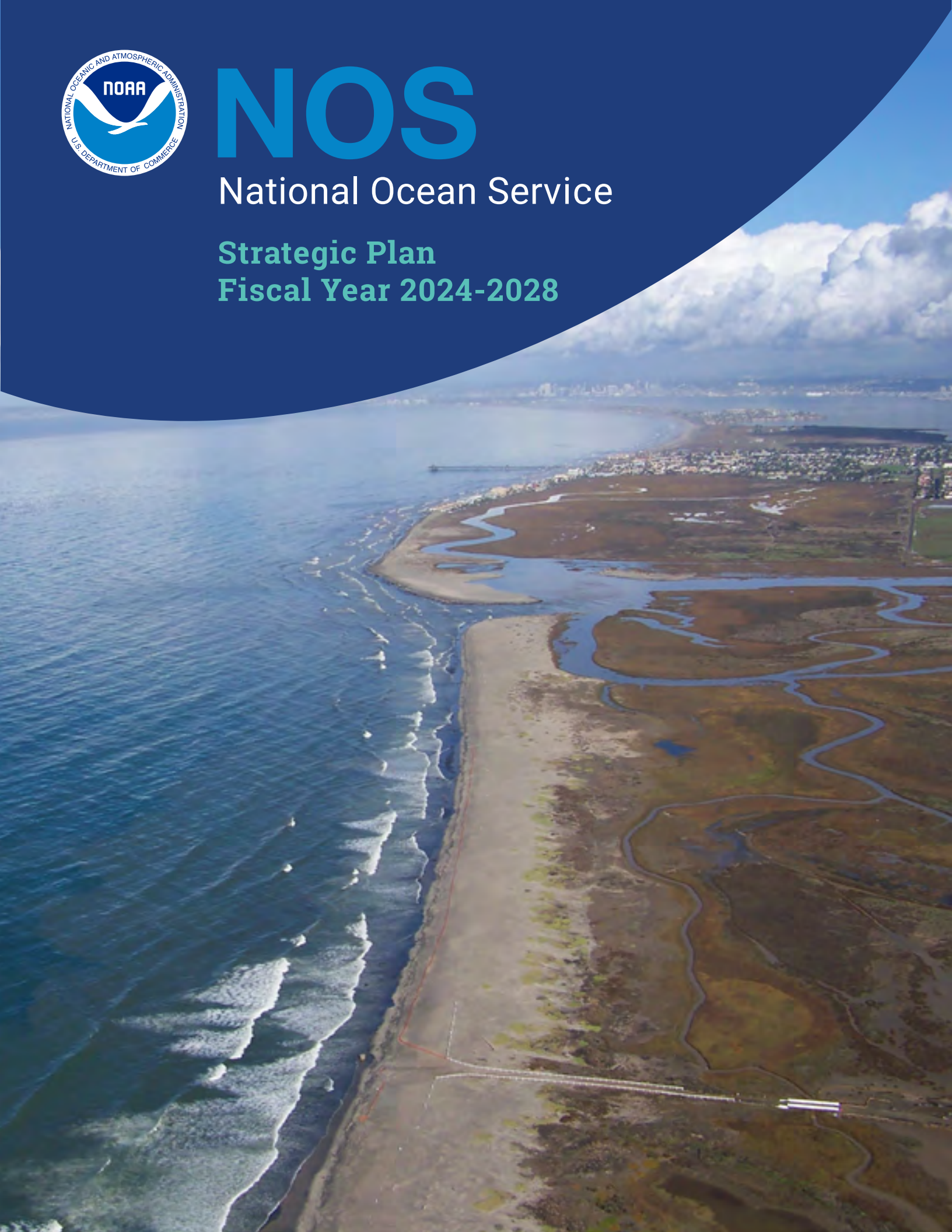
NOS

National Ocean Service

Strategic Plan
Fiscal Year 2024-2028



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Cover: The Tijuana River Estuarine Research Reserve is part of a network of 28 protected areas located in the United States and territories established for long-term research, education and stewardship. *(Tijuana River National Estuarine Research Reserve)*

A Letter from Nicole R. LeBoeuf

Assistant Administrator for Ocean Services and Coastal Zone Management

Climate change is transforming the ocean and coastal zones more rapidly than any other place on Earth. Both chronic and episodic changes are placing increasing pressure on important economic sectors and population centers, undermining our nation's resilience and prosperity and impacting underserved and underrepresented populations already burdened by systemic inequities and injustice.

The National Ocean Service (NOS) is a trusted and authoritative source of a diverse suite of products and programs that bolster, protect, and restore our natural resources and economy. To provide foundational support for our nation's resilience in the face of these growing challenges, NOS is stepping into a larger role to fill the need for data, products, and services that protect our ecosystems and enhance climate and economic resilience.

We will continue developing nautical charts, monitoring tides and currents, enhancing global positioning, and producing data integral to safe and efficient maritime transportation and commerce and coastal planning. We will also continue to provide the highest caliber expert scientific support in response to coastal floods, oil spills, and marine debris; manage national marine sanctuaries; and enhance our collective understanding of our estuaries and coasts, among many other things for which NOS is well-known. At the same time, we will step up our collection and dissemination of information critical to forecasting and climate modeling, to conserving and restoring important coastal and ocean habitats for resilience to future conditions, and to working directly with national, Indigenous, regional, and local decision-makers and communities to prepare coastal communities for a changing world.

Within this document, we have laid out NOS-wide priority pathways and operating principles for leveraging our trusted partnerships and proven expertise to meet increasing demands for our services across agencies, economic sectors, communities, and geographies, including providing leadership on the world stage. Effective and strategic implementation of NOS programs and activities has never been more important, as climate change will both impact and require more from nearly everything we do. Through the priorities and objectives laid out in this document, we will play to our strengths, enhance our use of partnerships and collaborations, attract and retain top talent, and provide innovative thinking and leadership in a rapidly changing world. Above all, NOS will remain true to our workforce and core values, as they are the foundation upon which our mission and service to the nation firmly rests.

Steady as we go,

Nicole R. LeBoeuf

About Us

NOS is one of six line offices within the National Oceanic and Atmospheric Administration (NOAA), part of the U.S. Department of Commerce. With roots in the U.S. Survey of the Coast established in 1807, we have grown into the United States' premiere coastal and ocean science agency. NOS provides world-class expertise in science, technology, and management. We conduct applied research and employ advanced surveying, observing, modeling, and computing technologies to provide services and tools that inform decision-making across a variety of agencies, organizations, and communities. We also serve as stewards and trustees for the long-term conservation and restoration of coastal and marine resources, including via response and restoration for oil and chemical spills and systems of marine protected areas. We strive to serve and engage the whole nation, including Indigenous peoples and historically underserved and underrepresented communities who have often been the first to observe and who experience disproportionate environmental hazards and hold many solutions. Importantly, we will rely upon our robust national and regional partnerships to better understand and address both economic and environmental needs, creating societal benefit and prosperity for the nation.

To inform the contents of this document, we identified our core values and operating principles, reaffirming who we are as an agency and as a workforce, and reinforcing what we hold most dear in our professional lives.

NOS MISSION:

Provide science-based solutions through collaborative partnerships to address evolving economic, environmental, and social pressures on our Great Lakes, ocean, and coasts.

NOS VISION:

The nation's coastal and Great Lakes communities, ecosystems, and economies are thriving and resilient to current and future environmental threats.

The Connecticut Reserve — the 30th National Estuarine Research Reserve and the first in the state — added over 52,000 acres to the national system. *(University of Connecticut)*

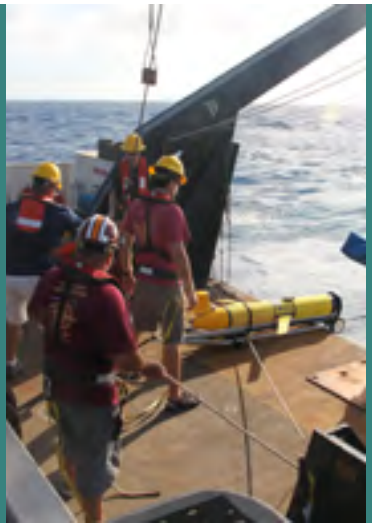
Core Values

- ***Mission-driven:*** We are passionate about and dedicated to advancing NOAA's mission of science, stewardship, and service. We value NOS's unique role in connecting sound science and service to the public.
- ***Integrity:*** We value the transparency and accuracy of our data, products, and services. We foster mutual trust and respect among our workforce as well as with the communities we serve.
- ***Inclusion:*** We create a welcoming environment for our staff, colleagues, and partners. We strive to be more representative of and accessible to the communities we serve. We support differences and diverse views to encourage our people to bring their entire, authentic selves to their work.
- ***Collaboration:*** We embrace our diverse and interconnected mission. We accomplish more when we work together and with our partners, playing to one another's strengths.

Scientists and crew members prepare to launch an ocean glider from the NOAA Ship *Nancy Foster* in order to collect critical data. *(NOAA)*

Using a high-precision tacheometer, Geodetic Survey employees take survey observations of a radio telescope operated by the National Radio Astronomy Observatory. *(NOAA)*

Coastal Ocean Science workforce members apply dredged sediments to a marsh pond at Marine Corps Base Camp Lejeune to support habitat restoration. *(NOAA)*



Operating Principles

- ***Skilled and engaged workforce:*** Our workforce is our greatest asset. We support our people — without them, we cannot accomplish our mission. We strive to create a workplace that embraces and celebrates our passions and talents, fostering a culture of trust, continuous learning, and professional development.
- ***Equitable and user-focused relationships:*** We forge relationships to ensure we meet the needs of our partners and coastal communities. We value the equitable use and applicability of the data, services, and tools we create and provide to support and empower Indigenous, federal, state, regional, and local decision-makers.
- ***Quality data, services, and products:*** We deliver high-quality and dependable data, services, and products to support and serve coastal communities and people across the country. The information we provide helps people across the nation understand and adapt to changing environmental conditions.
- ***Holistic approaches:*** We are committed to understanding the changing ecosystems across coastal, ocean, and Great Lake environments through an approach that brings together multiple knowledge systems and disciplines and that seeks the involvement of local communities, — including Indigenous peoples and underserved communities — in assessments, monitoring, research, and decision-making.

- ***Strong and diverse partnerships:*** We get further, faster by working together with others. Our inclusive outreach to diverse partners and communities allows us to obtain and consider novel and innovative ideas and approaches. Together, we build and strengthen diverse coalitions of partners and Indigenous communities to build networks focused on coastal, ocean, and Great Lakes interests that will help promote science, stewardship, and service for future generations.

Our Organization and Authorities

NOS consists of eight program offices with unique but interrelated missions:

- Center for Operational Oceanographic Products and Services
- U.S. Integrated Ocean Observing Systems
- National Centers for Coastal Ocean Science
- National Geodetic Survey
- Office for Coastal Management
- Office of Coast Survey
- Office of National Marine Sanctuaries
- Office of Response and Restoration

NOS headquarters, including the Management and Budget Office and the Information Management Office, support the work of all programs. Our current workforce consists of approximately 1,100 federal employees and is supported by approximately 700 contractors as well as **NOAA Corps officers**, grantees, and partners. As defined by our current financial structure, we support three primary areas: navigation, observations, and positioning; coastal science and assessment; and ocean and coastal management and services.

Navigation, Observations, and Positioning

We promote safe and efficient maritime transportation and commerce. We are the nation's leading authority on hydrography, shoreline mapping, and nautical cartography; water levels, tides, and currents; geodesy, reference frames, and geoid modeling; and the integration of cross-sector ocean observations and data to produce coastal models, forecasts, and prediction services. Our sustained geodetic measurements, hydrographic mapping, and oceanographic observations provide the foundation for sound coastal management, climate resilience, conservation, and disaster response and recovery.

EXPLORE SOME OF OUR DATA, TOOLS, AND PRODUCTS:

- Comprehensive nautical maps and charts for U.S. waters
- U.S. Integrated Ocean Observing System (IOOS®) National Data Portal
- Physical Oceanographic Real-time System (PORTS®)
- Continuously Operating Reference Station (CORS) Network
- National Water Level Observation Network (NWLON)

The National Water Level Observation Network observes, communicates, and assesses effects of water level changes throughout the country — essential information during storm events. Some network stations, such as the one depicted here, are reinforced to withstand major storms. *(NOAA)*

Primary Statutory Authorities:

- Coast and Geodetic Survey Act
- Hydrographic Services Improvement Act
- Integrated Coastal and Ocean Observation System Act
- Ocean and Coastal Mapping Integration Act

Coastal Science and Assessment

We provide expert scientific support and services in response to human-made and natural disasters. This includes assessing the damage from oil spills or other coastal or marine events and ensuring that response, recovery, and restoration actions mitigate harm to those resources and surrounding economies. We provide ecological forecasting, long-term monitoring, impact assessments, and risk analyses for marine toxins and threats, such as harmful algal blooms and hypoxia. NOS also supplies coastal managers with ecological, economic, and social science information to promote ecological resilience and to enhance the way communities sustainably interact with coastal ecosystems.

EXPLORE SOME OF OUR DATA, TOOLS, AND PRODUCTS:

- Environmental Response Management Application (ERMA®)
- Harmful Algal Bloom Forecasting
- Marine Debris Monitoring Toolbox

A U.S. Coast Guard member uses NOS's Emergency Response Management Application — the online mapping tool that integrates static and real-time data in a centralized, easy-to-use format for environmental responders and natural resource decision-makers. *(NOAA)*

Primary Statutory Authorities:

- Clean Water Act
- Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
- Harmful Algal Bloom and Hypoxia Research and Control Act
- Marine Debris Act
- National Coastal Monitoring Act
- Oil Pollution Act

NOS's Response and Restoration staff provides fate and transport analyses for leaking chemicals associated with incidents. In this 2022 vessel grounding and diesel fuel spill north of Sitka Sound, Alaska, Unified Command members identified impacts on local tribes' subsistence harvest areas. *(NOAA)*

Ocean and Coastal Management and Services

NOS manages a marine protected area network that currently includes 15 marine sanctuaries, 30 estuarine reserves, and two marine monuments within coastal, marine, and Great Lakes waters. Partnerships and meaningful community engagement are the key to successfully conserving these areas as well as other special places and habitats, such as salt marshes and coral reefs. We provide coastal and marine planners with the skills, tools, and data needed to manage the nation's coastal resources and communities. We also work in partnership with and provide funding to local governments, states, non-profit organizations, and other partners to advance coastal management, research, education, and engagement. We strive to establish equitable relationships with Indigenous communities — recognizing their long-standing stewardship of coastal and marine areas and knowledge — and to actively engage and partner with underserved and underrepresented communities so they have a voice in the process.

EXPLORE SOME OF OUR DATA, TOOLS, AND PRODUCTS:

- Sea Level Rise Viewer
- Digital Coast
- CoRIS: Coral Reef Information System
- National Marine Sanctuary Condition Reports
- National Marine Sanctuary 360° Virtual Reality Lesson Plans

Primary Statutory Authorities:

- Coastal Zone Management Act
- Coral Reef Conservation Act
- Digital Coast Act
- National Marine Sanctuaries Act

NOS's Marine Sanctuary System safeguards an array of diverse wildlife and vital ecosystems, such as this sea bass looking for food among the schools of smaller fish in this healthy coral reef. *(NOAA)*

Collaboration across NOAA

At NOS, we work across NOAA programs on a wide range of issues, including (but not limited to) coastal flooding and inundation, ecological forecasting, habitat conservation and restoration, climate mitigation and adaptation, incident response, and safe marine transportation. By working together on cross-NOAA teams and by making connections between programs where our individual missions are complementary, we enrich and multiply one another's expertise, leading to even greater success. For example, our hydrographic surveying and natural resource assessment and management work relies heavily on NOAA ships and planes managed by the Office of Marine and Aviation Operations. Satellite data from the National Environmental Satellite Data and Information Service populates numerous NOS models and enhances our ability to track oil spills and disease in corals. National Weather Service forecasters keep our staff and facilities secure and disseminate NOS-led rip current forecasts to keep beachgoers safe. NOS and the National Marine Fisheries Service are working hand-in-hand to advance sustainable aquaculture and offshore wind in U.S. waters, and our collaborations with the Office of Oceanic and Atmospheric Research are leading to exciting developments in the rapidly expanding field of marine carbon dioxide removal. Bottom line: NOS couldn't do its job to the fullest without working closely with the rest of NOAA.

Strategic Drivers

Our nation is facing unprecedented challenges, hazards, and vulnerabilities in our ocean and Great Lakes and along our coasts. To ensure that NOS is prepared to serve our nation's growing needs, we identified four strategic priorities that we believe will grow in relevance in the coming years and beyond. We did this by conducting significant internal and external engagement. Using focus groups, visioning exercises, listening sessions, public comment periods, and more, we worked to capture the major priorities and concerns of our staff, our partners, and the public. This input was critical to informing the strategic direction and objectives found in this document. With this in mind, this document is designed to keep us focused on these priorities, enable us to track our progress, and to help us align with the **U.S. Department of Commerce Strategic Plan 2022-2026**[1] and **NOAA's FY22-26 Strategic Plan, Building a Climate Ready Nation**[2]. The priorities laid out in this document will also assist NOS in identifying opportunities for enhanced collaboration across NOAA.

NOS aims to increase the positive impact of our work in response to our nation's growing need for ocean and coastal products and services via the priorities in this document. That said, many of the challenges and opportunities we face are not specific to the United States; rather, they are shared with many of our global partners. Just as NOS is stepping into leadership roles domestically, including within the U.S. federal government, as a convener of U.S. industry, and as a leading provider of authoritative information for use in our climate adaptation efforts, we are increasingly being asked to participate in international fora where our leadership and expertise contributes to critical ocean, coastal, climate, and other solutions for the international community as a whole. In response, we are working hard to identify how NOS can contribute its expertise and authoritative information and decision support to nations around the world, particularly when it comes to understanding and predicting the impacts of climate change on essential infrastructure, natural ecosystems, and coastal communities.

Some of the challenges we face:

Coastal flooding and sea level rise

Climate change is transforming the ocean and our coastal zones more rapidly than any other place on Earth. U.S. coastal counties, which are home to 40% of the nation's population, are experiencing rapid, accelerating change and increased risks from the combined effects of storms, tides, and sea level rise[3]. From 2017-2022, the United States experienced 21 tropical cyclones that each caused at least $1 billion (unadjusted) in damage[4]. The storms resulted in 3,656 total deaths and cost an estimated $638.4 billion[4]. Sea level rise is already increasing coastal flooding impacts. Without significant global action, by 2050 the United States could see sea level rise of over a foot on average, placing as much as $106 billion worth of coastal property below sea level[5][6]. Annual imports and exports, which exceed 1.4 billion tons and are valued at over $1.5 trillion[7], come through our ports and waterways to provide products that sustain our daily lives. The disproportionate number of people and vital infrastructure, like ports and military installations, along our coasts means that our ocean, coasts, and coastal communities are both highly influential and too big to fail. Coastal communities and economies need ready access to improved authoritative information about near- and long-term flood risks as well as strategies to plan for and mitigate impacts.

NOS is dedicated to proactively addressing the imminent threats of sea level rise by predicting, responding to, and mitigating the effects of this hazard — including the effect of coastal flooding, as seen on this roadway within Assateague Island National Seashore. *(National Park Service)*

Diverse coastal hazards

In addition to flooding, communities face a multitude of concurrent coastal threats. Harmful algal blooms endanger human health, contaminate clean drinking water, kill marine life, and threaten food security. Marine debris — from hurricane-borne debris to microplastics — pollute coastal ecosystems and create hazards for marine navigation. Oil and chemical spills can decimate local ocean environments, economies, and important food sources. Communities need science, information, and resources to help them address these and other hazards and to prevent prolonged economic loss and social harm.

Increasing stress on coastal habitats and ecosystems

Across the United States and the world, cumulative stressors on important coastal ecosystems are causing significant impacts. Between 2014-2017, nearly 30% of coral reefs worldwide suffered mortality-level heat stress[8]. Thirty-eight percent of coastal wetlands have been lost to large-scale conversion by draining, dredging, and filling, and about 7% of the world's seagrasses are lost each year because of development, polluted runoff, climate change, and other factors[9][10]. Without adequate stewardship of our nation's coastal areas, the many benefits these ecosystems provide may be lost. These benefits include biodiversity conservation, fisheries habitat, cultural values, recreational opportunities, and substantial protective value for coastal communities facing erosion, rising sea levels, and increasing coastal storms.

Historically underrepresented communities

For far too long, entire segments of our society have been left out of decision-making or marginalized when it comes to managing or benefitting from our ocean and coasts. Climate change and its impacts place many underserved communities at greater risk, leaving them less able to recover from coastal events due to a lack of resources, accessibility constraints, and systemic institutional barriers and inequities. At the same time, the place-based knowledge in underrepresented communities and in Indigenous communities hold solutions and knowledge needed to address these challenges. We must increase our engagement with these groups to ensure equitable design and service delivery of our tools, services, and products to help promote coastal resilience for everyone.

What we mean by engagement with federally recognized Indian tribes and other Indigenous groups:

NOS recognizes and honors the U.S. government's treaty obligations and its government-to-government relationships with federally recognized Indian tribes. A federally recognized Indian tribe is defined as an Indian or Alaska native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges under the Federally Recognized Indian Tribe List Act of 1994. At the same time, NOS acknowledges the interests, cultural connections, and ecological knowledge of the broader set of Indigenous communities that lack formal federal recognition. Where possible, NOS seeks to engage these communities in a way that enhances NOS's conservation and restoration activities without compromising the U.S. government's relationship with federally recognized Indian tribes. Throughout this document, NOS uses the term "Indigenous" to refer to all these tribes, bands, nations, pueblos, villages, and native communities while recognizing that each community has a preferred term to describe themselves.

Pandemic-related stressors

The ongoing pandemic has resulted in unprecedented challenges related to public health, remote work, and other significant aspects of our lives. These stressors and associated uncertainties about the future have taken a toll on our society's mental, physical, and economic well-being. Across the U.S. workforce, employees are exhibiting signs of burnout, including low retention rates and continued concerns about returning to physical office spaces. As we continue to navigate our hybrid working environment, NOS will seek to address pandemic-related and other persistent stressors while building a diverse and resilient workforce to meet the challenges and opportunities laid out below.

NOS plays a vital role in evaluating and responding to the impacts of cumulative stressors on critical coastal ecosystems, like the erosion occurring along Alaska's Arctic coastline, which poses a growing threat to cultural sites and infrastructure.
(United States Geological Survey)

Some of the opportunities available to us:

Coastal planning and resilience expertise

As the need for more data, tools, and services grows among coastal communities, NOS is being called upon like never before. We are uniquely qualified to prepare our nation for a changing world because it is our fundamental job to turn information into insight and science into services that save lives, protect property, and reduce future risks along our coasts. A wide array of NOS visual tools, products, and services are available for use in communities and by decision-makers from all walks of life to protect coastal economies and to plan for the future along rapidly changing coasts.

National estuarine research reserves, such as the Jacques Cousteau National Estuarine Research Reserve located in New Jersey, provide numerous benefits to adjacent communities, including flood protection and outdoor recreation, while promoting coastal and estuarine stewardship through research and education. *(Jacques Cousteau National Estuarine Research Reserve*

Ecosystem services and nature-based solutions

Healthy coastal ecosystems provide myriad benefits and services, including fisheries, tourism, carbon sequestration, and coastal protection. For example, the estimated total U.S. economic value of services provided by coral reefs is more than $3.4 billion each year[8]. When we consider flood risk reduction alone, a recent study estimated that U.S. coral reefs protect more than 18,000 lives and $1.805 billion worth of property by. reducing flooding[11]. We have the opportunity to support and enhance these ecosystem services via nature-based solutions, which can help communities become more resilient to climate change and restore fragile ecosystems for generations to come.

The National Coastal Resilience Fund supports projects that enhance the resilience of coastal communities, like this dune restoration project in Puerto Rico. *(NOAA)*

Untapped potential of the Ocean Enterprise and of ocean and coastal data

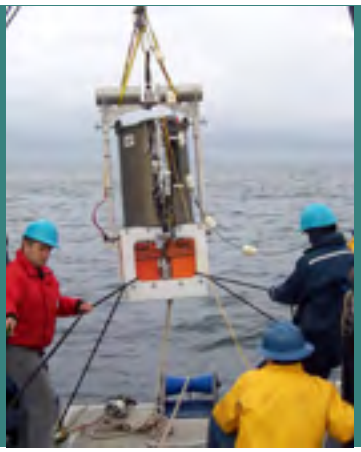
NOAA recently estimated the value of the U.S. Ocean Enterprise — specifically, businesses using ocean and coastal data to drive economic growth — to be $8 billion and growing[12]. Given our roles as ocean and coastal data collector, product developer, data disseminator, and as public servants, NOS is uniquely poised to accelerate the collection and use of ocean and coastal information in ways that are

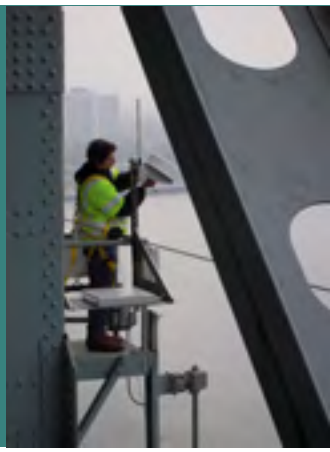
accessible and can contribute to societal good. We believe that we have an unprecedented opportunity to reframe our relationship with the ocean and the information we derive from the ocean and coasts. We can seize this opportunity by creating and fostering even more interest and investment in equitable and sustainable climate resilience by applying ocean and coastal information to derive insights and enhance predictive capabilities in a changing world.

The Geodetic Survey team provides accurate positioning to all nonmilitary U.S. federal mapping activities. *(NOAA)*

NOS scientists forecast, monitor, and analyze the spread of marine toxins and other threats using cutting-edge technologies like this Environmental Sample Processor. *(NOAA)*

NOS provides critical services for safe maritime transportation and commerce. *(NOAA)*





The strength of a diverse and engaged workforce

Higher productivity and increased innovation are the hallmarks of teams that utilize a wide range of viewpoints and backgrounds[13]. As the U.S. population becomes more diverse and infused with the next generation of workers, NOS will embrace and harness the benefits of this diversity[14]. We understand that we must do more to attract and retain youth and diversity within our workforce. NOS will also be stronger for prioritizing "total worker health" efforts, implementing strategies to reduce workforce burnout, and adding flexibilities to our hybrid workspace to promote efficiency and workforce satisfaction and attract NOS's workforce of the future.

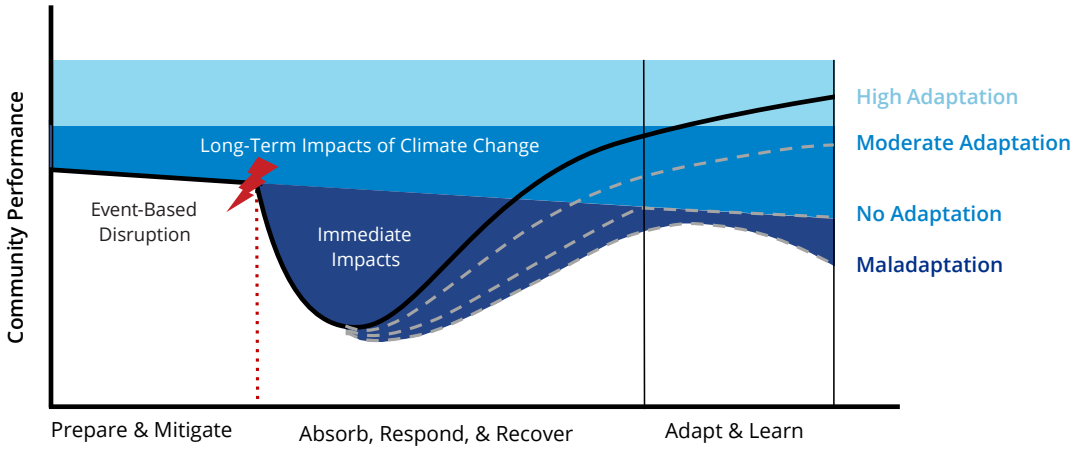
Supplemental funding and resource availability

In addition to regular appropriations, supplemental funding legislation, including the Bipartisan Infrastructure Law (BIL)[15] and the Inflation Reduction Act (IRA)[16], provide substantial resources to help NOS meet the challenges before us. These funds provide much-needed support for flood and inundation mapping, habitat restoration, ecosystem conservation and management, marine debris removal, and the development of nature-based solutions to protect communities from the effects of climate change, among other activities described in this document. Congressional direction for using these historic funds is well aligned with NOS's strengths and expertise, as well as with the priorities found within this document. Leveraging our long-standing partnerships and distributed workforce, NOS aims to make the most of these resources. At the same time, we are seeing operational costs continue to rise across all of NOS's activities; many foundational data and services vital to our nation did not receive new resources in these historic laws. NOS will continue to deliver these services at the highest level possible while ensuring that the importance of these programs is not overlooked and is, instead, communicated widely, including those upon which others' programs, services, and resilience depend. By conveying the interdependence and increasing demand across NOS programs, we will aim to keep pace with increasing operational and infrastructure costs so that we may continue to deliver impactful products and services to the American people.

GOAL 1:
Increase U.S. Coastal Resilience

What we mean by coastal resilience:

Coastal resilience is the ability of populations, ecosystems, and economies to prepare for, absorb, respond to, recover from, and successfully adapt to the impacts of natural and human-caused hazards, such as hurricanes and oil spills, and long-term environmental change, such as habitat loss and sea level rise.



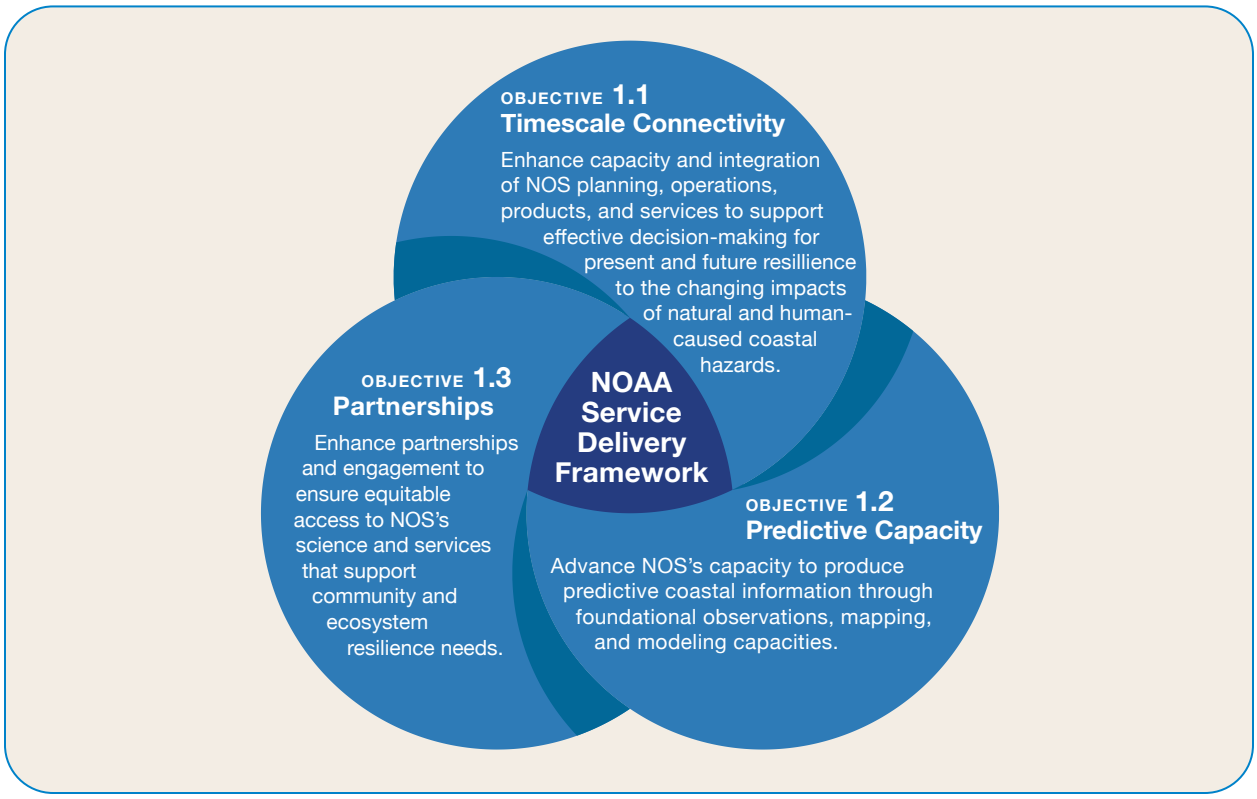
Actions to Reduce Impacts From Hazard Events and Climate Change

Shorelines play a crucial role in protecting coastal communities from the impacts of sea level rise and severe weather events. NOS uses nature-based solutions, creating living shorelines that employ native vegetation to stabilize these essential habitats. In this picture, scientists dig holes to plant new vegetation at a demonstration site within the Rachel Carson Reserve. *(N.C. Coastal Reserve)*

U.S. coastal communities, home to over 128 million people, are increasingly affected by the accelerating pace of changes in the ocean, coasts, and Great Lakes[17]. This number is growing and, as coastal development expands, these communities will face multiple long-term chronic stressors like sea level rise, ocean warming, and marine debris, as well as episodic events, such as hurricanes, oil and chemical spills, and harmful algal blooms. Threats and hazards from climate change are further exacerbated by aging essential infrastructure, from roads and bridges to ports and centers of development. To address these challenges, coastal decision-makers rely on NOS's diverse products and services to assess risks, plan, and take action to increase resilience to these stressors and impacts. To strengthen U.S. coastal resilience, NOS will expand our use of **NOAA's Service Delivery Framework** across the objectives within this goal. This will improve our ability to meet our mission across geographic and time scales, enhance predictive capabilities, and focus on place-based partnerships and the unique needs of individual communities.

Evidence of Success

- Decision-makers have access to new analyses and planning tools for predicting inundation and protecting coastal infrastructure on 20- to 100-year time horizons.
- Decision-makers have improved products and services to help them prepare and respond to coastal threats to health, including harmful coastal algal blooms, marine pollution, and oil spills.
- Coastal states and communities have increased training and technical assistance to support local resilience efforts.
- NOAA works with coastal states and decision-makers, Indigenous peoples, communities of color, and underrepresented communities to co-design and co-produce climate data, information, science, and tools that incorporate local knowledge.



OBJECTIVE 1.1

Support decision-making that increases present and future resilience.

Decision-makers across the United States face difficult choices about how to prioritize limited resources to simultaneously prepare for current threats, respond and recover from recent impacts, and plan for long-term coastal change. NOS will maintain and enhance the delivery of our products and services — from foundational data, observations, research, and modeling to training and decision-support tools — to help our nation not only address current threats but also prepare for future conditions. Through ongoing and robust engagement across NOAA and with partners, NOS will support efforts to incorporate climate resilience into current decision-making. Additionally, we will continue to conduct internal planning and preparedness to ensure our workforce, operations, and infrastructure is equipped to maintain essential functions in the face of major disruptions.

Strategy 1.1.1: Enhance our products, services, and foundational mapping and data to support planning and decision-making across multiple time scales (e.g., from emergency response to longer-term infrastructure siting).

Strategy 1.1.2: Perform continuous user engagement to ensure our products and services are useful, usable, and used by decision-makers.

Strategy 1.1.3: Enhance internal coordination, as well as cooperation with federal agencies and our domestic and international partners, to promote integrated resilience efforts that work at different timescales.

Strategy 1.1.4: Strengthen our incident planning and preparedness to maintain mission effectiveness into the future.

WHAT THIS LOOKS LIKE: Using resources from BIL, NOS and NOAA's Oceanic and Atmospheric Research are developing an enhanced capability to address **coastal flooding and inundation** at **subseasonal-to-centennial timescales**. NOS will produce and deliver authoritative, easily accessible data and products complemented by tools, applications, and decision-support services that enable all communities to advance their resilience to coastal inundation now and in the future. We anticipate this new capability will be operational for subseasonal to annual predictions by 2026.

> *"The Coast Guard Emergency Management Community has long relied on NOS for preparedness and response support, including applied research, development, and delivery of timely products and on-scene operational scientific support in coastal emergencies and disasters."*
>
> — Dana Tulis, *Coast Guard Director of Emergency Management*

OBJECTIVE 1.2:

Improve our capacity to forecast and predict future conditions by enhancing our foundational observations, mapping, and modeling abilities.

Sea level along the U.S. coastline is projected to rise in the next 30 years (2020-2050) as much as the rise measured over the last 100 years (1920-2020)[5]. Coastal communities and economies rely on our collection and stewardship of physical, biological, and ecological data, observations, and models to prepare for this change and enhance their resilience. Habitat data and surface current observations help oil spill responders prevent damage to sensitive ecosystems; water level observations and positioning data inform models that let emergency planners know if evacuation routes may flood during storms. Collaborating with our extensive partner networks, NOS will continue strengthening our collection of foundational data to develop new and improved predictive models to ensure that the resilience products derived from them are useful, usable, and used.

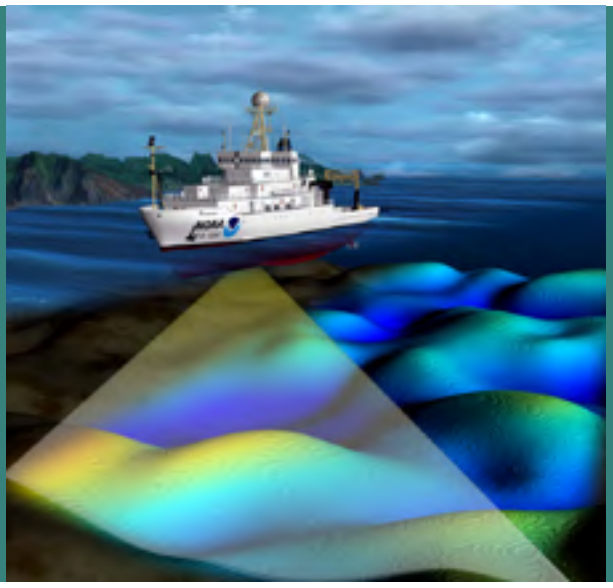
Strategy 1.2.1: Identify and prioritize coastal change variables that are critical to decision-making to inform our work, from data collection to product development.

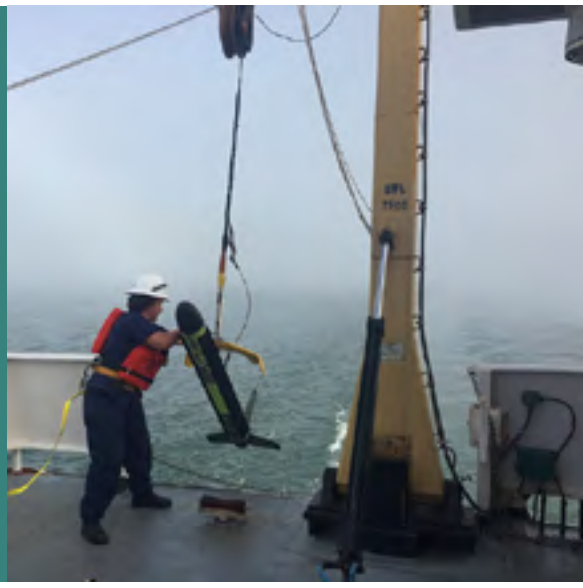
Strategy 1.2.2: Design, build, and sustain improvements to our observing system to support ocean and coastal predictions.

Strategy 1.2.3: Develop and advance forecasting and modeling of harmful algal blooms, hypoxia events, and other ecological hazards.

Strategy 1.2.4: Identify opportunities to connect data, observations, and models across NOAA, the federal government, international fora, and through other public and private partnerships.

NOS conducts hydrographic surveys utilizing various specialized equipment, including multibeam and side-scan sonar systems. Hydrographic data collected from these systems are used to update nautical charts. *(NOAA)*





WHAT THIS LOOKS LIKE: NOS delivers nowcasts, forecasts, reanalysis, and decadal/climate-scale projections, from regional models for the entire U.S. coastline. Via implementation of the newly developed **NOS Modeling Strategy**, we will further integrate our global ocean, coastal/estuarine, and Great Lakes modeling capabilities into an operational Earth System Modeling Framework, which will provide ecosystem change and coastal hazards predictions. NOS's foundational data and observations, including information on water levels, currents, shoreline bathymetry, and gravity, will provide customized inputs to support these models and state-of-the-art advances such as real-time data assimilation or ice forecast modules that can be collaboratively developed and integrated into the system.

> *"The NOAA harmful algal bloom (HAB) forecast helps Monroe prepare for the HABs before they get close to our city water intakes. Without the NOAA HAB forecast and other real-time monitoring sources, we would not have any warning of HAB locations and the direction they are heading."*
>
> -- Chris Knight, *Water Treatment Superintendent, City of Monroe, Michigan*

OBJECTIVE 1.3:

Enhance partnerships and engagement to ensure historically underserved communities and decision-makers have equitable access to our coastal resilience science and services.

Partnerships present critical opportunities to extend the reach and impact of NOS's coastal resilience efforts, especially to federally recognized Indian tribes, Indigenous communities, and historically underserved communities. NOS will continue to engage coastal communities and decision-makers to ensure equitable access to user-driven data, tools, training, technical assistance, and other information necessary to improve resilience. We will serve as a convening partner and use existing NOAA programs and partnerships, such as the National Estuarine Research Reserve System, National Marine Sanctuaries System, National Coastal Zone Management Program, Integrated Ocean Observing System, and NOAA's National Sea Grant College Program, as place-based touchstones for coastal resilience service delivery and outreach. Using enhanced resources from the IRA and the BIL, we will lead efforts to elevate, coordinate, and accelerate the federal government's efforts to equitably increase the resilience of the nation's coasts and coastal communities.

Strategy 1.3.1: Integrate equity into our resilience work, focused on understanding the needs of Indigenous peoples and underserved communities, collaboratively developing resilience resources, and empowering diverse voices within community conversations and governmental processes.

Strategy 1.3.2: Increase the application of NOAA's Service Delivery Framework across NOAA's and NOS's programs and partner networks to amplify the equitable delivery of resilience information and resources.

Strategy 1.3.3: Amplify the use of our field office staff and partner networks as focal points for on-the-ground research, service delivery, convening partners, and community engagement.

Strategy 1.3.4: Maximize existing partnerships and build new private sector, professional organization, academic, interagency, and community partnerships, seeking opportunities to leverage funding and other resources to achieve resilience goals.

WHAT THIS LOOKS LIKE: NOS will support regional climate resilience collaboratives that integrate climate adaptation strategies and transformational resilience investments for coastal communities. This work will emphasize building local resilience capacity and engagement with those who have been historically marginalized, underserved, or underrepresented, such as federally recognized Indian tribes and other Indigenous groups. Climate resilience and adaptation actions, supported by NOAA technical assistance, will be appropriate to the plan, place, and peoples.

Volunteers are crucial to NOS's mission as they help extend the reach and impact of NOS's efforts. Here, volunteers plant natural grasses safely behind a newly constructed breakwater, part of a living shoreline project at Camp Wilkes in Biloxi, Mississippi. The breakwater's role is to reduce erosion on the shoreline by decreasing wave energy and allowing plants to grow on the shore. *(Mississippi-Alabama Sea Grant Consortium)*

"The National Fish and Wildlife Foundation (NFWF) values our longstanding partnership with NOAA to advance conservation efforts. As of early 2023, NFWF has invested more than $585 million, and leveraged over $69 million from other partners, to support important resilience projects that are benefitting coastal communities and wildlife."

— Ellen Bolen, Director of Marine and Coastal Conservation, NFWF

GOAL 2: Make Equity Central to Our Mission

What we mean by equity:

For this document, we use "equity" as an overarching term that encapsulates the following principles.

- *Diversity:* the practice of including the many communities, identities, races, ethnicities, backgrounds, abilities, cultures, and beliefs of the American people, including underserved communities
- *Equity:* consistent, systematic, fair, just, and impartial treatment of all individuals, including our employees and those we serve
- *Inclusion*: the recognition, appreciation, and use of the talents and skills of employees of all backgrounds
- *Accessibility:* the design, construction, development, and maintenance of facilities; information and communication technology; programs; and services so that all people, including people with disabilities, can fully and independently use them
- *Justice:* The systemic and ongoing examination and transformation of polices, practices, processes, and products to ensure equitable opportunities, access to resources, and outcomes for everyone

Equity principles underpin NOS's values and how we conduct our mission, guiding our actions today and into the future. We recognize that historically underserved populations have been underrepresented in science, technology, engineering, and mathematics fields and disproportionately experience impacts from environmental change and degradation. NOS will amplify our external-facing efforts to equitably develop and provide our data, products, and services to ensure our work benefits more communities across the nation and serves all people fairly and responsibly. In parallel, we will look internally to build and sustain a diverse, equitable, and inclusive organization that is accessible to all. To achieve this, NOS will continue to respond to NOAA-led climate and equity assessment results and address barriers to achieving more equitable service delivery and building a more diverse and inclusive organization.

Evidence of Success

- Barriers to equitable service delivery are assessed and addressed across NOS, including enhancing accessibility for Indigenous peoples, communities of color, and other underserved and vulnerable populations to apply for federal funding opportunities.
- Vulnerable populations are better equipped to adapt and increase their coastal resilience.
- NOS recruitment efforts and use of direct hiring authorities improve our ability to reach historically underrepresented populations and diversify our workforce.
- NOS increases staff participation in equity training, listening sessions, and opportunities to provide feedback to leadership as a means of creating a more welcoming work environment.

OBJECTIVE 2.1:

Advance equity in the development, delivery, and continuous improvement of our science, products, and services.

Equitable service delivery is essential for all communities to prepare for coastal hazards and to foster the next generation of climate-resilient communities. NOS is committed to ensuring all communities have a foundational level of support and services needed to succeed and adapt to change. To do this, NOS will prioritize and support historically underserved and underrepresented populations to help create strong, resilient communities that have the tools and resources to address and respond to unprecedented environmental challenges. As part of this work, we will partner and sustain relationships with trusted local groups and organizations already active in those communities, and we will continuously assess and evaluate the equitable delivery and design of our data, products, and services.

Strategy 2.1.1: Strengthen engagement, from design to delivery, to better understand and address the concerns and challenges of underserved and underrepresented communities.

Strategy 2.1.2: Tailor delivery of our products and services to address the disproportionate impacts of ocean and coastal hazards facing historically underserved and underrepresented communities.

Strategy 2.1.3: Partner with trusted community groups and organizations already actively supporting historically underserved and underrepresented communities to provide improved and sustained tools and services.

Strategy 2.1.4: Continuously assess the design and delivery of our data, products, and services to determine how to better achieve equity objectives and outcomes.

Strategy 2.1.5: Identify and then reduce or eliminate institutional barriers that limit the reach of our mission to provide equitable and accessible services.

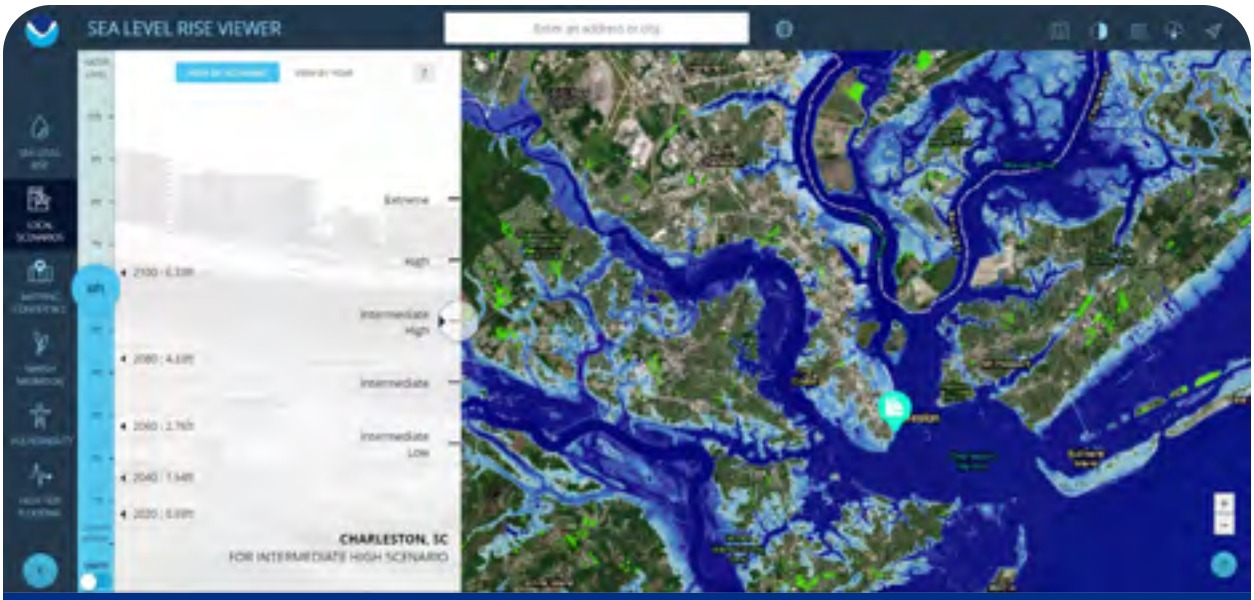
Following storm events, NOS provides emergency response imagery to support response and recovery efforts. These before and after images depict damage to buildings and homes in Lake Charles, Louisiana, following Hurricane Laura in 2020. *(NOAA)*

“Research reserves rely on NOS’s Digital Coast for the tools, data, and support that communities need to address extreme hazards in a changing climate.”

— Rebecca Roth, *Executive Director, National Estuarine Research Reserve Association*

WHAT THIS LOOKS LIKE: In 2021 and 2022, NOAA conducted service and equity assessments on three high-priority programs and services that represent how we provide services to communities via grants, tools, and warnings. NOS volunteered its popular **Sea Level Rise Viewer** as one of the three programs assessed for whether there are potential barriers and gaps that would prevent underserved communities from benefiting from our products and services. Based on our findings, we are:

- Improving our ability to understand if and how underserved communities use the Sea Level Rise Viewer and associated data, tools, and training;
- Better characterizing the most vulnerable populations and identifying best practices for ensuring equitable service delivery; and
- Working with our trusted networks and partners to build and sustain relationships and ensure underserved audiences benefit from the data and information resources.



NOS's Coastal Management team empowers communities to prepare for and mitigate the impacts of rising sea levels by providing essential tools, such as the Sea Level Rise Viewer — a web mapping tool that allows users to visualize potential flooding and sea level rise. *(NOAA)*

> *"The Short Term Prediction System and the West Coast Operational Forecast System, which rely on U.S. Integrated Ocean Observing System High-Frequency Radar-derived surface currents, are invaluable for the U.S. Coast Guard (USCG) Search and Rescue. Both are vital to the USCG's Search and Rescue mission of saving lives."*
>
> — Dr. Cristina Forbes, *Oceanographer, United States Coast Guard, Office of Search and Rescue*

OBJECTIVE 2.2:

Create a model workforce with a shared organizational culture of equity.

Having a workforce more representative of our nation will help NOS remain relevant, relatable, and resilient — better able to serve all communities equitably. NOS will strive to build and maintain a model workforce by including and encouraging diverse ideas, knowledge sources, opinions, and experiences. Doing so will assist NOS in generating greater creativity and innovation, resulting in better solutions and opportunities that will meet the nation's and our future organizational needs. We will incorporate and embrace equity principles to build and retain a diverse and representative workforce, provide and empower inclusive initiatives, and remove barriers to equal opportunity for hiring and employee development.

Strategy 2.2.1: Build and sustain a workforce representative of those we serve.

Strategy 2.2.2: Ensure our workplace culture is equitable and fosters innovation while providing all employees a sense of belonging, inclusion, and appreciation.

Strategy 2.2.3: Ensure our staff have equitable access to training, mentoring, and career development opportunities.

Strategy 2.2.4: Encourage and enable our staff to learn and apply diversity, equity, inclusion, justice, and accessibility principles and to implement and lead positive internal change.

Strategy 2.2.5: Strengthen our commitment to accountability to create a workplace free of discrimination and harassment where all employees can fully realize their potential.

Predicting future patterns of coastal inundation from sea level rise is critical to increasing coastal resilience. Here, NOS employees install stainless steel rods into the ground to install a Surface Elevation Table. The tables provide data to model the fate of the marsh in the face of rising water levels, ultimately providing insight into its restoration. *(NOAA)*

> *"In order to make lasting change, we must fully integrate diversity, equity, inclusion, justice, and accessibility concepts into every decision we make — from our business practices to our organizational culture. Whether we are talking about hiring more women and persons of color or helping underserved communities gain access to more climate resiliency projects, equity must be a consideration."*
>
> — Dr. Ngozi Butler-Guerrier, *Director, NOAA Office of Inclusion and Civil Rights*

WHAT THIS LOOKS LIKE: The COVID-19 pandemic has placed additional strain on employees, disrupted traditional social support networks, and reduced opportunities for in-person engagement. NOS is working to give our employees resources to promote their mental, physical, social, and emotional well-being. We established a new behavioral health and wellness "total worker health" program that:

- Provides healthcare services and resources to advance behavioral health literacy and awareness across our workforce;
- Leads short- and long-term planning to promote mental/behavioral health; and
- Coordinates with senior leadership to foster an organizational culture that promotes employee wellness and helps address localized wellness challenges.

At NOS, we recognize that building a diverse and inclusive workforce is crucial to fulfilling our mission. Therefore, we prioritize partnership, collaboration, and engagement through conferences, like the Society for Advancement of Chicanos/ Hispanics and Native Americans in Science National Diversity in STEM Conference pictured here. These events offer the perfect platform to support and encourage diversity and representation in our workforce. *(NOAA)*

WHAT THIS LOOKS LIKE: As part of its efforts to build a diverse and representative workforce, NOS supports NOAA's efforts to expand engagement with the **Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS).** In 2022, NOS contributed to NOAA's participation in the SACNAS National Diversity in STEM Conference, which positively affected NOAA brand awareness and attendees' interest in NOAA jobs and student opportunities. NOS will continue to support NOAA's engagement efforts with the SACNAS communities, including hosting events like region-specific training webinars that promote professional development and increase the likelihood that SACNAS members may apply for NOAA-affiliated student opportunities and jobs.

GOAL 3:
Accelerate Growth of the Ocean Enterprise and the Blue Economy

What We Mean by the Ocean Enterprise and the Blue Economy:

The Ocean Enterprise broadly consists of businesses, agencies, academia, and other groups that provide and support ocean measurement, observation, and forecasting, as well as those that supply technology to generate ocean data or work with ocean information to deliver societal, economic, or environmental benefits.

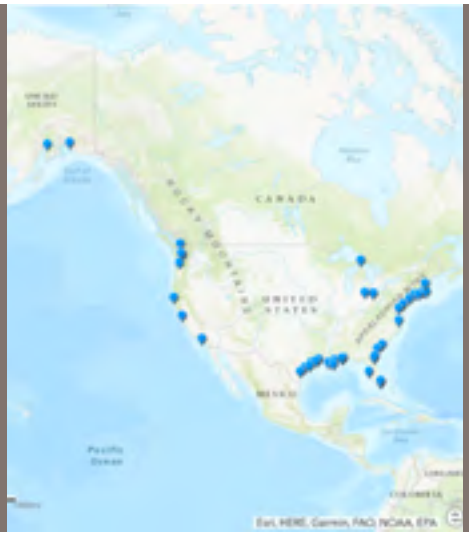
This concept focuses on the creation of value-added, data-driven economic opportunities based on sustainable and equitable solutions to pressing societal needs. By harnessing the power of big data to coalesce and apply ocean and coastal information to support economic growth and protect ocean health, the Ocean Enterprise is an important and growing component of the Blue Economy and a critical underpinning of all sectors of the Blue Economy. The World Bank defines the Blue Economy as the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems. NOAA uses the term Blue Economy to describe the evolving and emerging ocean and coastal-related activities that are rapidly growing and diversifying in response to economic, environmental, and social challenges. Evolving and emerging Blue Economy activities support the established Ocean Economy and Marine Economy, such as fisheries and commercial shipping, by supplying products and services that will be needed in the future and that are associated with an increase in ocean and coastal change and other societal drivers.

High-frequency radar stations, like this one at Michilimackinac State Park in Michigan, measure the speed and direction of ocean surface currents and are now licensed to use eight new radio frequency bands. Licensing for this station required international coordination with Canadian authorities. *(Michigan Technological University)*

We live in an era of unprecedented expansion of our ability to observe, measure, and understand the ocean and coasts, including how they express and are impacted by climate change. NOS sees enormous potential in connecting this vast collection of ocean, coastal, and Great Lakes data and information to businesses, governments, academia, and other organizations to deliver innovative, value-added products and services — such as customized prediction and decision-support tools — supporting marine economic drivers in coastal communities. The number of U.S. businesses in the fields of ocean measurement, observation, and forecasting increased by almost 60% between 2015 and 2020[12]. This information-focused sector, the Ocean Enterprise, informs decision-making across Blue Economy sectors. This includes providing the information needed to help the nation create equitable solutions and ecological sustainability, as well as to develop insights and predictive capabilities that will provide opportunities for climate adaptation and prosperity for society in the face of rapidly changing conditions. To accelerate the growth of the Ocean Enterprise, NOS will use our roles as ocean and coastal data collectors, product developers, data disseminators, predictive experts, and public servants to help revolutionize the way we interact with the ocean and each other to meet societal needs. Among other things, NOS will increase engagement with a wide range of businesses and philanthropic organizations regarding how we obtain and use ocean and coastal data to enable our maritime and coastal-based economies, as well as deliver ocean information services to public and private sector end users. These engagements will inform future interactions with businesses, philanthropy, other agencies, and our partners in prioritizing our own ocean observing capabilities, as well as our data dissemination and development of products derived from those data.

Evidence of Success

- The nation experiences growth and diversification in the U.S. Ocean Enterprise.
- NOS enables enhancements to NOAA's coastal and ocean-observing and modeling capabilities and improves public access to our data and services.
- NOS increases engagements with organizations that help promote sustainable economic growth, resolve societal challenges, and develop a diverse and vibrant Blue Economy workforce.
- NOS implements improvements to the research-to-application pipeline for new technologies that enable NOS, NOAA, and the entire Ocean Enterprise to more easily apply ocean and coastal data to meet the growing demand for real-time and predictive ocean and coastal information.



The Physical Oceanographic Real-Time Systems (PORTS®) program is a decision support tool that improves the safety and efficiency of maritime commerce and coastal resource management. PORTS® are located around the U.S. and provide real-time oceanographic and meteorological information that promotes safe and efficient marine transportation. *(NOAA)*

OBJECTIVE 3.1:

Provide consistent and reliable access to ocean and coastal observations, data, predictions, and information services.

The Ocean Enterprise depends on improving access to ocean and coastal observations and data and derived information products. To enable the creation of value-added services, businesses and other organizations must be able to find and use this information easily. NOS will continue to improve core observations and services, such as our land and water datums, and will lead efforts across NOAA to organize and provide consistent, easy access to underlying authoritative data and observations from all publicly available sources. NOS will also seek to enhance NOAA's partnerships across the Ocean Enterprise to improve these services to support society.

Strategy 3.1.1: Lead cross-NOAA efforts to improve the management, delivery, accessibility, and usefulness of NOAA's ocean and coastal observations, data, and information.

Strategy 3.1.2: Build and sustain a whole-of-government effort and work with the private sector, academia, Indigenous governments and institutions, international partners, and others to improve and provide access to NOAA's ocean and coastal observations, data, and information.

Strategy 3.1.3: Use modern and innovative technologies and other means to provide efficient access to ocean and coastal observations, data, and information, including access by artificial intelligence systems.

Strategy 3.1.4: Increase NOS's ocean and coastal observations to provide the quality and quantity of ocean and coastal data and information at the temporal and spatial scales needed to further spur economic growth and address societal challenges.

Strategy 3.1.5: Lead efforts to better track, measure, and report the development of Ocean Enterprise business activity and its contribution to the Blue Economy.

WHAT THIS LOOKS LIKE: One of NOS's early examples of a product designed to grow the Ocean Enterprise is **NOAA's Precision Marine Navigation**. A partnership with NOAA's National Weather Service, this decision-support tool connects and integrates a wide array of navigation data, such as Electronic Navigational Charts, high-resolution bathymetry, water levels, surface currents, and marine weather hazards. Making this information more readily available and usable supports:

- Efficient route planning that lowers fuel consumption and resulting carbon emission;
- Vessels' ability to navigate safely and avoid hazards; and
- Private sector innovators who use NOAA's ocean and coastal observations to develop new products and services.

OBJECTIVE 3.2:

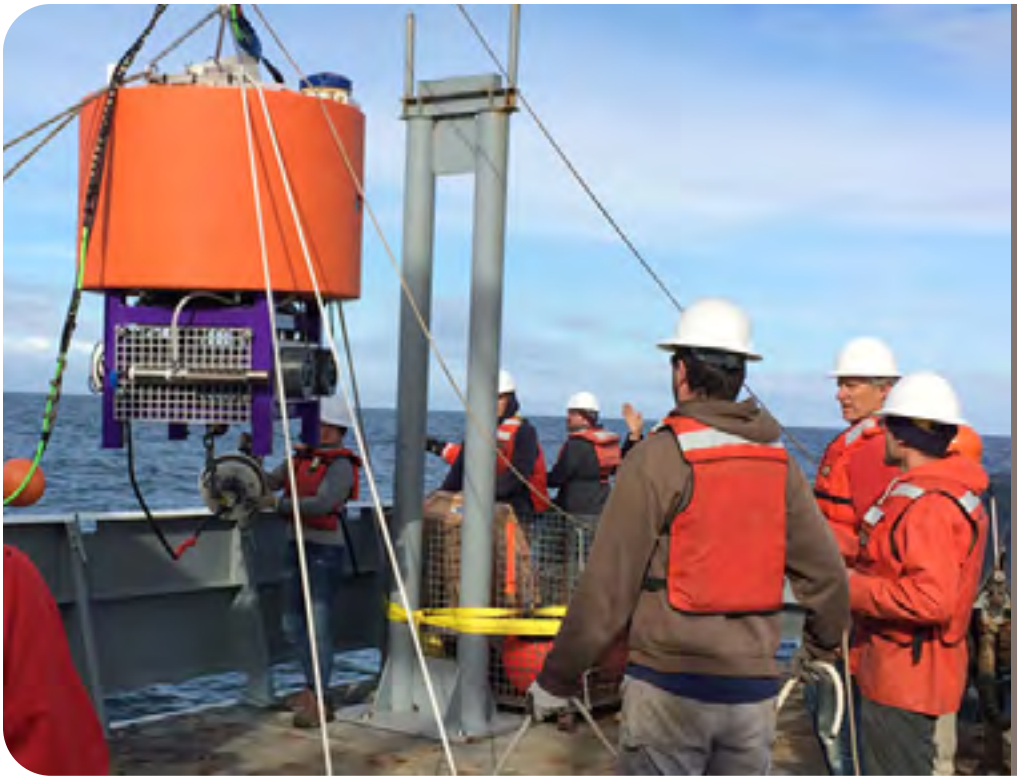
Accelerate NOS's technology pipeline from research to application.

NOS is a leader in ocean and coastal research. To maximize the public's benefit from our work, we must ensure the swift application of our scientific breakthroughs to improve our products and services. NOS will acquire and apply technologies, data, and innovative partnership models to advance our diverse missions, meet user requirements, and inform coordination and planning at national, regional, and local scales. Whether conserving coral reefs, forecasting harmful algal blooms, responding to marine pollution and natural disasters, informing safe marine transportation, or helping communities adapt to severe weather and sea level rise, NOS will seek to apply ocean and coastal observations and data to create innovative information-based solutions.

Strategy 3.2.1: Use enhanced resources from the IRA and the BIL to advance scientific research and employ new technologies to improve the ability to meet existing missions and mandates and address societal needs.

Strategy 3.2.2: Apply **existing NOAA policies** on transitioning research and development to applications and build capacity to move products and services more swiftly from research to operations or application.

Strategy 3.2.3: Enter into new agreements and partnerships to leverage others' capabilities and scientific and technical expertise to meet NOS missions and mandates.



NOS is known for delivering accurate, reliable, and cost-effective early warnings and forecasts of toxins in the marine environment. Cutting-edge technology, like the Environmental Sample Processor — an underwater robot shown here prior to deployment in 2016 — enables experts to remotely measure toxins, like paralytic shellfish poison, in the environment. *(University of Washington)*

OBJECTIVE 3.3:

Build a diverse U.S. workforce to advance the Ocean Enterprise and Blue Economy.

Acceleration of the Ocean Enterprise and connecting it to the Blue Economy's evolving and emerging sectors will require a U.S. workforce with new and unique combinations of skills and talents related to a wide range of applications, from design and manufacturing of ocean data sensors and platforms, to data sciences — including machine learning and artificial intelligence. To help develop such a diverse and skilled workforce, NOS must attract, develop, and retain top talent across the public, private, academic, and other sectors. Adding to the challenge, we must accomplish this in a competitive and rapidly changing labor market. NOS will work across NOAA and with external partners to provide a steady pipeline of educated, trained, and applied scientists, technicians, and other professionals specialized in using ocean and coastal information to solve societal challenges.

Strategy 3.3.1: Generate increased interest and awareness of the importance of ocean and coastal observations, information, the Ocean Enterprise and the Blue Economy among K-12 students.

Strategy 3.3.2: Optimize the use of NOAA scholarships, fellowships, internships, and other student opportunities to develop skills needed for the Ocean Enterprise and the Blue Economy.

Strategy 3.3.3: Work with the academic, philanthropic, and private sectors to equitably expand educational opportunities, technical training, and professional development opportunities.

A key component of NOS's mission is to enhance the Blue Economy: a sustainable and equitable ocean and coastal economy that optimizes advances in science and technology to create value-added, data-driven economic opportunities and solutions to pressing societal needs. *(NOAA)*

"National Ocean Service products, such as tide forecast predictions and observations and nautical charts, are some of the most critical tools for making decisions about whether or not to move a ship."

— Captain J. Kipling (Kip) Louttit, *Executive Director, Marine Exchange of Southern California & Vessel Traffic Service Los Angeles and Long Beach, San Pedro, CA*

OBJECTIVE 3.4:

Build coalitions and partnerships for sustainable ocean and coastal information and prediction-driven economic growth.

Collaboration and cooperation are central to NOS's culture. Building and strengthening partnerships related to the Ocean Enterprise and Blue Economy will allow NOS to build upon others' unique capabilities, extend the reach of our services, and provide new perspectives on the design and application of our work. NOS will bolster existing partnerships, build new alliances, and work across sectors to better inform decision-making, expand sustainable economic opportunities, and reach historically underserved communities.

Strategy 3.4.1: Continuously update and actively implement external communication, outreach, and engagement strategies, including convening listening sessions with communities and constituents.

Strategy 3.4.2: Establish equitable policies and principles for engagement with Blue Economy service providers and other interested groups.

Strategy 3.4.3: Emphasize and prioritize partnerships with organizations working to create sustainable and equitable economic opportunities and provide U.S. leadership abroad in pursuit of these goals.

Strategy 3.4.4: Develop and publicize use cases that demonstrate how existing programs, investments, and partnership efforts advance the Ocean Enterprise and Blue Economy and support new pilot and demonstration projects.

WHAT THIS LOOKS LIKE: NOAA will meet with technology manufacturers, observing and mapping firms, and service providers to build relationships to advance our sustainability, equity, and climate resilience goals. We will also work to provide the coastal data that is necessary to spur innovation, economic growth, and solutions to pressing societal needs. This includes working with other bureaus in the Department of Commerce, such as the Economic Development Administration and the International Trade Administration, as well as international partners, and by attending Blue Technology-focused conferences and trade shows. With enhanced resources from the IRA, NOS will also support the emerging networks of blue tech clusters, accelerators, and incubators where their work contributes to the public good.

> *"NANOOS, (part of the U.S. Integrated Ocean Observing System) is an invaluable partner and asset to the State of Oregon. The beach and shoreline monitoring data supports evidence-based efforts to maintain resilient and healthy communities through comprehensive coastal hazard mapping, dynamic coastal system understanding, and sound planning practices."*
>
> — Lisa Phipps, *Coastal Program Manager, Oregon Department of Land Conservation and Development*

GOAL 4:
Conserve, Restore, and Connect Healthy Coastal and Marine Ecosystems

What we mean by ecosystem services:

Healthy ecosystems provide a wide range of direct and indirect benefits, from recreational opportunities to habitat for species to storm surge protection. We refer to these benefits as ecosystem services. Understanding how changes to the ecosystem may affect these benefits should play a role in the community's decision-making process.

Natural resources and their ecosystem services are essential to our lives and livelihoods in ways large and small. Our marine and coastal environments and their abundance of resources, both material and cultural, are foundational to our nation's prosperity and our heritage. Degradation and alteration of these environments, exacerbated by climate change, threaten these places and their value across societal uses. NOS plays a critical role as a steward of the ocean and coasts in connecting communities to these special places. NOS will apply our scientific understanding, resource management, and foundational observations to mitigate stressors, enhance degraded ecosystems, restore ecosystem services, increase accessibility to historically underserved communities, and provide products and services that facilitate sustainable and equitable use. Our work to conserve and restore these ecosystems will also enhance blue carbon sequestration, provide nature-based solutions to mitigate environmental threats, support fisheries, and sustain communities in the face of climate change.

NOS manages the National Marine Sanctuary System, a network of protected ocean areas that provides a safe haven for wildlife and offers visitors the opportunity to explore the wonders of our ocean. Here, a kayaker explores the shipwrecks of Mallows Bay-Potomac River National Marine Sanctuary. *(NOAA)*

Evidence of Success

- Key ocean, coastal, and Great Lakes areas are restored or newly designated for conservation.
- The public has improved access to the benefits of healthy coastal and marine areas, including national marine sanctuaries and national estuarine research reserves.
- The nation has access to positioning and navigation information and observations with improved coverage and accuracy, supporting a thriving economy and increasing the safety of commercial and recreational activities along our coasts and Great Lakes.
- NOS increases our engagement with local organizations as well as Indigenous governments and communities, including how we incorporate feedback into marine and coastal management plans and decisions.

OBJECTIVE 4.1:

Conserve and restore coastal, marine, and Great Lakes areas to improve sustainability, restore lost ecosystem services, and promote adaptation and resilience.

With many of our nation's marine and coastal areas and biodiversity in decline, NOS's conservation and restoration actions will enable natural systems to more quickly recover from acute impacts and adapt to chronic ones, including climate change effects. NOS will advance coastal and marine conservation nationally by continuing to manage trust resources, such as those within national marine sanctuaries and marine national monuments, while enabling state-level conservation and restoration, including within national estuarine research reserves. Where stressors and events overwhelm the ability of natural systems to recover on their own, we will actively restore ecosystems and ecosystem services, including lost ecosystem services, to help mitigate risks to populations, communities, and infrastructure.

Strategy 4.1.1: Designate, protect, restore, and manage areas of the ocean and Great Lakes for long-term ecosystem health and biodiversity, including resilience to future environmental impacts.

Strategy 4.1.2: Implement nature-based solutions to mitigate risks to populations, communities, and infrastructure vulnerable to environmental change.

Strategy 4.1.3: Conserve and raise awareness of significant cultural resources to preserve and improve understanding of our human and national heritage.

Strategy 4.1.4: Promote cooperation on resource protection policies through enforcement, incentives, material assistance, stewardship, and education and by working with other federal agencies, states, tribes, Indigenous groups, industry, and nonprofit organizations.

Strategy 4.1.5: Restore the benefits of marine, coastal, and Great Lakes resources to people following events that result in loss of use, including injuries to resources from marine pollution.

WHAT THIS LOOKS LIKE: Discarded plastic bottles, bags, food wrappers, and other items we use daily can harm wildlife and clog waterways, as well as keep visitors away from littered beaches. Large marine debris can damage coral reefs, mangroves, and other sensitive habitats. Using increased funding from the BIL and IRA, the NOS **Marine Debris Program** will make historic investments to help communities remove the largest and most damaging debris and create opportunities to improve the resilience of the coastal and marine environment and local economies, such as $1.6 million in grants issued to several Gulf of Mexico states to remove marine debris from communities impacted by the 2020 and 2021 hurricane seasons.

NOS's Marine Debris Program is dedicated to protecting our ocean ecosystems from the threat of marine debris. In this picture, a member of the Marine Debris team is helping disentangle a Laysan albatross chick in Papahānaumokuākea Marine National Monument. *(NOAA)*

"We are proud to work with NOAA in their role as a leader in protecting nature, human health, and the economy from the impacts of marine debris. We look forward to pursuing our shared vision of a world free from this problem."

— Marine Debris Foundation Board

OBJECTIVE 4.2:

Provide foundational data and decision-support products that enable people and businesses to operate safely in ocean, coastal, and Great Lakes areas.

Human and economic activities — commercial, industrial, and recreational — are critical to coastal communities and the nation. NOS delivers foundational data, as well as products and services, to help ensure that our nation benefits from a wide range of economic and other activities without posing risks to safety, the environment, or essential ecosystem services. We provide unique capabilities for mapping our shorelines, oceans, and Great Lakes, measuring and predicting water levels and currents, and producing high-accuracy position reference systems to tie it all together. To ensure that marine and coastal economic activities can continue to thrive, NOS will increase our collection and integration of foundational information based on evolving user needs and in ways that improve efficiency and safety in an increasingly busy ocean and coastal environment.

Strategy 4.2.1: Provide high-quality oceanographic and other coastal data, tools, and predictive services to mitigate risks to trust resources from increasing human activity in the ocean and Great Lakes.

Strategy 4.2.2: Build and maintain the foundational informational infrastructure for geospatial data that underpins all mapping, charting, and transportation activities.

Strategy 4.2.3: Engage with users of our oceanographic and other coastal information to improve our products and services to promote safe and efficient transportation, as well as emerging industries like aquaculture and offshore wind.

Strategy 4.2.4: Enable more people to use our observation data and modeling by promoting ease of access and data standardization.

WHAT THIS LOOKS LIKE: NOS's National Centers for Coastal Ocean Science (NCCOS) provides high-value decision support to facilitate the planning and development of offshore renewable energy. NCCOS develops data, analytics, and models that evaluate social, physical, environmental, and ocean use characteristics, which the Bureau of Ocean Energy Management (BOEM) uses to inform planning, leasing, and assessments of potential environmental and ocean use conflicts. With the help of NOS data and models, BOEM and energy developers can mitigate adverse environmental impacts on habitats and species and conflicts with existing and future ocean industries. NOS uses these same data and analyses to inform its management, restoration, and monitoring of natural resources and will continue to work with BOEM to ensure we jointly meet our complementary missions.

OBJECTIVE 4.3:

Strengthen public and personal connections to coastal, ocean, and Great Lakes places.

Future generations depend on us to serve as good stewards of special coastal, ocean, and Great Lakes places and to pass on to them an awareness of how important these natural places and our cultural heritage are to our overall well-being. To ensure the durability of our efforts, NOS will work to foster meaningful connections between people and places, inspire an ethos of stewardship, and advance understanding of the value of coastal, ocean, and Great Lakes resources and their sustainable use.

Strategy 4.3.1: Advance public understanding of healthy environments and their intrinsic, economic, and protective value.

Strategy 4.3.2: Provide opportunities, resources, and modern facilities that foster equitable access to, and appreciation for, natural and cultural resources.

Strategy 4.3.3: Promote sustainable and inclusive recreation and tourism in our coasts and Great Lakes.

Strategy 4.3.4: Provide opportunities for wide public participation and engagement in community-driven and community-based stewardship.

National marine sanctuaries provide a unique opportunity to experience the iconic beauty of our oceans and coasts. Here, hikers explore the Olympic National Park and Olympic Coast National Marine Sanctuary in Washington. *(NOAA)*

OBJECTIVE 4.4:

Partner and engage to advance coastal and marine stewardship at all levels.

NOS shares responsibility for ensuring the health of the nation's ocean, coasts, and Great Lakes with other federal, state, and tribal governments. These partnerships are essential to our mission and will allow NOS to expand the reach of our data, science, and expertise by sharing information and engaging with external entities and other parts of government that also make decisions that affect our trust resources. More broadly, we will engage with and listen to the public and key groups, such as Indigenous, peoples, underserved communities, and scientists, to bring their unique knowledge and perspectives into stewardship decisions.

Strategy 4.4.1: Engage broadly with the public and communities, including Indigenous groups, in developing and implementing informed program actions.

Strategy 4.4.2: Work to build long-term relationships, engage and, as appropriate, consult with federally recognized Indian tribes to further meaningful, collaborative management of trust resources that respects each entity's individual capacities and goals.

Strategy 4.4.3: Convene those involved in restoration, conservation, and risk reduction work to form cross-sector partnerships.

Strategy 4.4.4: Provide decision-support products, environmental observations, and predictions to help the public understand and respond to environmental change.

Strategy 4.4.5: Facilitate sharing of science, data, and observations to empower collaborative and locally led conservation, restoration, and risk reduction.

Strategy 4.4.6: Advance interagency and international policy to mitigate sources of pollution that harm ecosystems and biodiversity.

WHAT THIS LOOKS LIKE: Florida Keys National Marine Sanctuary is North America's only coral barrier reef. It has extensive seagrass beds, mangrove-fringed islands, more than 6,000 species of marine life, and historic shipwrecks. NOS's Office of National Marine Sanctuaries (ONMS) extensively engaged with diverse partners, recreational and commercial users, and other interested groups to gather input on restoring this important marine ecosystem. In the resulting proposed **Restoration Blueprint**, 98% of the recommendations adopted were generated from public input. When the new plan is finalized in 2024, NOS will continue to work with these groups to manage the sanctuary.

The National Marine Sanctuary System advances coastal and marine stewardship by showcasing the incredible diversity of wildlife and habitats within our sanctuaries. In this photo, a snorkeler enjoys the vibrant marine life within the Florida Keys National Marine Sanctuary. *(NOAA)*

> *"Aquarium Conservation Partnership members are dedicated to advancing coastal and marine stewardship through impactful conservation and research efforts. This includes working with NOS on critical efforts like the Florida Keys Restoration Blueprint."*
>
> — Kim McIntyre, *Aquarium Conservation Partnership*

OBJECTIVE 4.5:

Advance NOS's understanding, including through the knowledge of Indigenous peoples and local communities, to improve stewardship decisions.

NOS's authoritative ocean and coastal observations, predictions, and other scientific data is essential to designing and implementing conservation and restoration actions that are effective and durable. NOS will apply our experience and knowledge, and codevelop research with Indigenous peoples and other community partners, to improve stewardship and conservation. We will seek to use this data to develop innovative and predictive capabilities to ensure lasting impacts of our stewardship and management decisions.

Strategy 4.5.1: In collaboration with Indigenous communities, work to implement NOAA's guidance on Indigenous knowledge across NOS, including through co-production of knowledge and co-stewardship.

Strategy 4.5.2: Apply our expertise in mapping, geodesy, observations, and ecological assessment to conservation priorities, strengthening robust long-term monitoring systems and infrastructure to inform conservation and restoration.

Strategy 4.5.3: Advance scientific understanding of carbon sequestration and storage to enable effective conservation interventions.

Strategy 4.5.4: Promote conserved and restored areas as nurseries for restoring adjacent ecosystems and as testbed environments for research, education, and technology development.

Strategy 4.5.5: Identify the observations, social science, and data needed to understand the intrinsic, economic, and cultural value of places and current patterns of community use and engagement.

Strategy 4.5.6: Use biological observations and ecological forecasting to anticipate future changes in natural resources and stressors — combined with records on historical levels and trends — to implement more effective actions and achieve better conservation and management outcomes.

NOS is committed to promoting coastal resilience by preparing communities to be more resilient and by mitigating the effects of climate change. At Swan Island, situated in the Chesapeake Bay, high rates of shoreline erosion and subsidence deteriorated the island's natural habitat and its ability to shelter the nearby town of Ewell, Maryland, from wave energy. To restore the area, 60,000 cubic yards of dredged sediment were placed on the island and planted with native salt marsh and dune plants. NOS is monitoring the restoration to evaluate what kind of management actions can facilitate better outcomes for these types of projects. *(NOAA)*

"We've seen strong viewership demand for information about potential red tide effects and impacted locations, and we find the harmful algal bloom forecasts incredibly useful for communicating these risks."

— Jason Dunning, *Meteorologist, WBBH-TV, Fort Myers, Florida*

Enterprise Objectives

NOS's ability to achieve the goals laid out in this document depends upon the strength of our workforce and our ability to run an efficient, effective, and equitable organization. We must attract and retain top talent from all communities to secure the skills to execute our mission now and into the future. Moreover, we must provide our people with the technology, working environment, and other mission support that will enable them to maximize their productivity, engage fully, and avoid burnout. Accomplishing this will be all the more challenging due to the impacts of the global pandemic, including disruptions to supply chains, increased competition for talented candidates, and the pivot toward increasing telework and hybrid operations.

NOS's workforce is composed of a global team of specialists who bring a diverse range of expertise to their work. *(NOAA)*

We will strengthen our ability to attract and retain a high-caliber, diverse workforce by adhering to our core values and operating principles and by finding ways to adapt and innovate in response to a changing workforce. We will also find cost-effective ways to hire the best and the brightest, deliver modern IT systems and support, improve our facilities to make the workplace as efficient as possible, and increase the efficiency of our business and administrative processes to maximize progress toward our strategic goals. We will look for ways to embed equity principles throughout all enterprise activities, such as reducing barriers to entry of underrepresented populations and increasing accessibility of our business and administration processes.

Evidence of Success

- NOS increases its hiring rate to exceed attrition for key positions across the entire workforce.
- NOS increases the availability and adoption rate of new and enhanced IT services.
- NOS achieves improved facilities condition indices and operational efficiencies.
- NOS sees improvement in Federal Employee Viewpoint Survey results and staff burnout surveys.

OBJECTIVE E.1:

Build workforce capacity to meet future needs.

To meet the objectives laid out within this document and fulfill the increased demand for our products and services, NOS will need to identify and evaluate innovative ways for sourcing, hiring, developing, managing, and retaining diverse talent in an equitable, efficient, and impactful way. Success will require an agile and data-driven approach to assess the effectiveness of different methods and maximize those that most efficiently meet our needs, both by developing the strengths of our current workforce and bringing in new talent to make up our workforce of the future. Achieving this objective will support our efforts to develop a model workforce (see also objective 2.2).

Strategy E.1.1: Prepare for future needs through competency-based employee development and hiring into progressive career paths.

Strategy E.1.2: Maximize resources and eliminate single points of failure through matrixed position management.

Strategy E.1.3: Enable agile and data-driven decision-making through real-time dashboarding of workforce indicators.

Strategy E.1.4: Maximize the use of direct hiring authorities to accelerate hiring and bring more diverse candidates into our workforce.

OBJECTIVE E.2:

Modernize our IT infrastructure for streamlined, cost-efficient mission support in a hybrid work environment.

IT systems, from general office communications to specialized modeling and development platforms, are critical to our everyday operations. NOS will maximize opportunities to achieve economies of scale for IT to support our mission. We will identify and implement opportunities to simplify and streamline IT service delivery, including leveraging shared NOS, NOAA, and Department of Commerce IT services. To enable our workforce to fully take advantage of hybrid work environments and improve accessibility for diverse needs, we will implement innovative enterprise technologies that empower our employees to virtually access their IT workspace and resources anytime, from anywhere, on any approved compatible device.

Strategy E.2.1: Consolidate key IT services within NOS where doing so increases our operational effectiveness and efficiency.

Strategy E.2.2: Leverage NOAA's service offerings for improved networking and network connectivity.

Strategy E.2.3: Implement an accessible, virtual workspace solution across NOS.

OBJECTIVE E.3:

Modernize our facilities and infrastructure to ensure climate resiliency and attract top talent.

Our research, operations, and management functions are conducted nationwide in specialized facilities, many of which are aging and are located in changing coastal zones. Our facilities require routine recapitalization, renovation, and modernization to provide state-of-the-art capabilities that will help attract and retain top talent in our workforce. Therefore, NOS will ensure our facilities are safe, sustainable, accessible, and inclusive environments that promote NOAA's mission and assist the organization with attracting and retaining a high-performing workforce. This includes making the most of increased funding from the IRA in selected locations for critical facility upgrades and maintenance.

Strategy E.3.1: Invest in facility maintenance, management systems, and resources to improve facility condition indices and operational efficiencies under changing conditions.

Strategy E.3.2: Develop and implement processes and procedures to oversee program office facility investment and recapitalization strategies.

Strategy E.3.3: Reduce our carbon footprint and energy costs by leveraging sustainable facility designs that result in energy-efficient, climate-resilient buildings.

OBJECTIVE E.4:

Improve operational efficiency and impact.

To maximize mission impact, NOS needs high-performing and efficient business and administrative functions that support our mission work and avoid diverting resources from mission activities. By improving the efficiency of our business functions, we can also support our efforts to manage staff burnout and cumulative workload. NOS will continue to examine our business functions to identify opportunities to streamline; we will also expand our ability to manage our portfolio of improvement activities to avoid cumulative impacts on key staff.

Strategy E.4.1: Review business functions to find efficiencies and opportunities to streamline.

Strategy E.4.2: Identify and mitigate root causes of compressed schedules for administrative tasks.

Strategy E.4.3: Monitor and manage combined workload impacts across NOS from regular operations, new initiatives, and improvement efforts.

Strategy E.4.4: Increase grant and budget execution capacity and expertise to ensure efficient and effective execution of increasing resources, including supplemental funding.

Making It Happen

Having our priorities identified and included in this document is key. However, effective and sustained implementation of strategic goals and objectives requires intentionally incorporating these ideas, initiatives, and priorities into day-to-day activities and the organizational culture. To give life to this document, NOS will:

- Apply the objectives and strategies within this document as a framework for advancing our mission and vision.
- Create an environment where we work in concert with our partner networks and with communities to be active participants in achieving the crosscutting goals of this plan.
- Incorporate our core values and operating principles into all aspects of our work, prioritizing the strategies presented in this document.
- Hold ourselves accountable by regularly assessing progress and achievements toward our goals and objectives.
- Review our goals and objectives periodically to ensure their applicability and relevance over time.

Staying true to our core value of collaboration, NOS will continue to work internally and with other offices across NOAA, the Department of Commerce, and with other agencies, partners, and communities to advance our interconnected priorities. By strengthening existing collaborations and developing new ones, we will improve our ability to realize our goals and deliver our very best to the nation.

		Navigation, Observations, and Positioning				Coastal Science and Assessment		Ocean and Coastal Management and Services	
		CO-OPS	IOOS	OCS	NGS	NCCOS	ORR	OCM	ONMS
Coastal Resilience	1: Support Decision-Making	●	●	●	●		●	●	
	2: Predictive Capacity	●	●	●	●	●	●		
	3: Partnerships	●	●	●	●	●	●	●	●
Equity	1: Equitable Development & Delivery	●	●	●	●	●	●	●	●
	2: Model Workforce	●	●	●	●	●	●	●	●
Ocean Enterprise and the Blue Economy	1: Access to Ocean & Coastal Intelligence	●	●	●	●	●	●	●	
	2: Research to Application	●	●	●	●	●	●		
	3: U.S. Blue Economy Workforce	●	●	●	●	●		●	●
	4: Coalitions and Partnerships	●	●	●	●	●			
Conserve, Restore, Connect	1: Conserve and Restore Area						●	●	●
	2: Data and Decision Support	●	●	●	●	●	●	●	
	3: Strengthen Personal Connections						●	●	●
	4: Partner and Engage	●	●	●	●	●	●	●	●
	5: Advance Understanding	●	●	●	●	●	●	●	●

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National Ocean Service

National Oceanic and Atmospheric Administration