estuaries around the Gulf

Emergent Wetlands Status and Trends

The Emergent Wetlands Status and Trends in the Northern Gulf of Mexico: 1950-2010 report (http://gom.usgs.gov/GOMEmWetStatusTrends.aspx) will provide scientists, managers, and citizens with valuable baseline information on the status and trends of emergent wetlands along the coast of the Gulf of Mexico. This study examines the emergent wetlands of eight individual estuarine areas within the northern Gulf of Mexico region, as well as presenting statewide summaries for Texas, Louisiana, Mississippi, Alabama, and Florida. This report addresses background information for each State and estuarine area, the methodology employed to analyze and document the historical trends and current status of emergent wetlands, current status and historical trends of estuarine and palustrine emergent wetlands, causes of status change, emergent wetlands mapping and monitoring, and restoration and enhancement activities and needs.

Coastal Community Resilience



The Alliance's goals for coastal community resilience are to provide enhancements for coastal communities, ecosystems, and economies to become more resilient to coastal hazards; increase the understanding of coastal hazards risks; incorporate state-of-the-art mitigation methods for reducing risks and enhancing resilience; and encourage adoption of new methods of risk mitigation and resilience. The USGS Northern Gulf of Mexico (NGOM) Ecosystem Change and Hazard Susceptibility project (http://ngom.usgs.gov) is designed to determine the evolution of coastal ecosystems on the northern Gulf Coast, the impact of human activities on these ecosystems, and the vulnerability of these ecosystems and human communities to more frequent and more intense hurricanes in the future.

Other USGS research and monitoring efforts include the following:

- Storm surge, inundation, and wind-field monitoring and modeling
- High-resolution maps that track changes in bathymetry, shorelines, topography, and other landscape features
- Hurricane impacts on coastal infrastructure, coastal habitats, barrier islands, and fish and wildlife populations
- Integrated models and forecasting tools that link shoreline processes with ecosystem structures and functions
- Development of alternative futures and associated management options

Environmental Education and Outreach

The Alliance's goal for environmental education and outreach is to increase both awareness and stewardship of Gulf Coast resources through targeted education projects and public awareness. The USGS has several offices that perform outreach related to the Gulf with activities such as science and media seminars, job shadowing, classroom presentations, and special events like National Wetlands Day.

More information can be found at the following Web sites:

- National Wetlands Research Center (www.nwrc.usgs.gov)
- LaCoast, an outreach Web site of the Coastal Wetlands Planning, Protection and Restoration Act (http://lacoast.gov)
- Southeast Ecological Science Center (http://fl.biology.usgs.gov/)
- St. Petersburg Coastal and Marine Science Center (http://coastal.er.usgs.gov/)
- Water Resources of the United States, a Web site that provides access to the Alabama, Florida, Louisiana, Mississippi, and Texas Water Science Centers (http://water.usgs.gov)

For more information, contact

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