ACCURATE COASTAL ELEVATION TO SUPPORT WETLANDS RESTORATION

Needs and opportunities identified by Gulf States in Wetlands Restoration White Paper:

- "Acceleration in sea-level rise, land subsidence, and increased storm vulnerability due to erosion and loss of barrier islands creates confounding dilemmas in managing and maintaining existing and restored wetlands and are serious challenges to restoration efforts."
- "Improving scientific understanding and encouraging the use of information on projected relative sea-level rise and subsidence will help prioritize conservation (restoration, enhancement and acquisition) projects."
- "Taking advantage of remote sensing technologies and long-term monitoring stations, such as aerial photography, LIDAR, tide and water level gages, and land elevation benchmark stations, will assist the Gulf Coast States in scientifically addressing their wetland restoration efforts as well as provide baseline information to measure subsidence over large areas. A collaborative effort employing these techniques will provide the appropriate information to make long-term management decisions based on sound, scientific data."
- "It is critical to the Gulf States that the Federal Government remain active and expand its support for wetland restoration in the Gulf of Mexico."

Federal Response: Through the NOAA/National Ocean Service's National Geodetic Survey (NGS), the Federal Workgroup will provide technical guidance and assistance as the Gulf States work to establish, coordinate, and disseminate geospatial data needed to understand and relate coastal elevation data.

Recent studies by NOAA/National Ocean Service's National Geodetic Survey (NGS) and the NOAA-funded Louisiana Spatial Reference Center (LSRC) at Louisiana State University indicate that coastal Louisiana is sinking at a surprisingly fast rate. Decades of subsidence, from both local and regional causes, have introduced large changes in the heights of the existing network of benchmarks, the component of the National Spatial Reference System (NSRS) which serves as the measuring tool for land elevations (heights) relative to mean sea level. Subsidence negatively impacts public safety, commerce, and the coastal wetlands.

Within the past decade, GPS technology and new surveying techniques developed by NGS provide accurate heights quickly and economically. Along the Gulf Coast and in other areas experiencing subsidence (or uplift), published heights based on the latest survey data may be outdated within six months.

In the very near future, determination of true sea level rise and land subsidence will be measured through the Continuously Operating Reference Stations (CORS) and their connection to tidal datums computed from NOS' Center for Operational Oceanographic Products and Services (CO-OPS) tide and water level stations. The CORS framework will be able to provide subsidence rates accurate to 1 mm/year. Monuments in the NSRS will be published with up-to-date height value and an accurate rate of movement. Using these data,

the elevations of the water levels (tidal datums, sea level trends, storm surge estimates, annual variations, return frequencies, etc.) will be overlaid on the GIS topographic layers and can then be truly integrated with the land subsidence rates for risk assessment. Remote sensing technology will be used to collect aerial photography and conduct LIDAR surveys to determine high resolution precision shoreline and bathymetry data, as well as measure subsidence over large aerial extents. This collaborative effort to improve the geodetic reference system and tidal datum will provide public officials, coastal managers, engineers, and others, the same, consistent set of accurate heights and rates of movement to perform their work. The rates will be analyzed by others to determine why certain things are occurring and to provide managers with the appropriate information to make long-term management decisions based on sound, scientific data.

NGS continues to provide technical guidance and assistance to the LSRC and others as it evolves in its leadership role in the state's establishment, coordination, and dissemination of geospatial information. To fully realize the potential of the LSRC, local and state agencies must be actively engaged and supportive of the work and development of the vision of the future of Louisiana. By expressing their needs and requirements, the local and state agencies, private sector, and the academic community will greatly contribute to the development of the system to meet all users' needs. NGS and the LSRC are committed to providing a collaborative approach to help policymakers, planners, and coastal resource managers use the latest science and best technologies to understand and relate accurate elevation data to meet all their needs.

Project Contacts: Juliana Blackwell, NOAA's Ocean Service, juliana.blackwell@noaa.gov
Charlie Challstrom, NOAA's Ocean Service, charlie.challstrom@noaa.gov

Federal Workgroup Co-leads: EPA, ACOE
Other partner: DOI

This Federal Response Proposal represents an initial project idea from the 13 agencies represented on the Federal Workgroup, in response to the Gulf State Alliance white papers; it is meant to stimulate discussion, among the Gulf State Alliance and the Federal Workgroup, as they work toward the development of a draft Gulf Plan of Action. Implementation of this project idea is subject to further evaluation and the availability of funding.