HYDROGRAPHIC SERVICES REVIEW PANEL

A federal advisory committee, advising the NOAA administrator

Coastal Resilience

Coastal resilience means building the ability of a community or coastal system to "bounce back" after hazardous events such as hurricanes, coastal storms, and flooding – rather than simply reacting to impacts.

NOAA should play a more proactive and leading role in aiding coastal states and local communities to address the threat of increased flooding and coastal erosion. A governmental effort is needed to coordinate, consolidate, simplify, and inform by increasing accessibility of decision support tools.

According to the Intergovernmental Panel on Climate Change (IPCC) latest Sea Level Rise Scenarios for the United States, sea level along the U.S. coastline is projected to rise, on average, 10 to 12 inches between 2020 and 2050, which will be as much as the rise measured over the last 100 years (1920 - 2020). Sea level rise will vary regionally along U.S. coasts because of changes in both land and ocean height. Sea level rise will create a profound shift in coastal flooding over the next 30 years by causing tide and storm surge heights to increase and reach further inland. By 2050, “moderate” (typically damaging) flooding is expected to occur, on average, more than 10 times as often as it does today, and can be intensified by local factors (2022 Interagency SLR Technical Report). By 2050, high tide flooding on a national scale is expected to be between about 45 - 70 days/year on average as compared to 3 to 7 days in 2022 (State of High Tide Flooding and 2022 Outlook).

The IPCC has published numerous analyses demonstrating that hurricanes have become stronger worldwide during the past four decades; multiple analyses agree that climate change is making these storms more intense, destructive and costly. The combined effects of sea level rise, flooding, land subsidence, poorly managed coastal construction/planning, and accelerated storm erosion all pose a threat to life, property, and the economic resilience of the United States coastal regions. Through foundational data analysis and services, supported by its mandate to gather, disseminate and analyze spatial information, NOAA is a key resource for understanding and managing the trends and impacts of these occurrences.

Flooding in Leeville, LA, Hurricane Rita, Sept 2005; photo credit Windell Curole

NATIONAL IMPACT

At varying levels, the threat of sea level rise is pervasive throughout our coastal areas. Sufficiently informed and resourced communities around the coastal US are adopting sea level rise adaptation plans and considering options that include increasing low-lying elevations via the addition of compatible sediment (e.g., thin layer placement or marsh restoration) or “managed retreat” as part of the solution. Communities need to consider what to protect, what to preserve, and what to abandon along a stored coastline that continues to shrink. Many underserved coastal communities do not have the resources to develop similar adaptation plans, or to identify funding or partnerships to, for example, capture the foundational data necessary to inform such plans, such as water level data. In many of the coastal states, “phased adaptation” can help communities make small, manageable and affordable changes in the near-term that will cumulatively result in long-term improvements.

Because sea level rise, land subsidence, increased rainfall, and coastal erosion will continue, it is critically important to educate and assist community planners to leverage the use of a common and consistent

vertical reference frame (datum) for the ground, buildings, and coastal protection features assess local sea level conditions including tides against that reference, and use that information to inform policy and planning. Local decision makers face challenges when federal or non-federal geospatial data are provided with inconsistent or incomplete vertical datums.

Continuously tracking how and why sea level is changing, and how coastal landforms and communities are adjusting, is an important part of informing plans for adaptation. Our ability to monitor and understand the individual factors that contribute to sea level rise allows us to track changes in a way that has never been possible (e.g., aligning satellites and in-situ data to track global ocean levels and ice sheet thickness). Ongoing and expanded monitoring in the coastal zone (e.g., topobathy lidar , vessel and satellite based hydrographic charting) will be critical as sea levels continue to rise or glacial ice at the coast retreats. To maximize the applicability and accessibility of these data, they must be combinable in time and space for incorporation into useful tools for researchers (e.g., digital twin and integration into the Blue Topo initiative) and decision makers (e.g., forecasts of long-term coastal change).

RECOMMENDATIONS FOR NOAA ACTION

Working with its federal, state and industry partners, NOAA should prioritize the following:

- Increase collaboration with local communities, taking advantage of established networks such as NOAA's navigation managers, regional geodetic advisors, coastal state geospatial coordinators, Sea Grant extension agents, Integrated Ocean Observing System (IOOS) Regional Associations, National Environmental Satellite, Data, and Information Service STAR, Non-Governmental Organizations that represent/assist coastal states and communities, and other partners.
- Geodetic Surveys: Continue to modernize the National Spatial Reference System (NSRS). New temporal capabilities are critical for monitoring changes at climate timescales.
- Expand funding and research programs for long-term observations such as Continuously Operating Reference Stations (CORS), National Water Level Observation Network (NWLON) and leverage the data integration and local partnership.
- Establish funding and research plans for mapping including hydrographic, ground deformation and subsidence, enabling millimeter-scale changes in land deformation over the span of days to years at a 5-year recurring basis collected through the nation's coastal zone. Assure data supports multiple applications such as Digital Twin, BlueTopo and interagency sediment inventories.
- Data Analysis and Models: Coupled by atmospheric and hydrodynamic physical modeling, support sea level modeling, validation and prediction efforts to establish a common framework for model interoperability and to more efficiently integrate systems across disciplinary boundaries.

In October 2003, Secretary of Commerce Don Evans established the Hydrographic Services Review Panel as directed by the Hydrographic Services Improvement Act of 2002, Public Law 107-372. Panel members, appointed by the NOAA Administrator, include a diverse field of experts.

- Decision Support Tools: Support NOAA's Coastal Inundation Dashboard (CO-OPS) and other interagency efforts that consolidate, clarify, and make accessible tools to communicate the risk from changing water levels, land motion, and coastal erosion for coastal decision makers.

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