



# CHART THE future

NOAA's Next Generation Strategic Plan Executive Summary





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# letter

## FROM THE NOAA ADMINISTRATOR

NOAA's mission is central to many of today's greatest challenges. The state of the economy. Jobs. Climate change. Severe weather. Ocean acidification. Natural and human-induced disasters. Declining biodiversity. Threatened or degraded oceans and coasts. These challenges convey a common message: Human health, prosperity, and well-being depend upon the health and resilience of both managed and unmanaged ecosystems. Combined with the capabilities of our many partners in Government, universities, and the private and nonprofit sectors, NOAA's science, service, and stewardship capabilities can help transition to a future where societies and the world's ecosystems reinforce each other and are mutually resilient in the face of sudden and prolonged change.

We clearly have a long way to go in order to realize this vision. We know much about the steep rise of global greenhouse gases and their current and potential impacts on the environment and on society. But our level of uncertainty about many of these impacts is far too high, particularly at regional to local scales. Our society's ability to mitigate and adapt to a changing climate will require far greater knowledge of climate trends and their impacts than we can deliver currently. At the same level, our ability to sustainably use and protect ocean and coastal resources will drive, in substantial measure, the prosperity, health, and safety of future generations—as will our ability to forecast and predict a wide range of environmental events, from hurricanes and tornados, to regional water supplies and pollutants along our coasts.

All of these challenges entail problems at the intersection of society, economy, and the environment—where NOAA's mission has its greatest impact. My optimism about the future is rooted in NOAA's long-standing record of science, service, and stewardship. We must address challenges and opportunities proactively and shape a better future for generations to come. This is the purpose of NOAA's Next Generation Strategic Plan.

The Plan conveys NOAA's mission and vision of the future, the national and global issues NOAA must address, the specific outcomes NOAA aims to help society realize, and the actions that the Agency must undertake. It emerged from extensive consultations with NOAA employees and our stakeholders—the extended community of partners and collaborators in the public, private, and academic sectors who contribute to NOAA's mission. In stakeholder forums across the country; a national forum in Washington, DC; as well as in Web-based engagement and idea generation, we took a fresh look at the major trends facing the Nation to stimulate our best thinking on how NOAA might respond.

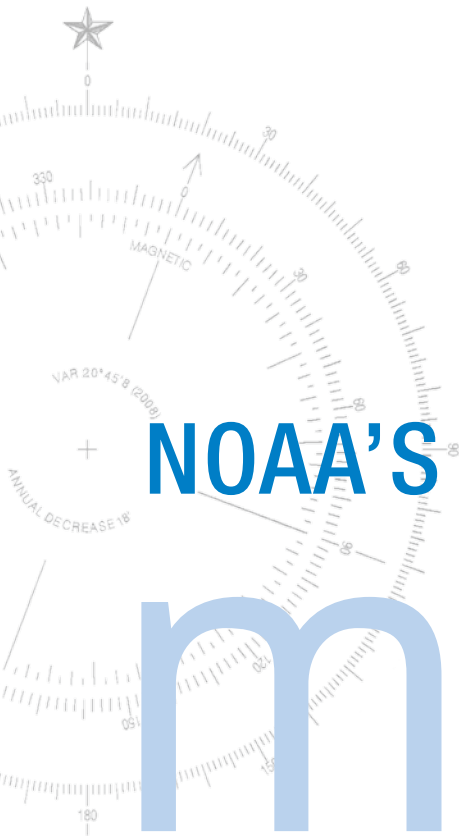
Informed by these consultations, the Plan represents our assessment of the highest priority opportunities for NOAA to contribute substantially to the advancement of society. The availability and quality of fresh water, the exposure of people and communities to high impact weather, stresses of urbanization of the coasts, the exploitation of ocean and coastal resources, and above all the pervasive effects of climate change on society and the environment—these are the central challenges we must face if we are to improve human welfare and sustain the ecosystems upon which we depend. These are the challenges that define NOAA's strategic goals. Through the concerted efforts of NOAA and many other organizations, we can navigate our way toward a future where people, communities, and ecosystems prosper and are resilient in the face of change.

Thank you for engaging in NOAA's strategy. Your continued interest and involvement in NOAA is vital to the work of the Agency and to the health of our society, economy, and environment.



Jane Lubchenco, Ph.D.

**UNDERSECRETARY OF COMMERCE  
FOR OCEANS AND ATMOSPHERE**



**NOAA'S**

# mission

- To understand and predict changes in climate, weather, oceans, and coasts,
- To share that knowledge and information with others, and
- To conserve and manage coastal and marine ecosystems and resources.

NOAA generates tremendous value for the Nation—and the world—by advancing our ability to understand and anticipate changes in the Earth’s environment, improving society’s ability to make scientifically informed decisions, and by conserving and managing ocean and coastal ecosystems and resources. NOAA’s world-class research and information services continuously advance our scientific understanding of a changing climate and its impacts. NOAA monitors and models the environment to forecast daily weather; warn us of hurricanes, tornados, and tsunamis; and support private enterprise with the information necessary to sustain economic growth. NOAA manages the Nation’s fisheries and supports the responsible management of coastal habitats and species. NOAA makes key contributions to our understanding of the processes by which ecosystems provide services crucial for human survival on Earth, and in helping to educate businesses and Federal, State, and local decision makers about how the health of human society and the health of the environment are interconnected. These functions require satellite systems, ships, buoys, aircraft, research facilities, high-performance computing, and information management and distribution systems. NOAA provides research-to-application capabilities that recognize and apply significant new understanding to questions, develop research products and methods, and apply emerging science and technology to user needs. NOAA invests in and depends heavily on the science, management, and engagement capabilities of its partners. NOAA’s organizational enterprise—its people, infrastructure, research, and partnerships—are essential for NOAA to achieve its vision, mission, and long-term goals.

**Science** at NOAA is the systematic study of the structure and behavior of the ocean, atmosphere, and related ecosystems; integration of research and analysis; observations and monitoring; and environmental modeling. Science provides the foundation and future promise of the service and stewardship elements of NOAA’s mission.

**Service** is the communication of NOAA’s research, data, information, and knowledge for use by the Nation’s businesses, communities, and people’s daily lives.

**Stewardship** is NOAA’s direct use of its knowledge to protect people and the environment, as the Agency exercises its authority to regulate and sustain marine fisheries and their ecosystems, protect endangered marine and anadromous species, protect and restore habitats and ecosystems, conserve marine sanctuaries and other protected places, respond to environmental emergencies, and aid in disaster recovery.



# NOAA'S vision of the future

## **Healthy ecosystems, communities, and economies that are resilient in the face of change**

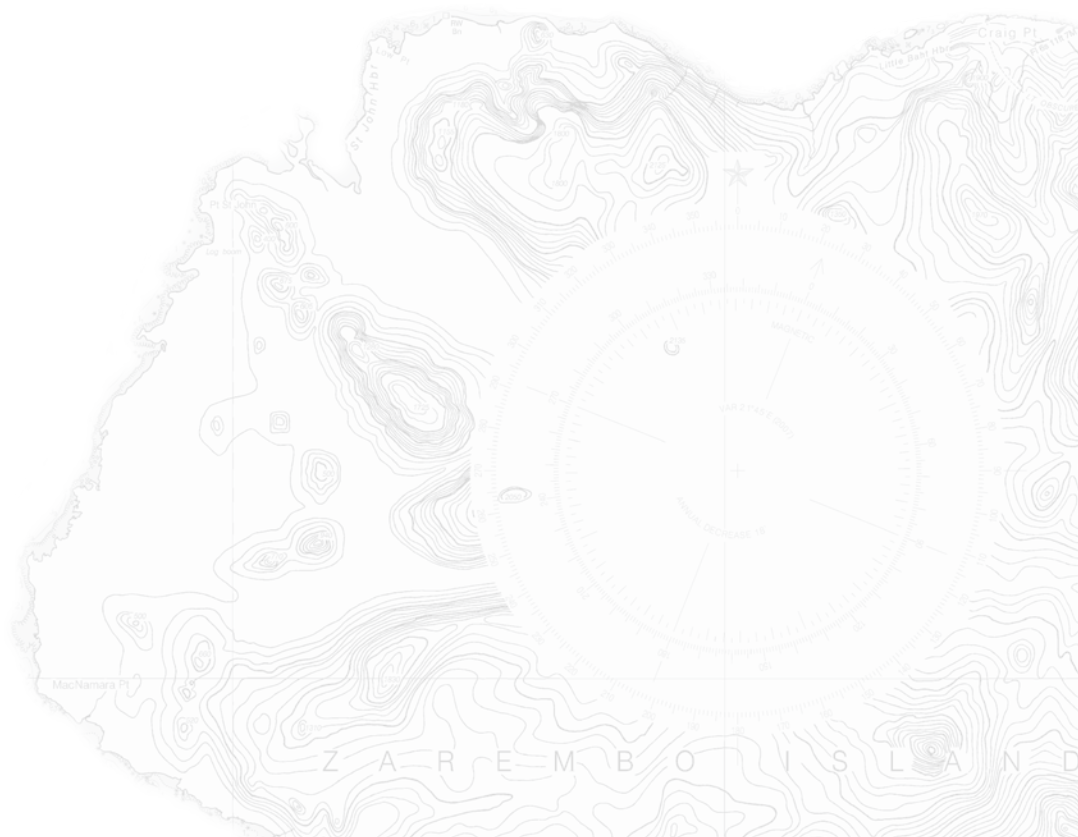
Earth's ecosystems support people, communities, and economies. Our own human health, prosperity, and well-being depend upon the health and resilience of natural and social ecosystems. Managing this interdependence requires timely and usable scientific information to make decisions. Human well-being requires preparing for and responding to changes within these natural systems. NOAA's mission of science, service, and stewardship is directed to a vision of the future where societies and their ecosystems are healthy and resilient in the face of sudden or prolonged change.



A vision of resilience will guide NOAA and its partners in a collective effort to reduce the vulnerability of communities and ecological systems in the short-term, while helping society avoid or adapt to potential long-term environmental, social, and economic changes. To achieve this vision we must understand current Earth system conditions, project future changes, and help people make informed decisions that reduce their vulnerability to environmental hazards and stresses that emerge over time, while at the same time increase their ability to cope with them.

Resilient human communities and economies maintain or improve their health and vitality over time by anticipating, absorbing, diffusing, and adapting to change. Resilient communities and institutions derive goods from ecosystems in a way that does not compromise ecosystem integrity, yet is economically feasible and socially just for future generations. To this end, NOAA will focus on four long-term goals that are central determinants of resilient ecosystems, communities, and economies—and that cannot be achieved without the Agency's distinctive mission and capabilities.

The objectives identified in the Plan are the basis for NOAA's corporate planning, performance management, and stakeholder engagement over the next five years. Objectives are specific outcomes NOAA can achieve on the path to broader, long-term goals and toward a more capable, flexible enterprise. They are measurable and can be affected by specified activities over a 5-year period. Evidence of Progress for each Objective—found in the full version of this Plan—form the basis of outcome-oriented performance measures. NOAA's Line Offices and Staff Offices are be accountable for executing the strategy laid out in this document through implementation plans at a tactical (rather than strategic) level of detail. Where there are shared capabilities to achieve an objective, there is also joint accountability for budgeting, executing, and performing toward that objective.





# long-term

## CLIMATE ADAPTATION AND MITIGATION

### **An informed society anticipating and responding to climate and its impacts**

Projected future climate-related changes include increased global temperatures, melting sea ice and glaciers, rising sea levels, increased frequency of extreme precipitation events, acidification of the oceans, modifications of growing seasons, changes in storm frequency and intensity, air quality, alterations in species' ranges and migration patterns, earlier snowmelt, increased drought, and altered river flow volumes. Impacts from these changes are regionally diverse, and affect numerous sectors related to water, energy, transportation, forestry, tourism, fisheries, agriculture, and human health.

These changes already have profound implications for society, underscoring the need for scientific information to aid decision makers develop and evaluate options that mitigate the human causes of climate change and adapt to foreseeable climate impacts. While the Nation has made significant progress in understanding climate change and variability, more work is needed to identify causes and effects of these changes, produce accurate predictions, identify risks and vulnerabilities, and inform decision making. No single organization can accomplish these tasks alone. NOAA will advance this long-term goal of climate adaptation and mitigation as it builds upon a strong scientific foundation and decades of engagement with interagency, academic, and private sector partners.

NOAA is a national leader on the Intergovernmental Panel on Climate Change and, at the Federal level works with the Interagency Climate Change Adaptation Task Force and the U.S. Global Change Research Program. Recipients of NOAA's climate science and services include the Environmental Protection Agency and Agencies within the U.S. Departments of Energy, State, Agriculture, Transportation, Interior, Health and Human Services, Homeland Security, and Defense. NOAA also partners with the National Aeronautics and Space Administration to develop satellite technology that detects climate trends. Sustained partnerships among Federal Agencies, international, State, local and tribal governments, academia, non-governmental organizations, and the private sector are required to meet the objectives of this goal.

## objectives

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**Improved scientific understanding of the changing climate system and its impacts**

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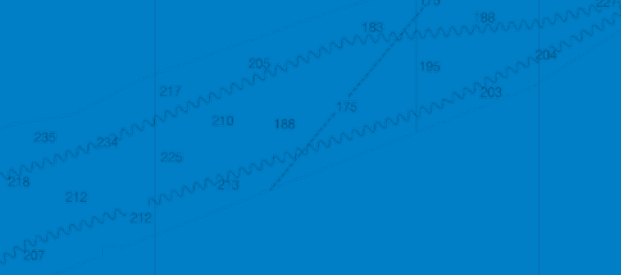
**Assessments of current and future states of the climate system that identify potential impacts and inform science, service, and stewardship decisions**

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**Mitigation and adaptation choices supported by sustained, reliable, and timely climate services**

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**A climate-literate public that understands its vulnerabilities to a changing climate and makes informed decisions**





# long-term WEATHER-READY NATION

## Society is prepared for and responds to weather-related events

A weather-ready nation is a society that is able to prepare for and respond to environmental events that affect safety, health, the environment, economy, and homeland security. Urbanization and a growing population increasingly put people and businesses at greater risk to the impacts of weather, water, and climate-related hazards. NOAA's capacity to provide relevant information can help create a society that is more adaptive to its environment; experiences fewer disruptions, dislocation, and injuries; and that operates a more efficient economy.

Over the long-term, climate change may increase the intensity and even the frequency of adverse weather events, which range from drought and floods, to wildfires, heat waves, storms, and hurricanes. Changing weather, water, and climate conditions affect the economic vitality of communities and commercial industries, including the energy, transportation, and agriculture sectors. Environmental information aligned with user needs will become ever more critical to the safety and well-being of those exposed to sudden or prolonged hazards and is essential to sustain competitive advantage, expand economic growth, and to secure the Nation.

Achieving a weather-ready nation requires the work of NOAA, and the combined efforts of numerous public, private, and academic partners. The dissemination, communication, and validation of NOAA forecasts and warnings depend on the media, the emergency management community, and the U.S. weather and climate industry. NOAA views this diverse and growing industry of companies, media outlets, and others that create weather programming, provide consulting services, and deliver information to American society as a key strategic partner, which provides valuable services to many businesses while also being an important economic sector in its own right.

## objectives

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**Reduced loss of life, property, and disruption from high-impact events**

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**Improved freshwater resource management**

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**Improved transportation efficiency and safety**

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**Healthy people and communities due to improved air and water quality services**

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**A more productive and efficient economy through environmental information relevant to key sectors of the U.S. economy**

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# long-term HEALTHY OCEANS

## Marine fisheries, habitats, and biodiversity sustained within healthy and productive ecosystems

Ocean ecosystems provide many benefits to humans. Yet our marine, coastal, and Great Lakes environments are already stressed by human uses. Habitat changes have depleted fish and shellfish stocks, put more species at-risk, and reduced biodiversity. As long-term environmental, climate, and population trends continue, global demands for seafood and energy, recreational use of aquatic environments, and other pressures on habitats and over-exploited species will increase. Depleted fish stocks and declines in iconic species (such as killer whales, salmon, and sea turtles) result in lost opportunities for employment, economic growth, and recreation along the coasts. In addition, climate change impacts to the ocean, including sea level rise, acidification, and warming, will alter habitats and the relative abundance and distribution of species. Climate change poses serious risks to coastal and marine ecosystems productivity, which, in turn, affects recreational, economic, and conservation activities.

A strong understanding of ocean, estuarine and related ecosystems—and the species that inhabit them—supports NOAA's approach to management, and accounts for the complex connections among organisms (including humans); their physical, biotic, cultural, and economic environments; and the wide range of processes that control their dynamics. An ecosystem-based approach will assist policy makers to weigh trade-offs between alternative courses of action. By working toward the long-term sustainability of all species, NOAA will also help ensure for present and future generations that seafood is a safe, reliable, and affordable food source; that seafood harvest and production, recreational fishing opportunities, and non-consumptive uses of living marine resources continue to support vibrant coastal communities and economies; and that species of cultural and economic value can flourish.

Achieving healthy and sustainable ocean ecosystems will require strong coordination and integration across NOAA and with Federal, State, local, and tribal stakeholders. Collaboration with academic institutions, non-governmental organizations, Federal agencies, and NOAA's operational and research programs will help to provide the scientific foundation for ocean resource management decisions and strengthen ecosystem science.

## objectives

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**Improved understanding of ecosystems to inform resource management decisions**

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**Recovered and healthy marine and coastal species**

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**Healthy habitats that sustain resilient and thriving marine resources and communities**

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**Sustainable fisheries and safe seafood for healthy populations and vibrant communities**



# long-term

## RESILIENT COASTAL COMMUNITIES AND ECONOMIES

### Coastal and Great Lakes communities are environmentally and economically sustainable

The complex interdependence of ecosystems and economies will grow with increasing uses of land, marine, and coastal resources, resulting in particularly heavy economic and environmental pressures on the Nation's coastal communities. Continued growth in coastal populations, economic expansion, and global trade will further increase the need for safe and efficient maritime transportation. Similarly, the Nation's profound need for conventional and alternative energy presents many economic opportunities, but will also result in greater competition for ocean space, challenging our ability to make informed decisions that balance conflicting demands as well as economic and environmental considerations. At the same time, the interdependence of ecosystems and economies makes coastal and Great Lakes communities increasingly vulnerable to chronic—and potentially catastrophic—impacts of natural and human-induced hazards, including climate change, oil spills, harmful algal blooms and pathogen outbreaks, and severe weather hazards.

NOAA envisions invigorated coastal communities and economies, with increased resiliency and productivity. Comprehensive planning will help protect coastal communities and resources from the impacts of hazards and land-based pollution to vulnerable ecosystems by addressing competing uses, improving water quality, and fostering integrated management for sustainable uses. Geospatial services will support communities, navigation, and economic efficiency with accurate, useful characterizations, charts and maps, assessments, tools, and methods. Coastal decision makers will have the capacity to adaptively manage coastal communities and ecosystems with the best natural and social science available.

Resilient coastal communities and economies cannot be achieved without strong partnerships. NOAA will build on existing strategic partnerships in our coastal communities with other Federal Agencies (such as the U.S. Coast Guard) to help provide services to adapt to coastal hazards and provide safe conditions in the Arctic, the DOI to conserve and manage special marine and coastal places, and the EPA and USDA to improve coastal water quality and encourage smart growth. Comprehensive ocean and coastal planning also will require an unprecedented level of engagement and collaboration with state, local and tribal partners, as well as a wide range of stakeholders in the private and academic sectors.

## objectives

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**Resilient coastal communities that can adapt to the impacts of hazards and climate change**

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**Comprehensive ocean and coastal planning and management**

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**Safe, efficient and environmentally sound marine transportation**

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**Improved coastal water quality supporting human health and coastal ecosystem services**

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**Safe, environmentally sound Arctic access and resource management**



NOAA'S

# enterprise-wide capabilities



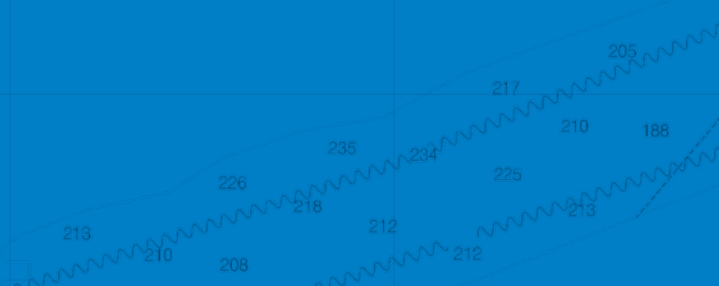


NOAA's strategy would be incomplete without detailing the enterprise-wide capabilities that will be required to achieve the environmental, social, and economic outcomes targeted by NOAA's strategic goals. NOAA's enterprise-wide capabilities consist of three groups:

- **Science and technology**—NOAA's vision centers on a holistic understanding of the interdependencies between human health and prosperity, and the intricacies of the Earth system. Achieving this level of understanding presents an overarching, long-term scientific and technical challenge to NOAA: *to develop and apply holistic, integrated Earth system approaches to understand the processes that connect changes in the atmosphere, ocean, space, land surface, and cryosphere with ecosystems, organisms, and humans over different scales.*
- **Engagement**—The best way for NOAA to meet the increasingly complex needs of its stakeholders is often to deliver data and knowledge to those who have not yet accessed it. NOAA must understand these needs at all levels—within the U.S. and abroad—and respond to them. Conversely, NOAA's next breakthrough in research, development, operational improvement, or policy action may depend on the unique knowledge or needs of a partner or customer.
- **Organization and administration**—NOAA's managers, at headquarters and in the field, have common responsibilities to manage the investment of taxpayer dollars, deploy physical infrastructure, and retain a qualified workforce. NOAA's managerial efforts provide the rest of the Agency with the staff, the infrastructure, and the financial capital needed to get the job done. Effective management of these resources fosters an organizational environment in which core competencies are used most effectively and final products and services have the greatest impact.

These capabilities represent cross-cutting requirements that support NOAA's strategic goals as a whole.





## enterprise-wide

# SCIENCE AND TECHNOLOGY

Over the long-term, drawing upon its world-class research, observation, and modeling capabilities, NOAA is uniquely positioned to:

- Acquire and incorporate knowledge of human behavior to enhance understanding of the interaction between human activities and the Earth system.
- Understand and quantify the interactions between atmospheric composition and climate variations and change.
- Understand and characterize the role of the oceans in climate change, and variability and the effects of climate change on the ocean and coasts.
- Assess and understand the roles of ecosystem processes and biodiversity in sustaining ecosystem services.
- Improve understanding and predictions of the water cycle from global to local scales.
- Develop and evaluate approaches to substantially reduce environmental degradation.
- Sustain and enhance atmosphere-ocean-land-biology and human observing systems.
- Characterize the uncertainties associated with scientific information.
- Communicate scientific information and its associated uncertainties accurately and effectively to policy makers, the media, and the public at large.

To address this long-term challenge and meet the near-term science requirements within and across its strategic goals, NOAA must simultaneously pursue three objectives within its core scientific and technical enterprise: a holistic understanding of the Earth system, accurate and reliable data from sustained and integrated Earth observing systems, and an integrated environmental modeling framework.

## objectives

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**A holistic understanding of the Earth system through research**

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**Accurate and reliable data from sustained and integrated Earth observing systems**

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**An integrated environmental modeling system**



# enterprise-wide ENGAGEMENT capability

Achieving NOAA's goals involves garnering support from domestic and international partners through engagement.

NOAA's capacity to engage individuals and other organizations effectively will determine its long-term success. It is not sufficient for NOAA to conduct, fund, and direct science. NOAA must be aware of science conducted, funded, and directed by others and must integrate and convert that scientific information into applications used within the Agency, and accepted and recognized by the scientific community world-wide, then harness its stewardship responsibilities by meeting society's broader needs for more information. Scientists must solicit management needs as early as possible in the design of research with a constant eye toward management's potential use of research results. Scientists must engage with their peers, but also with colleagues around the world, in other disciplines, and with the public at large. Managers of NOAA's environmental data and information services must engage with decision makers in local governments and industries. Regulators must engage with communities they regulate, as well as with their regulatory counterparts in other nations. NOAA must also engage with constituents, educators, and communicators to share knowledge and information.

## objectives

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**An engaged and educated public with an improved capacity to make scientifically informed environmental decisions**

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**Integrated services meeting the evolving demands of regional stakeholders**

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**Full and effective use of international partnerships and policy leadership to achieve NOAA's mission objectives**





# enterprise-wide ORGANIZATION AND ADMINISTRATION

# capability

At the heart of NOAA operations is the creative work of scientists, engineers, technicians, managers, NOAA Corps Officers, and administrative staff. Only by investing in this stock of intellectual capital can NOAA achieve its strategic goals to provide the public with scientific knowledge, information services, incident response, and environmental stewardship capabilities.

NOAA's mission also requires a transformed, agile, service-oriented, and secure IT infrastructure to propel its scientific and operational goals with advanced computing capabilities. World-class delivery of reliable and scalable IT services is essential to meet growing demands and to process and disseminate ever-increasing volumes and types of environmental information efficiently.

NOAA's research, operations, and management functions are conducted in specialized facilities located across the Nation and internationally. From highly-specialized laboratories to state-of-the-art data and computing centers, from satellite operations to energy-efficient offices, NOAA must ensure its facilities provide modern, sustainable, and safe environments to fulfill its mission successfully and to attract and retain a high-performance workforce.

NOAA's unique mission is particularly resource intensive, requiring diverse investments in land, structures, satellites, ships, aircraft, unmanned systems, sensors, equipment, software, and IT. In addition to its physical infrastructure, a large part of NOAA's mission requires investing in the capabilities of its partners through grants, cooperative agreements, and contracts. Successfully managing these systems and partnerships to operate efficiently and effectively over their entire life cycle requires a long-term perspective.

## objectives

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**Diverse and constantly evolving capabilities in NOAA's workforce**

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**A modern IT infrastructure for a scientific enterprise**

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**Modern, safe, and sustainable facilities**

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**A high-performing organization with integrated, efficient, and effective business systems and management processes**

# NOAA'S

# strategy

## execution and evaluation

The Next Generation Strategic Plan identifies what NOAA should produce in the future (i.e., outputs), and why those outputs are important (i.e., outcomes). Distinguishing between outputs and outcomes gives NOAA the flexibility to evolve while staying true to its ultimate mission and vision. The Plan will facilitate:

- Well-reasoned, transparent decision-making and investment choices based on priorities,
- Alignment of requirements for resources with requirements for products and services,
- Monitoring the effectiveness of outputs in contributing to societal outcomes, and
- Common understanding of roles, responsibilities, and the meaning of "success."

NOAA will systematically monitor and evaluate its performance toward the outcome-oriented goals and objectives in the Plan. Evaluating performance will allow NOAA to learn from its successes and failures, improve continually as an organization, and deliver better on the promise of its mission of science, service, and stewardship. NOAA's performance measures, including those required under the Government Performance and Results Act, are published annually in the NOAA Annual Performance Plan and Performance Accountability Report.

NOAA's Next Generation Strategic Plan supports the U.S Department of Commerce (DoC) Strategic Plan and Annual Performance Plan. A direct relationship between NOAA's goals, objectives and performance measures is included in the annual budget submission to DoC. DoC uses this information for its Annual Performance Plan and Performance and Accountability Report, which integrate outcomes and performance measures across the Department.

For further information on the analyses used in developing the Plan, including NOAA's *Scenarios for 2035 and the results of NOAA's extensive stakeholder consultations*, please visit: [www.noaa.gov/ngsp](http://www.noaa.gov/ngsp).







# acknowledgements

NOAA's Next Generation Strategic Plan emerged from extensive consultations with NOAA employees and our stakeholders. NOAA acknowledges the valuable input that staff and stakeholders provided in public forums and online. We also thank NOAA's Federal Advisory Committees and our partners in numerous trade associations for their input and feedback on early drafts of the Plan. And we thank the representatives from NOAA Line and Staff Offices who served on the Scenario Team, Plan Steering Committee, Working Group, and Communications Team.

## RESILIENCE IN THE FACE OF CHANGE

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