NOAA Science Update to the Science Advisory Board

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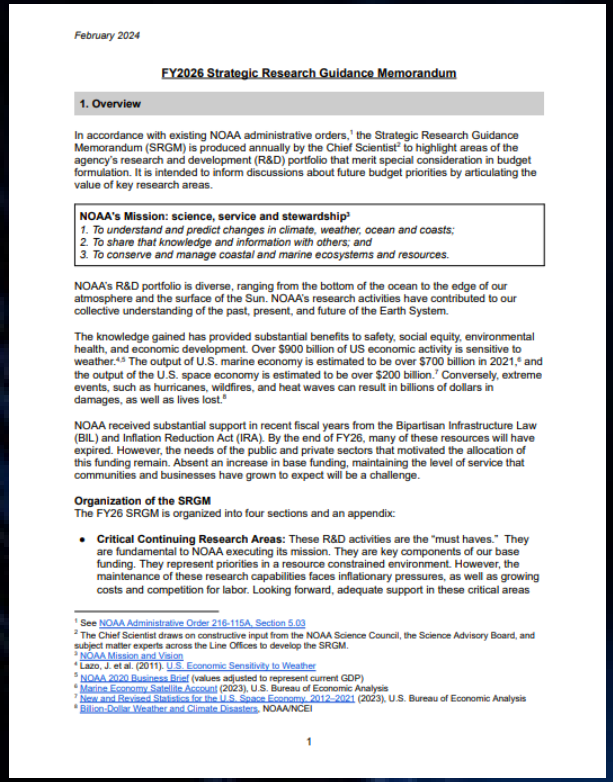
March 19th, 2024

Strategic Research Guidance Memorandum Released



February 2024

FY2026 Strategic Research Guidance Memorandum

1. Overview

In accordance with existing NOAA administrative orders,[1] the Strategic Research Guidance Memorandum (SRGM) is produced annually by the Chief Scientist[2] to highlight areas of the agency's research and development (R&D) portfolio that merit special consideration in budget formulation. It is intended to inform discussions about future budget priorities by articulating the value of key research areas.

NOAA's Mission: science, service and stewardship[3]
1. To understand and predict changes in climate, weather, ocean and coasts;
2. To share that knowledge and information with others; and
3. To conserve and manage coastal and marine ecosystems and resources.

NOAA's R&D portfolio is diverse, ranging from the bottom of the ocean to the edge of our atmosphere and the surface of the Sun. NOAA's research activities have contributed to our collective understanding of the past, present, and future of the Earth System.

The knowledge gained has provided substantial benefits to safety, social equity, environmental health, and economic development. Over $900 billion of US economic activity is sensitive to weather.[4,5] The output of U.S. marine economy is estimated to be over $700 billion in 2021,[6] and the output of the U.S. space economy is estimated to be over $200 billion.[7] Conversely, extreme events, such as hurricanes, wildfires, and heat waves can result in billions of dollars in damages, as well as lives lost.[8]

NOAA received substantial support in recent fiscal years from the Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA). By the end of FY26, many of these resources will have expired. However, the needs of the public and private sectors that motivated the allocation of this funding remain. Absent an increase in base funding, maintaining the level of service that communities and businesses have grown to expect will be a challenge.

Organization of the SRGM
The FY26 SRGM is organized into four sections and an appendix:

- **Critical Continuing Research Areas:** These R&D activities are the "must haves." They are fundamental to NOAA executing its mission. They are key components of our base funding. They represent priorities in a resource constrained environment. However, the maintenance of these research capabilities faces inflationary pressures, as well as growing costs and competition for labor. Looking forward, adequate support in these critical areas

[1] See NOAA Administrative Order 216-115A, Section 5.03
[2] The Chief Scientist draws on constructive input from the NOAA Science Council, the Science Advisory Board, and subject matter experts across the Line Offices to develop the SRGM.
[3] NOAA Mission and Vision
[4] Lazo, J. et al. (2011). U.S. Economic Sensitivity to Weather
[5] NOAA 2020 Business Brief (values adjusted to represent current GDP)
[6] Marine Economy Satellite Account (2023), U.S. Bureau of Economic Analysis
[7] New and Revised Statistics for the U.S. Space Economy, 2012–2021 (2023), U.S. Bureau of Economic Analysis
[8] Billion-Dollar Weather and Climate Disasters, NOAA/NCEI

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The FY26 Strategic Research Guidance Memorandum (SRGM) was published in February 2024.

FY26 SRGM High-Level Outline

1) Critical continuing research areas

What do we need to maintain our funding for and potentially prioritize in a resource constrained environment?

2) Emerging research areas

What are the emerging areas we need to put science on a path to success when NOAA is asked for leadership down the line?

3) Success multipliers and risks

Cross-cutting factors that we can build upon, or that undercut our success

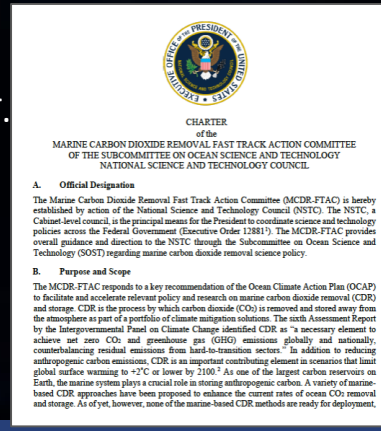
NOAA's CDR efforts

The Strategy for NOAA Carbon Dioxide Removal (CDR) Research was published in June 2023 and $24M in marine CDR awards were made.
FTAC on marine CDR was established September, 9th, 2023. The Marine CDR Research Plan is to be published no later than September.

FTAC Work:

- Permitting, regulatory, and other standards and policies. The FTAC seeks feedback on how the U.S. government intends to apply relevant domestic and international frameworks to regulating MCDR research, including field tests in the ocean. March 19th, 12:30 – 2:30 EST Registration here
- Comprehensive Federal MCDR research program. The FTAC seeks feedback on a Federal research program that will accelerate the development of the knowledge needed to understand the effectiveness and safety of MCDR approaches. March 26th, 12:30 – 2:30 EST. Registration here
- Mechanisms to enable public awareness and public-private cooperation. The FTAC seeks feedback on how to enable public engagement in MCDR research and how to promote cooperation between the Federal government and non-Federal parties on MCDR research, including field tests. April 9th, 12:30 – 2:30 EST. Registration here

Submit additional through the marine CDR FRN by April 23, 2024



CHARTER
of the
MARINE CARBON DIOXIDE REMOVAL FAST TRACK ACTION COMMITTEE
OF THE SUBCOMMITTEE ON OCEAN SCIENCE AND TECHNOLOGY
NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

A. **Official Designation**

The Marine Carbon Dioxide Removal Fast Track Action Committee (MCDR-FTAC) is hereby established by action of the National Science and Technology Council (NSTC). The NSTC, a Cabinet-level council, is the principal means for the President to coordinate science and technology policies across the Federal Government (Executive Order 12881). The MCDR-FTAC provides overall guidance and direction to the NSTC through the Subcommittee on Ocean Science and Technology (SOST) regarding marine carbon dioxide removal science policy.

B. **Purpose and Scope**

The MCDR-FTAC responds to a key recommendation of the Ocean Climate Action Plan (OCAP) to facilitate and accelerate relevant policy and research on marine carbon dioxide removal (CDR) and storage. CDR is the process by which carbon dioxide (CO_2) is removed and stored away from the atmosphere as part of a portfolio of climate mitigation solutions. The sixth Assessment Report by the Intergovernmental Panel on Climate Change identified CDR as "a necessary element to achieve net zero CO_2 and greenhouse gas (GHG) emissions globally and nationally, counterbalancing residual emissions from hard-to-transition sectors." In addition to reducing anthropogenic carbon emissions, CDR is an important contributing element in scenarios that limit global surface warming to +2°C or lower by 2100.[2] As one of the largest carbon reservoirs on Earth, the marine system plays a crucial role in storing anthropogenic carbon. A variety of marine-based CDR approaches have been proposed to enhance the current rates of ocean CO_2 removal and storage. As of yet, however, none of the marine-based CDR methods are ready for deployment,

Reputational Risk

- Within the Science Council, we've been discussing potential reputational risks to NOAA, and how our risk assessment processes address reputational risks
- The good news:
  - NOAA has a strong reputation with users/customers
  - Reputational risk discussions are occurring regularly at Leadership and Line Office levels
  - Scientific Integrity Policy and Enterprise Risk Management system both address aspects of reputational risk
- Areas for discussion later today:
  - Thinking about connections between climate research and climate policy
  - Learning from other organizations about their risk management processes

Updated Scientific Integrity Policy

NAO 202-735D-3: Scientific Integrity

Share:

Issued 03/01/2024; Effective: 03/01/2024; Last Reviewed: 03/01/2024

Attachment

- View the Procedural Handbook (774Kb) Link
- → View the PDF (1.03Mb) Link

SECTION 1. PURPOSE

Scientific and technological information, data, and evidence are central to the development and iterative improvement of sound policies, and to the delivery of equitable services and programs, across every area of government. The 2022 National Science and Technology Council Report of the Scientific Integrity Fast Track Action Committee (FTAC), Protecting the Integrity of Government Science (The FTAC Report) found that strong scientific integrity policies and practices bolster the ability of Federal agencies to protect government science. 1

Nature Capital and Biodiversity

The agreement aims to leverage the strengths of both organizations in research, education, and monitoring to better understand ocean biodiversity and address risks to ocean ecosystems.

Key areas of collaboration include marine biodiversity, fisheries resilience, habitat restoration, coastal blue carbon, marine protected areas, and environmental justice.

The MOU expands partnerships between the Marine Biodiversity Observation Network (MBON) and Marine Global Earth Observatory (MarineGEO) to document biodiversity from near shore to deep ocean, ensuring information availability for local fisheries, culture, health, and livelihoods.

NOAA, Smithsonian join forces to advance ocean biodiversity and resilience

New agreement expands collaboration on ocean and coastal research, technological innovation and education initiatives

Focus areas: Ocean & Coasts **Topics:** marine biodiversity , resilience , ecosystem , America the Beautiful **Share:**

January 23, 2024

NOAA Research and Development Vision Areas: 2020 - 2026

Vision Area 1: Reducing societal impacts from hazardous weather and other environmental phenomena

Vision Area 2: Sustainable use and stewardship of ocean and coastal resources

Vision Area 3: A robust and effective research development, and transition enterprise

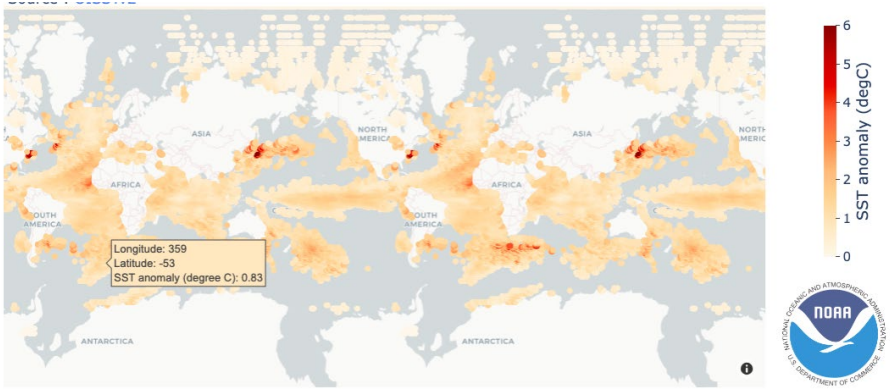
Vision Area 1: Reducing societal impacts from hazardous weather and other environmental phenomena

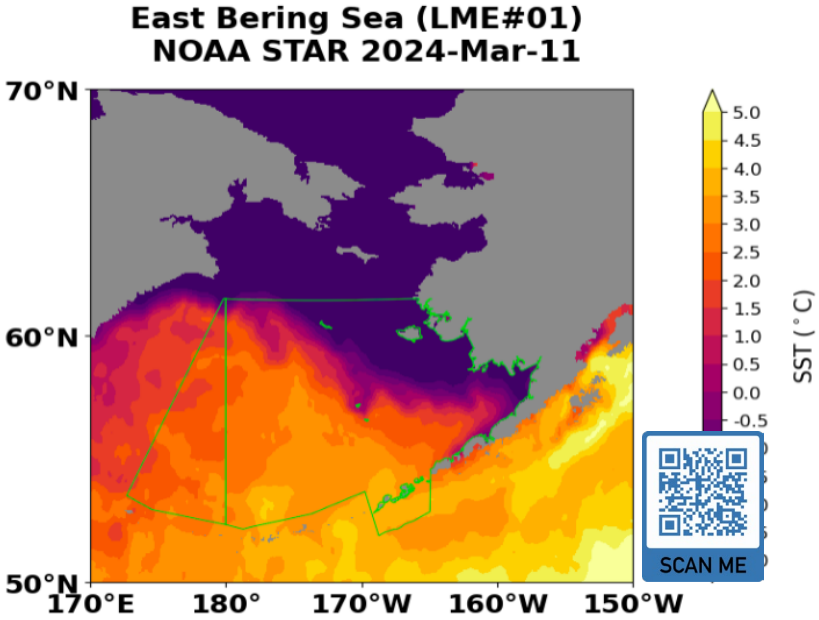
A radar monitoring severe storms.
Photo credit: Robin Tanamachi, NOAA/OAR/NSSL

NOAA Fisheries & NOAA Research examine Marine Heat Waves at multiple spatial and temporal scales

Marine heatwaves are periods of persistent anomalously warm ocean temperatures, which can have significant impacts on marine life as well as coastal communities and economies.

NOAA scientists in PSL and NMFS are working to characterize marine heatwaves, understand how they form and dissipate, and predict them in advance.

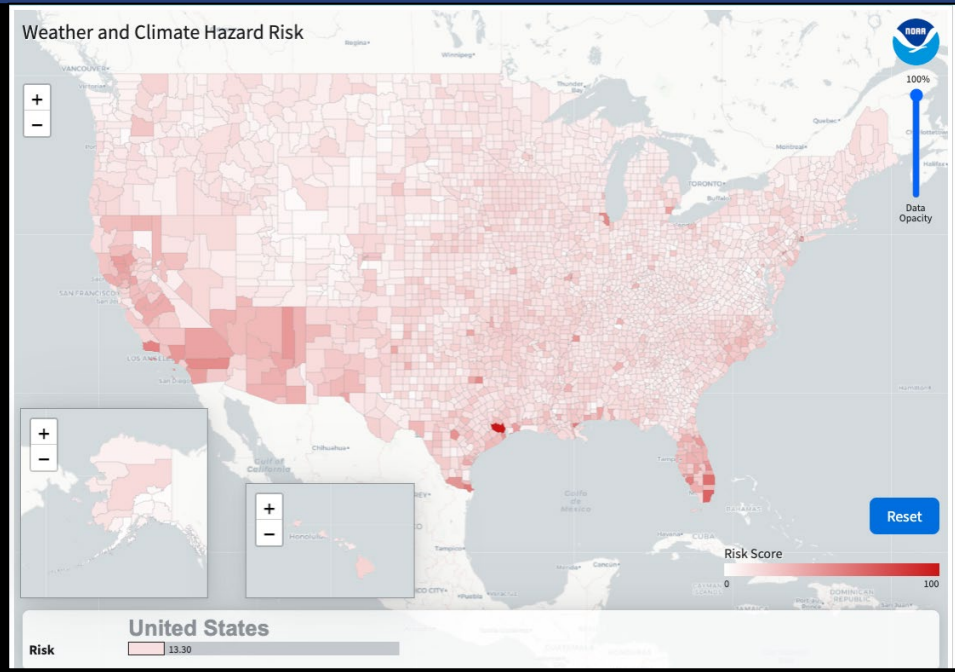




Scientist gather data to provide current ocean maps, forecasts of heatwaves, interactive tools for users to explore ocean heatwaves and data from webpages at other institutions.

Billion-Dollar Disasters: Mapping Vulnerabilities with Census Tract-Level Data

- The NCEI Billion-Dollar Disaster and Risk Mapping tools now include U.S. Census tract data
- This work expands on FEMA's National Risk Index to provide an integrated view of U.S. hazard risk, exposure, and vulnerability across more than 100 combinations of weather and climate hazards.
- These enhanced interactive maps provide data for over 72,000 U.S. Census tracts, which are small subdivisions of counties that average about 4,000 inhabitants.
- Users can now visualize combined physical exposure, socioeconomic vulnerability, and markers of resilience to natural hazards on a finer scale than ever before.



Climate disasters mapped for U.S. counties & Census tracts in the Billion-Dollar Disasters dashboard from NOAA NCEI.

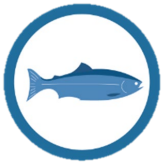
Vision Area 2: Sustainable use and stewardship of ocean and coastal resources

South entrance of Detroit River to the right and northeast corner of Lake Erie to the left. Photo credit: NOAA/OAR/GLERL

NOAA Fisheries Distribution Mapping and Analysis Portal (DisMAP)

The Distribution Mapping and Analysis Portal (DisMAP) is a user friendly and interactive website designed to provide visualization and analysis tools to better track, understand, and respond to shifting distributions of marine species. The portal provides access to data for over 400 species in 9 Regions.

Scientists, resource managers, and other stakeholders can use the portal to explore:

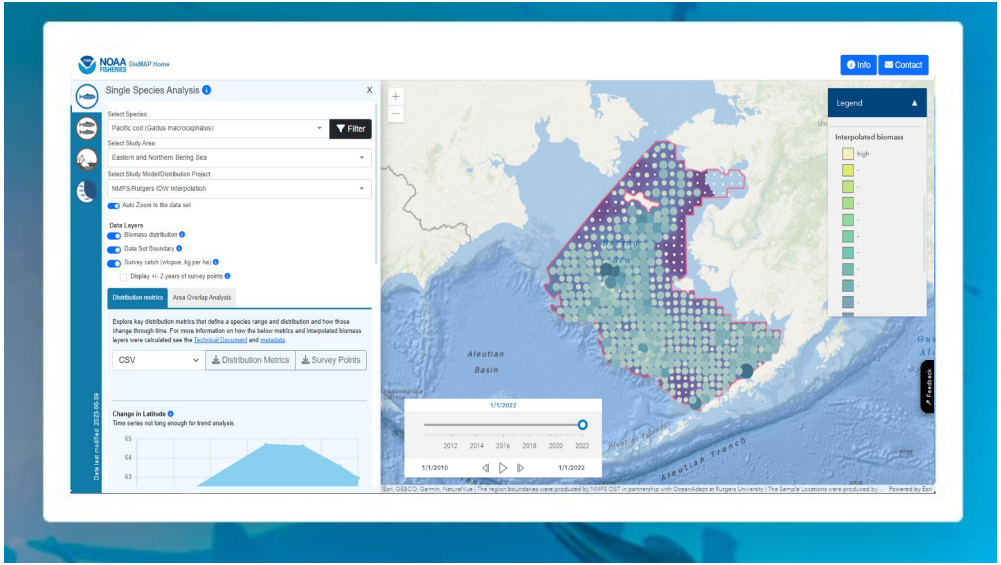


Single species distributions

Explore changes over time for several key metrics that define a species range and distribution

Regional Summaries

Explore how communities have shifted at the regional level over time



Last spring, DisMAP got some exciting upgrades, including additional years of survey data, new filtering features, and data from a new region—the Northern Bering Sea.

Projects from Sea Grant's American Lobster Initiative

- Sea Grant supports several ongoing studies in the Gulf of Maine, Georges Bank, and southern New England to learn how physical and chemical changes are affecting American lobster and the associated industry.
- Through these projects, Sea Grant aims to increase the American lobster industry's resilience to the biological, economic, and social impacts of ecosystem change, ultimately aiding in the conservation and management of American lobster.
- The initiative fosters collaboration between scientists, industry members, and policymakers to ensure that research outcomes inform evidence-based management practices and support the long-term health of lobster fisheries.

Vision Area 3:
A robust and effective research, development, and transition enterprise

The GOES-17 satellite above the thermal vacuum chamber.
Photo credit: Lockheed Martin.

NOS new AI method to detect rip currents in coastal web camera video

A new method detects rip currents by applying AI to optical flow fields measured from video imagery of the coastal zone. The method will enable near real-time rip current detection as part of the NOAA-funded Webcam Coastal Observation System (WebCOOS) to warn of potential hazards and help inform validation and improvement of the NOAA rip current model.

WebCOOS partners with communities to use webcams to:

Identify Rip Currents

Study Beach Erosion

Monitor Beach Usage

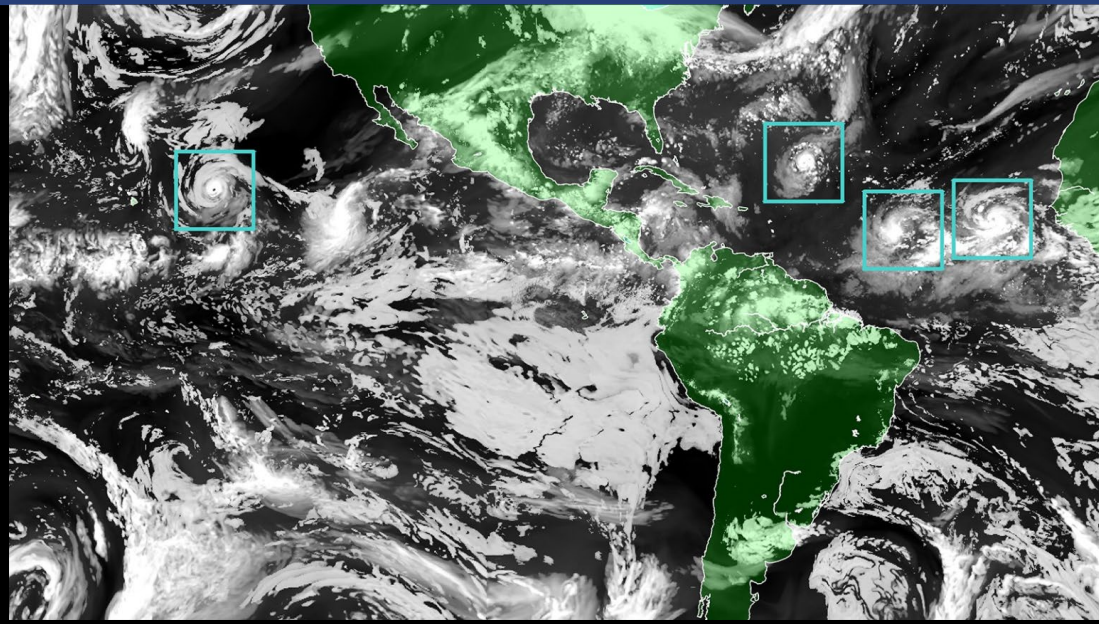
Flood Monitoring

Examples of rip current detection using the new AI method described in: de Silva, A., M. Zhao, D. Stewart, F. Kahn, G. Dusek, J. Davis and A. Pang. (2023). RipViz: Finding Rip Currents by Learning Pathline Behavior. IEEE Transactions on Visualization and Computer Graphics.

NOAA launched new hurricane forecast model as the 2023 Atlantic Season started strong

NOAA's National Hurricane Center has launched the Hurricane Analysis and Forecast System (HAFS) to enhance hurricane forecasting capabilities, aiming for improved accuracy and timely warnings for the public.

HAFS has demonstrated a 10-15% enhancement in track predictions compared to existing models, with particular strength in predicting rapid intensification, crucial for reducing storm impacts on lives and property.

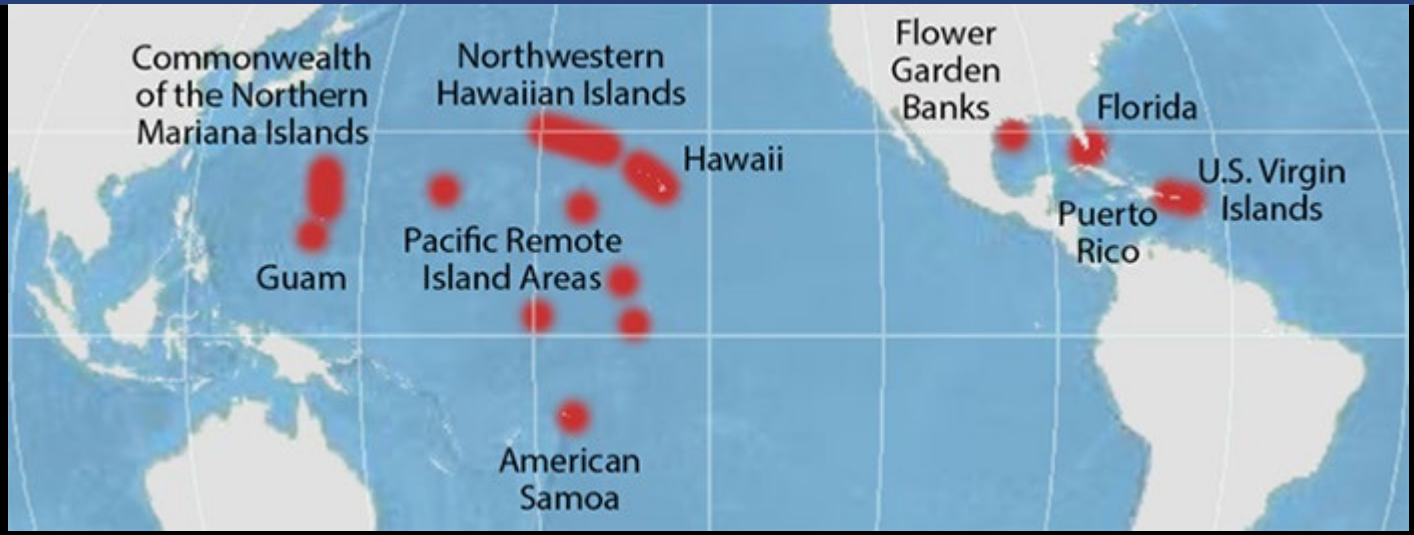


HAFS integrates high-resolution physics, data assimilation, ocean coupling, and assimilation techniques for novel observations, providing more accurate forecasts. Developed through collaborative efforts and leveraging NOAA's updated supercomputers, HAFS marks a significant advancement in hurricane prediction mandated by the Weather Research and Forecasting Innovation Act of 2017.

Vision Area: Building a Climate Ready Nation

The GOES-17 satellite above the thermal vacuum chamber.
Photo credit: Lockheed Martin.

NOAA's National Coral Reef Monitoring Program



- The Pacific National Coral Reef Monitoring Program (NCRMP) has been tracking Climate and Ocean Acidification (OA) indicators since 2013.
- NCRMP-OA data, integrated with ecological monitoring sets, provide comprehensive insights into coral reef ecosystem states.
- Collaborations with NOAA, academic institutions, and regional partners enhance data collection and analysis, aiding in projecting future reef conditions and evaluating management strategies under different climate change scenarios

First NOAA GO-SHIP Cruise in 5 Years Departs to Study Unique Atlantic Basin

- The expedition gathered crucial data on oceanic conditions, including temperature, salinity, and carbon dioxide levels.
- This research endeavor will contribute to understanding ocean processes and their impacts on climate and marine ecosystems.
- The GO-SHIP cruise used state-of-the-art equipment and sampling techniques to collect comprehensive data across various depths and locations within the Atlantic Basin.
- Collaborations with international partners and scientific institutions enhance the scope and depth of research, fostering a global perspective on ocean dynamics and climate patterns.

Thank you!