

Questions from Rep. Velázquez

Question: Dr. Spinrad, Puerto Rico and the Americans who live there suffer disproportionately from coastal erosion and inundation – a result of warming oceans, sea level rise, and climate change. Yet it was not until April 2021 that a long overdue National Water Model included Puerto Rico. There are pieces of the FY2022 budget that call for nature-based coastal resilience research in large regional areas of underserved communities through grants and Cooperative Institute involvement, but these instances are without great detail. Can you highlight how people who reside in areas vulnerable to increasing hurricane activity and accompanying natural disasters will be supported by your budget increase requests for NOAA’s products and services?

- **Response:** The budget increase for NOAA includes \$5.0 million for a 5-year effort to complete the development, operational implementation, and distribution of Flood Inundation Mapping (FIM) based on National Water Model forecasts. These near real-time forecasts will produce event-based maps of forecasted flood events and will include maps for Puerto Rico. This effort improves service equity by expanding FIM services from 110 thousand to over 3.4 million river miles across the entire country.

Storm Surge Modeling: Two of NOAA’s storm surge models, Extra-Tropical Storm Surge (ETSS) and Probabilistic-ETSS extended their geographic domain to include Puerto Rico and the US Virgin Islands in 2021, to prepare for the implementation of the Sea, Lake and Overland Surges from Hurricanes (SLOSH) model (including the prediction of waves) to be available for this area by approximately 2024. Probabilistic Surge, or P-Surge, is the model used by the National Hurricane Center for tropical cyclone storm surge predictions and is projected to be ultimately capable of providing storm surge forecasts for Puerto Rico by leveraging this SLOSH code.

NOS’ [US Integrated Ocean Observing System](#) (IOOS®) is a national-regional partnership working to provide new tools and forecasts to improve safety, enhance the economy, and protect our environment. Integrated ocean information is available in near real time, as well as retrospectively. U.S. IOOS is composed of 11 Regional Associations (RAs), which guide development of and stakeholder input to regional observing activities. The Caribbean Coastal Ocean Observing System ([CARICOOS](#)) is one of the 11 IOOS RAs. NOAA provides funding to CARICOOS through a five-year cooperative agreement with parts of the funding used to obtain and improve on observations and modelling through:

- new oceanographic data buoys,
- wave run up and storm surge analysis through coastal sediment transport modelling,
- coastal erosion work through real time video capture to monitor shoreline changes and provide long time series for beach profiles, and
- continuing to operate and maintain six gliders which provide real time data that feed into improving understanding on hurricanes and other natural disasters.

Under the FY2022 budget Initiative, the National Center for Coastal and Ocean Science (NCCOS) [Effects of Sea Level Rise Program \(ESLR\)](#) will support new projects explicitly focused on conducting work with underserved communities, including those vulnerable to extreme weather and climate events, with an emphasis on enhanced environmental justice and increased local science capacity and training. This effort will increase the ability of underserved communities to apply for and gain access to grant funding opportunities. In doing so, NOAA will enhance existing and develop additional interagency partnerships to provide holistic science and tools to mitigate risk of inundation to ecosystems, infrastructure, and communities.

NOAA and the National Fish and Wildlife Foundation (NFWF) partner to manage the National Coastal Resilience Fund (NCRF), currently in its fourth year of funding. This program funds projects that advance restoration or enhancement of natural features, such as coastal wetlands, dunes, and coral reefs, to protect coastal communities and infrastructure from flooding, while also improving habitat for fish and wildlife. The NCRF has funded projects to plan for and address the impacts of hurricanes and other natural disasters in Puerto Rico. The increase in funding proposed in the FY22 budget means that more resources will be available in this competitive grant program that can go to improve coastal resilience in communities nationwide.

NOAA is working to provide more equitable products and services to benefit all communities across the country, including U.S. islands and territories. The proposed FY22 budget allows for additional resources to make specific and systemic changes to engagement, service delivery, and training to equip coastal communities, especially those with underserved populations, with improved capacity to address coastal hazards. NOAA will build upon its existing suite of coastal resilience products and services. This includes addressing known barriers, as well as expansion of equity assessments and analysis of that data, to ensure more equitable access and greater usability for a broader portion of the coastal population. NOAA will also provide additional translation services for climate adaptation products and services, including those related to green infrastructure, to ensure greater access for Spanish-speaking communities.

NOAA is expanding the Nation's capacity to adapt and become resilient to extreme weather events and climate change. Beginning in FY21, the NOAA Regional Integrated Sciences and Assessments (RISA) program began supporting efforts that directly address the disproportionate impacts of climate change on the U.S. Caribbean, including Puerto Rico and the U.S. Virgin Islands. The FY21 funding call solicited applications for collaborative planning activities to identify and examine issues of regional importance related to social and economic dimensions of climate variability and change. The program is currently in the process of hiring two engagement specialists in the region to bring together a variety of stakeholders to collectively address pressing climate and

adaptation issues. Funding in FY22 will continue these expansion efforts and will target frontline communities being impacted by a variety of climatic issues including those in coastal zones.

The FY22 budget increase request for NOAA's products and services will also fund collaborative research, conducted by NOAA and the Cooperative Institutes (CIs), which supports communities who reside in areas vulnerable to increasing hurricane activity and accompanying natural disasters. NOAA works with CIs to research warming oceans, sea level rise, and climate change. In addition, the proposed CI for Water Resources will continue to expand the CI National Water Model capabilities. The CI research portfolio includes efforts to estimate the societal and socioeconomic impacts and values of high-impact weather systems and regional-scale climate variations of extreme events, with the goal of providing needed data to mitigate adverse outcomes. A continuing component of this work is performed in collaboration with social scientists, meteorologists, emergency managers, and members of the media. CIs support NOAA's research on improving the communication of science to the public through outreach efforts and assessments of the value and utility of current and future hazardous weather products, including the watch/warning/advisory system. Further, [CI's partnerships](#) with research institutions, including Minority Serving Institutions, and universities, such as NOAA Cooperative Science Centers, directly support those underserved communities that suffer disproportionately.

Coastal hazards are a major theme in which NOAA's Puerto Rico Sea Grant (PRSG) program combines research, outreach, education and communication efforts, and these efforts will continue to be supported by the FY22 budget increase request. PRSG partners with coastal hazards experts who strive to create awareness of the vulnerability of coastal communities to these hazards through applied research and outreach activities. By investing in research projects that have produced tsunami simulation tools, as well as flooding models and maps, the program stimulates socioeconomic analyses to shed light on public perceptions of risks, economic impacts of coastal hazards, and the effectiveness of mitigation strategies. In addition, PRSG is collecting information and quantifying statistical data on biophysical vulnerability and resilience characteristics of coastal communities.

Question: Dr. Spinrad, the FY22 NOAA budget calls for a funding increase to improve delivery of National Weather Service (NWS) products to underserved communities and strengthen the relationship between NWS forecast offices and local partners. This will include educational outreach and exercises to develop strategies for increasing resilience to extreme urban heat islands such as those within my district in New York City. Can you highlight how this program will inform Emergency Action Plans and be applied to the increasing regularity of other major disasters, like extreme flooding and sea level rise, being driven by climate change?

- **Response:** NOAA is currently developing a unified heat strategy, which includes expanding partnerships and developing new ones, in an effort to ensure we are effectively updating and communicating heat danger effects across the country, with a focus on the impacts of excessive heat on underserved communities.

We are leveraging social science research to increase understanding of trusted relationships and refine local NWS heat hazards criteria and messaging within underserved and other vulnerable populations, which will result in NWS efforts to strengthen relationships with these partners while also including them in existing local partnerships such as with emergency managers.

The NOAA heat strategy will also focus on greater collaboration regarding outreach, messaging, and data sharing with agencies that address vulnerability to extreme heat such as the Center for Disease Control and Prevention, U.S. Census Bureau, U.S. Department of Housing and Urban Development, U.S. Department of Labor, Environmental Protection Agency, and the Federal Emergency Management Agency.

NOAA is also a core partner of the interagency [National Integrated Heat Health Information System](#) (NIHHIS). NIHHIS works across agencies, sectors, and institutions to understand decision maker needs and provide actionable information to better protect vulnerable populations from extreme heat. NIHHIS consists of an interagency working group focused on harmonizing the federal approach to heat and health; local and regional pilot projects that include federal funding to mitigate urban heat islands and address other heat impacts; and international coordination via the [Global Heat Health Information Network](#). NIHHIS helps provide the information and facilitates the partnerships needed to improve heat resilience and the development of heat action plans that include both adaptation and response. Many aspects of improving heat resilience, such as more green space, improved social cohesion, and comprehensive heat plans, also improve resilience for other disasters.

For the fourth year, NOAA is assisting with the NIHHIS [Urban Heat Island mapping campaigns](#). This summer's campaigns included several boroughs of New York City, as well as several New Jersey communities in the Tri-State area. The mapping campaigns build partnerships and catalyze local action, engaging residents in a scientific study to map and understand how heat is distributed in their communities. The campaign outcomes include new data on the distribution of air temperature and heat indices within cities that have been used in city and county heat action plans, public health practices, urban forestry, research projects, and other engagement activities. NIHHIS also recently funded [five research cooperative agreements](#) to apply climate science analysis to managing urban heat in community resilience projects, with local NOAA National Weather Service Weather Forecast Offices partnering on many of these projects.

In addition, NOAA realizes that it is important to engage and empower youth, as the next generation of climate leaders, in addressing the impacts of excessive heat, flooding and

sea level rise. NOAA's [Environmental Literacy Grants program](#) provides funding support for STEM and environmental education projects that involve K-12 students in using NOAA-related sciences to build community resilience to climate change and extreme weather events. For example, a NOAA-funded project in New York City, led by the National Wildlife Federation and their partners, will implement The Resilient Schools Consortium. Students and their teachers in eight New York City Department of Education public schools will adopt-a-shoreline in Coney Island, Brooklyn—a frontline community battered by Superstorm Sandy in 2012 and threatened by sea level rise, coastal erosion, and inequitable exposures to flooding. Through school curriculum, field trips to local beaches, community engagement events, dune plantings, and public art installations, this project will connect students—who live or attend school in the Coney Island area—to residents and community partners. Together, they will increase their awareness of future climate impacts and develop strategies for building climate resilience and equitable adaptation to sea level rise.