

STRATEGIC PLAN

2015-2019

People, businesses and the environment thriving in the face of climate impacts



CLIMATE PROGRAM OFFICE

Advancing scientific understanding, monitoring, and prediction of climate and its impacts to enable effective decisions



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2015-2019 STRATEGIC PLAN

LAST MODIFIED JUNE 26, 2014

INTRODUCTION

Recent losses from extreme weather events and phenomena like drought demonstrate the nation's increasing vulnerability to changing environmental conditions. Public concern about such risks is growing and with it the need for options to make the nation more resilient in the face of environmental challenges. To reduce risks associated with climate variability and change, or to take advantage of possible benefits that may arise from a changing climate, the nation needs unbiased, authoritative and timely information from a trusted source. Supporting programs that enable NOAA to develop and provide that information underlie the mission of the Climate Program Office (CPO).

The National Oceanic and Atmospheric Administration (NOAA) is a leading provider of weather, water, and climate information to the nation and the world. The Climate Program Office sits at the center of the agency's climate science portfolio. Situated within NOAA's Office of Oceanic and Atmospheric Research, the Climate Program Office manages programs that advance observations, process understanding, modeling, prediction, and decision support.

This Strategic Plan speaks to that full range of responsibilities. The Climate Program Office's mission *to advance scientific understanding, monitoring, and prediction of climate and its impacts to enable effective decisions* focuses on our commitment to sustain and grow the fundamental, core capabilities that have long been the hallmark of NOAA's climate science. CPO also works to ensure its science helps citizens, businesses, and governments make smart choices, and to that end, this Plan describes how NOAA's fundamental capabilities will be used to address critical Societal Challenges facing the nation: weather and climate extremes; climate impacts on water resources; coasts and climate resilience; and sustainability of marine ecosystems.

Our Plan describes a truly integrated, end-to-end approach that builds climate information, literacy, and regional capacity for resilience – thereby informing a society that must cope with the impacts of a changing climate. From fundamental observations, foundational research, modeling, and predictions through delivering decision support tools and information in ways that allow decision makers and the public to act, the Plan highlights the objectives the Climate Program Office will pursue over the next five years.

Collaboration with our partners across NOAA and elsewhere in government, academia, the private sector, and internationally is an essential element of this Plan, as is the development of effective and efficient business practices, both within the Office and in working with our partners. Finally, the Plan recognizes that we must enhance and sustain a highly skilled and competent workforce prepared to deal with changing needs and conditions. Together, the goals and objectives described herein are intended to achieve our vision of *people, businesses, and the environment thriving in the face of climate impacts*.

MISSION

WHY WE EXIST

We advance scientific understanding, monitoring, and prediction of climate and its impacts to enable effective decisions.

VISION

WHAT WE HOPE TO ACHIEVE

People, businesses and the environment thriving in the face of climate impacts.

CPO'S VALUE PROPOSITION

WHAT WE ARE UNIQUELY POSITIONED TO DO IN THE MARKETPLACE

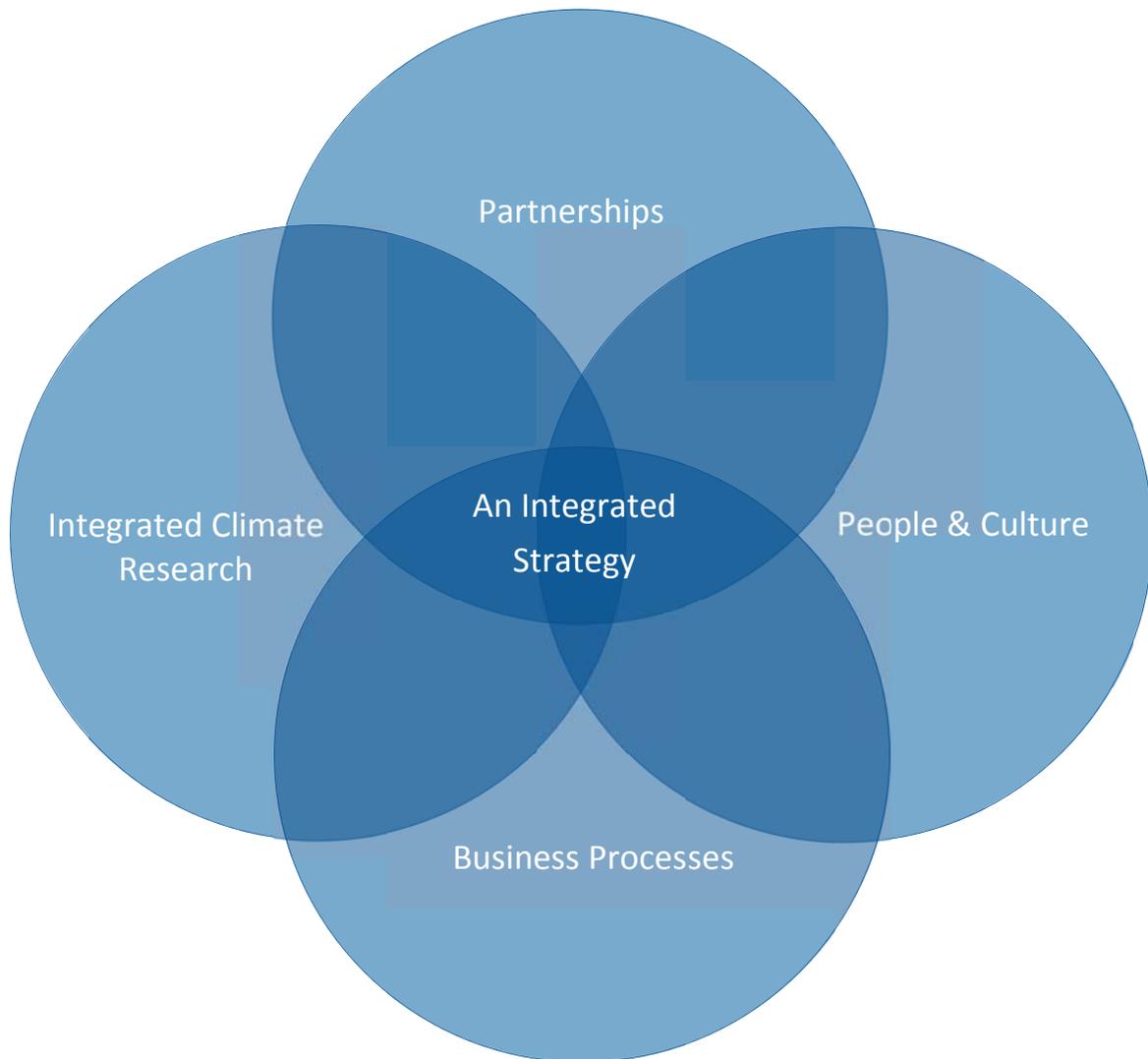
CPO's position at the intersection of NOAA's science and service missions, the climate research community, and the broader climate enterprise enables it to lead a research agenda and forge partnerships that enhance society's ability to make effective decisions.

IMPERATIVES FOR SUCCESS

IN ORDER FOR CPO'S STRATEGIC PLAN TO BE SUCCESSFUL, ALL OF THE FOLLOWING IMPERATIVE STATEMENTS MUST BE TRUE...

- We sustain an end-to-end integrated program that monitors our changing climate, conducts cutting-edge mission-oriented climate science and related societal research, and purposefully transitions relevant expertise, data, tools, and model outputs into operational and applications-oriented projects for societal benefit.
- We build and sustain partnerships that are committed to managing and maintaining robust observing, monitoring, modeling, prediction, decision-support, and high performance computing systems.
- Our leadership is fully supportive of CPO serving as the integrating focal point for climate science and services across and beyond NOAA.
- We hire, train, and sustain a very high quality, success-oriented workforce with expertise aligned to meet our mission needs.
- We design and implement adaptive and transparent business and management practices for integrated program planning and implementation, partnerships, grants management, and staff advancement.
- Our partners across and beyond NOAA share and invest in CPO's goals and objectives because, likewise, we share and invest in theirs.

CPO STRATEGIC GOALS FRAMEWORK



GOALS

1.0 PARTNERSHIPS

Promote partnerships that build on mutual strengths and interests, and advance the value and impact of CPO work.

2.0 INTEGRATED CLIMATE RESEARCH

Achieve a fully integrated research program to advance scientific understanding, monitoring, modeling and prediction of climate and its impacts to enable effective decisions.

3.0 PEOPLE & CULTURE

Empower people and their role in the organization to sustain a highly skilled and competent workforce prepared to deal with changing needs and conditions.

4.0 BUSINESS PROCESSES

Adapt CPO's infrastructure, management practices, and business processes to sustain high performing and responsive programs, products, and services.

1.0 PARTNERSHIPS

Promote partnerships that build on mutual strengths and interests, and advance the value and impact of CPO work.

CPO understands that efforts to build resilience in the face of a changing climate will best be achieved by building on the many capabilities and strengths and mutual interests of partners. Goal 1 defines strategies for targeted collaboration with partners across NOAA, and with other federal agencies, academia, congress, state and local governments, the private sector, the international community, non-governmental organizations, and professional societies. CPO recognizes that working with partners around common goals and objectives is the best strategy for achieving its ultimate vision of “People, businesses and the environment thriving in the face of climate impacts”. CPO will pursue the following strategic objectives to advance its partnerships:

PARTNERS

- OAR Programs & Laboratories
- NOAA Line Offices
- Other Federal Agencies
- Academia
- State and Local Governments
- Private Sector
- International Organizations
- Non-Governmental Organizations
- Professional Societies

- 1.1 Build, sustain and adapt a diverse and balanced portfolio of partnerships to advance CPO’s integrated climate research agenda.
- 1.2 Implement responsive and impactful mechanisms for partner coordination and communications.
- 1.3 Sustain investment and commitment to execution across the NOAA Climate Goal.
- 1.4 Build awareness for CPO and NOAA Climate Goal capabilities at the highest levels of the Department of Commerce (DOC) and NOAA.
- 1.5 Collaborate with other federal agencies, including through multiagency mechanisms (e.g. U.S. Global Change Research Program (USGCRP)) to maximize the return on Federal investment in the U.S. climate research enterprise.
- 1.6 Enhance NOAA - academia collaboration and research to advance the CPO integrated climate research mission, including the Societal Challenge activities and foundational capabilities.
- 1.7 Support NOAA - academia partnerships through the Postdocs Applying Climate Expertise (PACE) and NOAA Climate and Global Change (C&GC) Postdoctoral Fellowship Programs.
- 1.8 Foster high-profile partnerships to address national, regional, state, and municipal needs.
- 1.9 Pursue public - private partnerships to promote resilience of businesses and communities in the face of climate challenges.
- 1.10 Engage the international research and development community to identify common goals, support research and observing activities, increase capabilities, and encourage productive international climate research endeavors that address NOAA’s goals.

1.11 Capitalize on capabilities of Non-Governmental Organizations (NGOs) to enhance regional observing and integration into a global observing system.

1.12 Leverage professional societies for defining climate research needs and conducting outreach at national and regional levels.

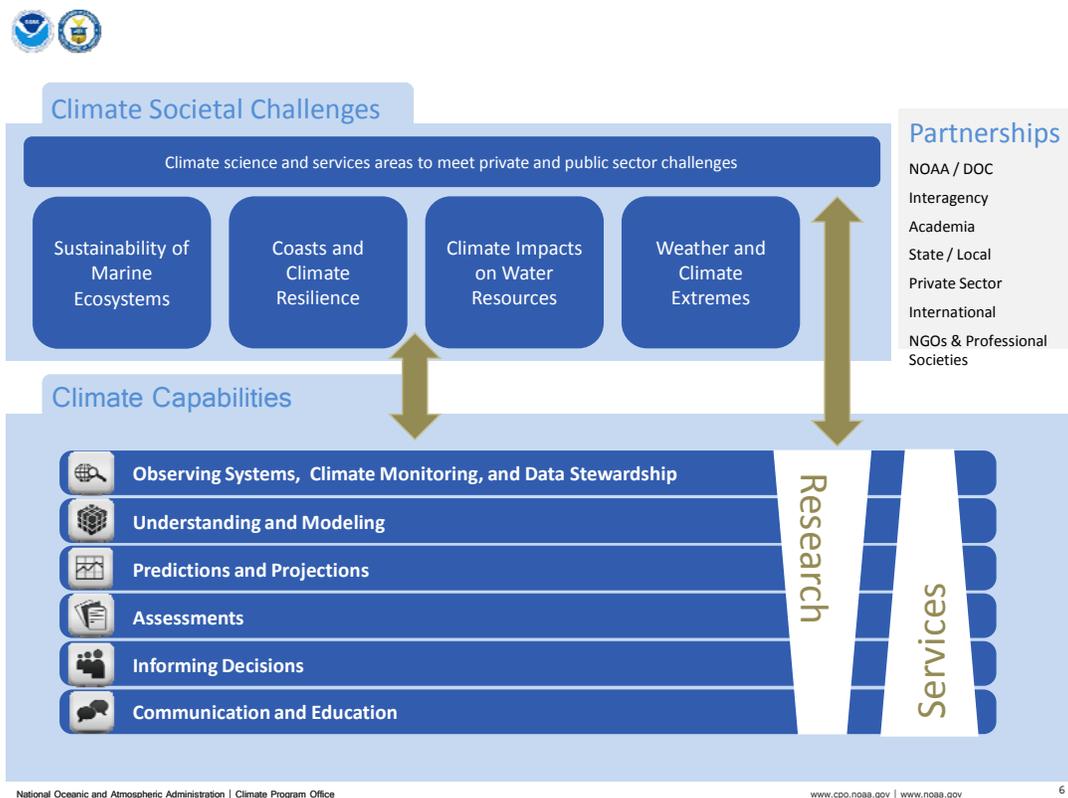
1.13 Work with NGOs, citizens groups and civil society to engage a broader spectrum of the U.S. public to strengthen local climate and climate impacts monitoring and observations.

2.0 INTEGRATED CLIMATE RESEARCH

Achieve a fully integrated research program to advance scientific understanding, monitoring, modeling, and prediction of climate and its impacts to enable effective decisions.

NOAA recognizes the urgent and growing need for reliable, trusted, transparent, and timely climate information across all sectors of our economy and to address the needs of a sustainable society. In response, NOAA is focused on advancing progress on its foundational climate capabilities and on select critical climate Societal Challenge areas (see figure below):

- Weather and Climate Extremes
- Climate Impacts on Water Resources
- Coasts and Climate Resilience
- Sustainability of Marine Ecosystems



In order to make progress in these areas, NOAA draws on foundational capabilities developed over the past decades, including global observing systems, climate monitoring, foundational research that advances understanding and modeling, predictions and projections of the future climate state, impacts assessments, and development of services for decision support. It is essential that these mission-focused capabilities be integrated across CPO and with partners to ensure research, transitions, operations and applications components are effectively linked end-to-end to address these galvanizing needs of high societal relevance. The short bi-directional arrow on the schematic above depicts these relationships.

Although the CPO strategy emphasizes key Societal Challenges above, it is also important to stress that NOAA and CPO help inform decisions about public and private sector challenges through the provision of foundational information, including global observations, and predictions and projections of the future climate state. The long bi-directional arrow on the schematic above depicts these relationships. The strategic objectives that CPO will pursue to advance these foundational capabilities are discussed starting on page 11.

The CPO Integrated Climate Research strategy is designed to both advance NOAA's foundational capabilities as well as to accelerate and maximize NOAA contributions toward select critical Societal Challenge areas. CPO will continue to improve foundational capabilities to understand, monitor, model, and predict climate and its impacts, motivated by a range of policy, economic, and sustainability needs. Additionally, CPO will continue to support decision-support research that explores and develops capabilities for potential new and relevant societal challenges. New Societal Challenge areas will be targeted as they emerge from these foundational research activities and in response to demand.

The first portion of Goal 2 is focused on the Societal Challenges and the aspects of the foundational capabilities that contribute to their success. The latter portion of Goal 2 is focused on aspects of the individual foundational capabilities that build on NOAA's strengths. All of the activities below emphasize CPO contributions to their development and success.

ADDRESSING CRITICAL SOCIETAL CHALLENGES

The Challenges will integrate knowledge development, including scientific assessments and decision support tools, capacity development and coordination among a network of NOAA constituents and partners. Critical to meeting societal goals is a sustained set of foundational capabilities in research, observations and prediction. Network-based collaborative approaches to innovation and problem-solving have been evident in the successful public and private arenas. CPO has robust examples on which to build. The Societal Challenges will enable and sustain a collaborative framework between research and management in four initial, key areas. CPO will advance climate science and services to meet the Societal Challenges by drawing on NOAA's foundational capabilities and by supporting partnerships that build on mutual strengths and interests, and advance the value and impact of CPO work. CPO will pursue the following strategic objectives to advance the Societal Challenges:

Weather & Climate Extremes

- 2.1 Support development of 3 prototype monitoring and early warning information systems for heat waves, extreme precipitation and floods by 2019.
 - 2.1.1 Develop and implement plans for the end-to-end systems, including research, transition, design, delivery, operations, and evaluation.
 - 2.1.2 Enhance access to current state of knowledge on heat waves, extreme precipitation and floods.
- 2.2 Support development of integrated information systems for extremes.

- 2.2.1 Provide decision makers with heat early warnings to week three, and robust data sets for trend analysis.
 - 2.2.2 Support the use of NOAA data and information on extremes in climate adaptation decision making at the local and regional scales, while advancing best practices for connecting science and services on extremes.
 - 2.2.3 Focus research efforts on strategies for coping with and building sector-based community resilience for the impacts of climate change and extreme events.
- 2.3 Monitor, advance understanding and improve predictions of extremes in support of the prototype early warning systems.
- 2.3.1 Advance understanding of how key physical processes influence extreme event frequency and intensity, such as the effects of declining sea ice on extra-tropical extremes, and the effects of ENSO on heat waves, extreme precipitation and floods.
 - 2.3.2 Identify new sources of predictability for extremes on sub-seasonal, seasonal and decadal time scales.
 - 2.3.3 Identify the extent to which extreme heat and extreme precipitation events are non-stationary in climate change projections, and promote the use of this information by decision makers in assessing and responding to future risk.
 - 2.3.4 Support the development of high-resolution coupled models that accurately represent the characteristics of extremes.
 - 2.3.5 Establish reliable estimates of confidence, ensuring access to partners for use in and understanding of weather and climate extremes.
 - 2.3.6 Enhance the representation of uncertainty in the prediction of extremes via multi-model systems.

Climate Impacts on Water Resources

- 2.4 Identify, characterize, develop and support delivery of climate-related data and information needed to maintain stewardship in the management of water resources and water infrastructure.
- 2.4.1 Improve coordination for prioritizing and advancing monitoring, forecasts and impacts assessments of surface and groundwater interactions to inform drought and flood risk management from watersheds to coast.
 - 2.4.2 Advance current drought prediction capabilities.
 - 2.4.3 Enhance the suite of drought information available to North America and the World and the number of partnerships in early warning information system development.
- 2.5 Develop integrated information systems for water resources.
- 2.5.1 Enhance capacity and coordination to inform and manage the Nation’s water resources and attendant hazards in a changing climate.
 - 2.5.2 Develop improved approaches for and guidance on watershed and habitat restoration to mitigate impacts of drought and floods.
 - 2.5.3 Increase the number of new national and international partnerships in early warning information system development.
 - 2.5.4 Understand and communicate the importance of the impacts of drought and floods on the US economy and environment.
- 2.6 Monitor, advance understanding and improve predictions for water resources.
- 2.6.1 Advance understanding to anticipate the changes in runoff, timing, and availability of water resources.

- 2.6.2 Further the understanding of climate-induced changes in droughts and extremes and their impacts.
 - 2.6.3 Develop and implement improved methods for data assimilation using ensemble forecasts and hybrid variational methods to predict extreme precipitation events across climate timescales.
 - 2.6.4 Advance water resource predictions and projections based on improved models and process-level understanding of uncertainties.
- 2.7 Build regional capacity for people, business and communities to prepare and adapt to variations and changes in drought and water resources.
- 2.7.1 Improve the national and regional drought information framework by transferring successful approaches (information development, products, capacity, and coordination) to areas not yet having active early warning systems.
 - 2.7.2 Develop guidance and standards with the private sector and others for developing value-added drought and flood-related products to support disaster risk reduction.
 - 2.7.3 Fully develop and implement interagency coordination, services, and collaboration agreements sourced from key external partners. These will include existing links to the Western Governors Association, U.S. Department of Agriculture, Tribes and others.
 - 2.7.4 Draw on lessons from extension and other service models to improve drought and water knowledge, products, information and use.

Coasts & Climate Resilience

- 2.8 Support the development of an experimental prediction system for local to regional predictions of total water level from all sources of coastal inundation to provide high-resolution, local, scalable, integrated and interdisciplinary data, models and information.
- 2.9 Develop integrated information systems to support climate resilient coasts.
- 2.9.1 Sustain and enhance coastal climate extension, regional assessment, and a system of indicators of climate impacts on ocean and coastal resources.
 - 2.9.2 Advance regional summaries of coastal inundation and sea-level-rise data, products and information.
 - 2.9.3 Advance assessments of coastal inundation risk.
 - 2.9.4 Broaden understanding of climate and coastal inundation-related hazards vulnerability, and synopses of the current state of knowledge.
 - 2.9.5 Support development of improvements in the visualization of potential impacts from coastal inundation across time scales.
- 2.10 Observe, monitor, advance understanding and improve predictions for climate resilient coasts.
- 2.10.1 Advance the understanding of the physical causes and modeling of processes that determine sea-level variability and change at the regional level.
 - 2.10.2 Advance prediction systems that capture sea-level variability and change at the regional level.
 - 2.10.3 Advance the development of sea-level rise projections based on improved models and process-level understanding of uncertainties.

Sustainability of Marine Ecosystems

- 2.11 Support climate resilient marine resources and resource-dependent communities.
- 2.11.1 Support assessments of past climate, ocean and marine resource conditions at regional scales.

- 2.11.2 Support development and tracking of core indicators of climate impacts in marine ecosystems.
 - 2.11.3 Advance seasonal to decadal predictions of regional climate effects on ocean conditions and marine resources.
 - 2.11.4 Increase understanding of current and future impacts of climate variability and change on marine ecosystems and fisheries.
- 2.12 Develop integrated information systems to support marine ecosystems.
- 2.12.1 Support integration and use of climate-related information, tools and services in management of marine resources.
 - 2.12.2 Improve understanding of marine resource manager needs for climate information.
- 2.13 Observe, monitor, advance understanding and improve predictions for marine ecosystems.
- 2.13.1 Strengthen and test climate-related vulnerability assessments of marine ecosystems with NOAA partners.
 - 2.13.2 Support efforts to understand and project the impacts of climate variability and change on specific marine resources and resource-dependent users at regional scales.
 - 2.13.3 Advance the representation of ocean biogeochemical cycles in models.
 - 2.13.4 Advance data assimilation of biogeochemical data to support ecosystem monitoring.
 - 2.13.5 Explore marine ecosystem prediction based on state-of-the-art climate predictions system such as the National-Multi-Model Ensemble.
 - 2.13.6 Explore long-term projections of marine ecosystems based on Earth system model projections.
 - 2.13.7 Form collaborative partnerships between global and regional observations and monitoring efforts and scientists focused on climate and ecosystems.

FOUNDATIONAL CAPABILITIES

CPO will pursue the following strategic objectives to advance the Foundational Capabilities:

Observing Systems, Climate Monitoring, and Data Stewardship

- 2.14 Evolve the ocean, atmosphere, land, Arctic and relevant biogeochemistry and biological observing systems.
 - 2.14.1 Sustain critical observing system elements according to NOAA needs and international requirements.
 - 2.14.2 Evolve the requirements for the current climate observing system to be responsive to new needs of research, forecasting, assessments, and Societal Challenges.
 - 2.14.3 Adapt the sustained observing capabilities to comply with new requirements, including those for earth system modeling and prediction.
 - 2.14.4 Develop, and begin implementation of, climate observational technology advances that will improve efficiencies, timeliness, and reduce reliance on infrastructure (e.g. ships).
 - 2.14.5 Maximize synergies between sustained observing activities and future climate field campaigns.
- 2.15 Develop and apply observing system evaluation capabilities in the context of analyses, models, model validation, forecast centers, and research endeavors.
- 2.16 Promote international integration and delivery of climate data.

- 2.17 Develop synergies between in situ and remote sensing communities for critical satellite calibration/validation work, product and information development, and updating requirements of the in situ observing system.
- 2.18 Establish and expand new long time-series baseline indicators of climate variability and change.
- 2.19 Deliver products describing the state of the climate, including those in support of reanalyses, and develop new products describing climate variability and change, and rapid transitions and thresholds.

Understanding and Modeling

Earth System Science

- 2.20 Improve understanding and modeling of key processes and phenomena in Earth's coupled climate system.
 - 2.20.1 Gain a better understanding of key processes and phenomena in support of NOAA climate and Earth system models.
 - 2.20.2 Advance understanding of the roles of natural variability and changing radiative forcing that lead to observed subseasonal-to-multidecadal scale changes in climate.
 - 2.20.3 Advance understanding of climate-induced changes and variability in tropical and extratropical cyclones and their associated impacts.
 - 2.20.4 Improve the understanding of process interactions leading to extremes.
 - 2.20.5 Advance the understanding of coupled modes of variability and predictability on intraseasonal to decadal timescales in support of prediction.
 - 2.20.6 Develop an improved understanding of teleconnections in the climate system.
 - 2.20.7 Improve understanding of processes and phenomena regulating sea level variability and change.
 - 2.20.8 Improve understanding of Arctic processes and feedbacks in the global climate system.
- 2.21 Improve understanding of the changing atmospheric composition of long-lived greenhouse gases and short-lived climate pollutants.
 - 2.21.1 Improve understanding of emissions from urban areas, and oil and gas extraction and their effects in different regions of the U.S. on atmospheric chemistry and climate
 - 2.21.2 Improve realism of the nitrogen cycle in NOAA Earth System Models, including major feedbacks on the global carbon cycle.
 - 2.21.3 Support future NOAA field campaigns focused on biomass burning, oil and gas extraction, and nighttime chemical processes.
 - 2.21.4 Reduce the uncertainty of North American CO₂ flux estimates by 1%.
 - 2.21.5 Coordinate and improve composition product development for the National Environmental Satellite, Data, and Information Service Center for Satellite Applications and Research (NESDIS/STAR).
- 2.22 Advance the development of climate and related Earth System Models.
 - 2.22.1 Lead the development of a cross-NOAA strategy for climate and Earth system models for research and applications, including operations, consistent with national strategies.
 - 2.22.2 Support climate and Earth system model intercomparison projects with national and international partners, to advance model development and support science that leverages model output.

- 2.22.3 Enhance the representation of key physical processes in Earth system models - including clouds, the cryosphere and biogeochemical cycles in the ocean and atmosphere - to reduce model biases.
- 2.22.4 Support the development of higher-resolution coupled global models that better represent regional-scale features, including extremes.
- 2.22.5 Support interagency initiatives that enhance the evolution towards a common software infrastructure and increased model interoperability.
- 2.22.6 Develop process-level metrics to assess model performance in support of model development and the use of model data for applications.

Predictions and Projections

- 2.23 Advance climate and Earth system predictions from global to regional scales on sub-seasonal to decadal timescales.
 - 2.23.1 Enhance linkages between the understanding of predictability and the formulation of climate predictions.
 - 2.23.2 Improve the depiction of forecast uncertainties, incorporating those in the forecast initial conditions and model formulation.
 - 2.23.3 Develop a prototype intraseasonal-to-interannual global climate prediction system that builds on the experimental real-time National Multi-Model Ensemble system and incorporates advances in models, forecast initialization and statistical methodologies.
 - 2.23.4 Develop prototype applications of the global climate prediction system.
 - 2.23.5 Explore predictions of Earth system components beyond physical climate.
 - 2.23.6 Advance the development of a prototype decadal climate prediction system.

- 2.24 Advance an integrated Earth system reanalysis capability for research, monitoring and prediction.
 - 2.24.1 Improve the suite of next-generation NOAA climate reanalyses to represent regional-scale features, drought, extremes, Arctic and sea-level.
 - 2.24.2 Advance data assimilation to take advantage of new data types, including physical and biogeochemical observations.
 - 2.24.3 Explore coupled ocean-atmosphere-land data assimilation techniques for an integrated Earth system analysis.

- 2.25 Infuse modeling and prediction research advances into NOAA's products, services and operational systems.
 - 2.25.1 Enhance coordination with NOAA partners to accelerate the transition of research advances in climate and Earth system models and prediction methodologies into operations
 - 2.25.2 Evaluate the readiness of research advances in climate and Earth system models and prediction methodologies for operational implementation according to agreed protocols.

- 2.26 Advance climate and Earth system centennial projections from global to regional scales.
 - 2.26.1 Improve the understanding of climate and Earth system global projections and associated uncertainties.
 - 2.26.2 Support the development of regional-scale projections for drought, extremes, sea-ice, sea-level, coastal and marine ecosystems.

Informing Decisions

Public Communication, Education & Engagement – External

- 2.27 Improve communications and engagements on several policy levels to increase policy leaders', decision makers', and constituents' awareness, understanding, appreciation, and support of NOAA's leading roles in climate science and information services.
 - 2.27.1 Support revision, production, and execution of a more effective communication and engagement strategy.
 - 2.27.2 Support development of communications highlighting relevant climate science results, information services, case studies, and outcomes.
 - 2.27.3 Support the adoption and implementation of Climate Literacy in the Next Generation Science Standards.

- 2.28 Increase target audiences' awareness and understanding of Earth's climate system, climate-related events, and impacts on their lives, businesses, and communities.
 - 2.28.1 Implement an audience-focused framework for outreach and engagement that provides consistent, scalable branding and messaging.
 - 2.28.1.1 Provide timely, data-driven visualizations and scientific explanations about climate-related extreme events for the climate-interested public.
 - 2.28.1.2 Promote the visibility of CPO accomplishments, such as publications in peer-reviewed journals, CPO-sponsored conferences, and major milestones.
 - 2.28.1.3 Expand and enhance our use of social media and citizen science in promoting public climate literacy.

 - 2.28.2 Improve stakeholders' abilities to make informed decisions and to manage their climate-related risks and opportunities.
 - 2.28.2.1 Expand and simplify public access to NOAA's and its partners' climate datasets, data products, and model outputs.
 - 2.28.2.2 Expand and enhance public access to NOAA's and partners' decision-support tools and training resources designed to help planners, policy leaders, businesses, resource managers, and concerned citizens identify and manage climate-related risks and opportunities, and become more resilient to extreme events.
 - 2.28.2.3 Show where and how climate conditions are changing, with interpretation and explanation from subject matter experts.
 - 2.28.2.4 Understand local and regional datasets pertaining to extreme events, with emphasis on defining thresholds for multi-stressor situations and outlooks showing potential for future extremes.
 - 2.28.2.5 Simplify people's ability to find and use climate data.

 - 2.28.3 Develop communication, education, and engagement projects and products designed to advance the public's climate literacy, and to help build a Climate-Smart Nation.
 - 2.28.3.1 Expand and deploy frameworks for vetting, reviewing, and ensuring scientific quality in climate and energy literacy-related education materials.
 - 2.28.3.2 Support the Climate Literacy Campaign using the findings of the National Climate Assessment and other authoritative information.

2.29 Implement durable, widely applicable metrics that allow us to consistently monitor, inter-compare, and report our results (both outputs and outcomes), and take corrective action where evidence indicates a lack of progress.

Public Communication, Education & Engagement - NOAA

2.30 Implement and evolve an inclusive framework for climate communication, education, and engagement (CEE) across CPO and NOAA's Line Offices.

2.30.1 Build awareness of opportunities for synergy and capacity building among relevant personnel across CPO and NOAA.

2.30.2 Synergize the Climate-Smart Nation and Weather-Ready Nation campaigns.

Integrated Information Systems

Lead interdisciplinary research, applications and services development to improve resilience and preparedness in critical socio-economic sectors of the U.S.

This section focuses on the CPO capabilities directed towards developing and sustaining integrated information systems that facilitate effective climate-related decision support in the public and private sector, and with our international partners. An information system is an integrated set of components for collecting, storing, and processing data and for delivering and communicating information, knowledge, and products. Integrated Information Systems, such as the National Integrated Drought Information System (NIDIS), coordinate the sustained, systematic collection, analysis and integration of relevant climate and impacts information about and coming from regions of impending risk that:

(a) Informs the development of strategic responses to anticipate crises and take advantage of opportunities;

(b) Provides capabilities for generating problem-specific risk assessments and scenarios, and

(c) Effectively communicates options to critical actors to inform decision-making, preparedness and adaptation across the weather-climate continuum.

Effective information systems foster the collaboration between the research and management networks to develop scientifically credible and socially robust (in terms of acceptability, usability and benefits) information, tools and options for climate-sensitive communities across the nation, and identify and test innovations across integrated information subsystem components. Effective integrated information systems involve sustained commitments of people and institutions.

CPO will pursue the following strategic objectives to advance Integrated Information Systems:

2.31.1 Assess and analyze the causes, impacts and risks of climate variations on infrastructure and human and natural systems in the U.S. and internationally (through continued support of assessments, stakeholder engagement activities, and comprehensive competitive research opportunities).

2.31.2 Advance understanding of decision-making needs, capacity and use of climate information through social and behavioral research.

2.31.3 Build interdisciplinary knowledge and expertise relevant to NOAA's support of highly influential assessments.

2.31.4 Develop and support participatory processes — such as scenario planning and vulnerability and adaptation assessments — to enhance decision making for climate-resilient communities, economies and ecosystems.

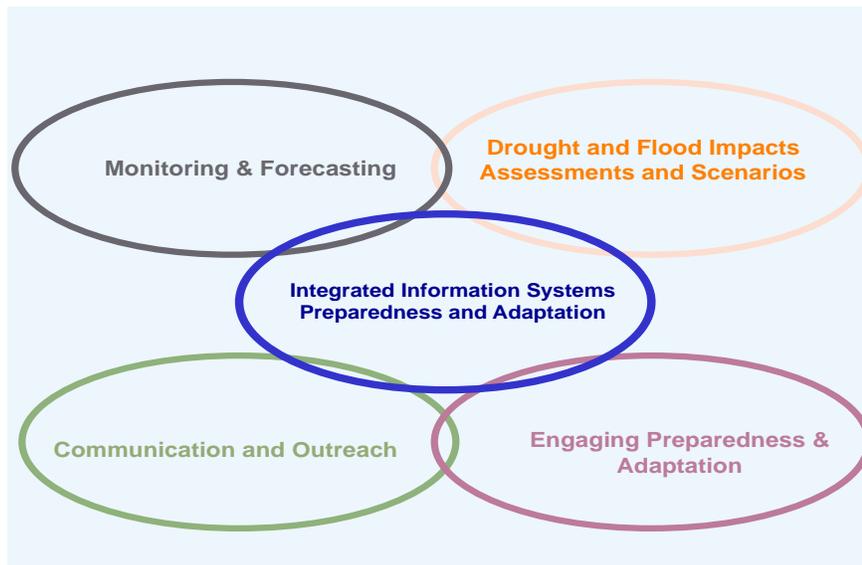
- 2.31.5 Expand relationships with select public and private sector entities (e.g. U.S. Department of Agriculture, Coastal States Organization, U.S. Agency for International Development (USAID), Association of Metropolitan Water Agencies, The World Bank) to raise awareness and use of our research, tools and training opportunities, and update assessments of the needs of practitioners in critical socio-economic sectors.
- 2.31.6 Build public and private sector awareness for and use of social, economic and behavioral research about climate impacts, early warning, preparedness and adaptation.
- 2.31.7 Expand interdisciplinary research teams that engage decision makers to build regional capacity to prepare for and adapt to climate extremes, variability and change.
- 2.31.8 Produce and communicate decision-relevant climate information through model interpretation and synthesis of data, analysis, and observations.
- 2.31.9 Develop experimental tools and resources for decision makers and practitioners that can be incorporated into ongoing services.

The components of integrated information systems build on the basis provided by the foundational capabilities, such as improvements in multi-model ensembles and impacts assessments. In coordination with cross-NOAA science and service capabilities including the Regional Climate Service Directors, the Regional Climate Science Centers, Regional Integrated Sciences and Assessments (RISAs) and NIDIS Early Warning Systems, the Societal Challenges will focus on developing regional integrated information systems that integrate:

- Monitoring and Forecasting
- Risk Assessment and scenario generation
- Education and Public Awareness
- Embedding information in Preparedness and Adaptation

The components advance in parallel to address both near -term and long-term emergent events, trends and regimes shifts in the integrated physical, economic, and social system.

The figure below highlights the components of an integrated information system, with some emphasis on droughts and floods. It should be noted, however, that the integrated information system concept applies to all the Societal Challenges.



3.0 PEOPLE & CULTURE

Empower people and their role in the organization to sustain a highly skilled and competent workforce prepared to deal with changing needs and conditions.

Our people are our greatest asset and the essential component to mission success. Goal 3 focuses on enhancing and sustaining a highly skilled, dedicated and competent workforce adaptive to changing needs and conditions. This requires an organization that supports professional development, provides opportunities for growth, values innovation and agility and understands roles and responsibilities, and engenders trust in management. Training and development are critical dependencies necessary to maintain expertise necessary to deliver on our commitments. Most critically, CPO will develop a culture of openness and provide the governance mechanism for ensuring that the contributions of the staff will be coordinated and integrated in a manner that benefits or rewards all members.

The desired organizational culture embedded in this strategy is focused on collaboration and teamwork as a core operating model, internally, across NOAA, externally and with all of our partners. All staff will be able to communicate a vision for community-led problem solving using CPO's science and services.

CPO will pursue the following strategic objectives to advance its People and Culture:

PEOPLE

3.1 Retain and attract a highly skilled, innovative, diverse and flexible workforce positioned to lead the climate agenda for NOAA and achieve CPO objectives.

Recruitment

- 3.1.1 Develop and implement a strategic staffing approach to align with the CPO strategic plan.
- 3.1.2 Periodically assess competencies against CPO's emerging strategic directions.

Training and Career Development

- 3.1.3 Enhance individual skills and strengths through training and professional development.
- 3.1.4 Evaluate individual professional development pathways across the Climate Program Office.
- 3.1.5 Support flexible work arrangements that allow for development.
- 3.1.6 Invest in the following training and development activities:
 - Management and leadership development
 - Change management
 - Communication, relationship management and customer service
 - Collaboration and teamwork
 - Scientific expertise and leadership
 - Innovation
- 3.1.7 Support individual development planning and training opportunities offered by NOAA and OPM.
- 3.1.8 Support employee career development through participation in national and international scientific panels, steering committees, and research activities.
- 3.1.9 Support employee career development via collaboration and exchange visits with scientific institutions.
- 3.1.10 Promote CPO accomplishments through publications in peer review journals, by convening CPO-specific conference sessions, and via a CPO Annual Report.

Succession Planning and Knowledge Transfer

- 3.2 Ensure the continuity of leadership, expertise and knowledge necessary for sustained scientific leadership.
 - 3.1.1 Develop succession plans for Division level and above.
 - 3.1.2 Formalize the OPM system to transfer knowledge and innovations from long-term employees to new entrants.

CULTURE

Integration, Agility and Teamwork

- 3.2 Streamline the organization structure to foster integration and agility.
 - 3.2.1 Maximize time to perform mission work with increased delegation of roles and responsibilities and reduction of time spent in non-critical meetings.
 - 3.2.2 Foster interactions and dialogue among CPO staff members.
 - 3.2.3 Identify and address impediments to the flow of information between nodes in the office and overcome barriers to CPO working as a team.
- 3.3 Foster a culture which encourages interdisciplinary efforts and teamwork.
 - 3.3.1 Target areas for cross program coordination and collaboration within CPO.
 - 3.3.2 Create new opportunities for professional contribution and growth which align with Program goals.
- 3.4 Maintain an agile organization that can respond to emerging research challenges and national needs.
- 3.5 Encourage employees to develop their ideas through collaborative team efforts within CPO and with partners outside of CPO.
- 3.6 Convene an annual offsite CPO retreat.
- 3.7 Facilitate transparent and ongoing communication at all levels within CPO.

Transparency and Accountability

- 3.8 Sustain a culture of transparency, respect, and empowerment between management and staff and across Divisions.
 - 3.8.1 Increase transparency in operations and procedures.
 - 3.8.2 Empower decision-making at all levels.
- 3.9 Formalize and fully communicate organizational expectations to reduce uncertainty and clarify tasking procedures.

Recognition

- 3.10 Apply objective standards and practices for cash and time off awards.
- 3.11 Take advantage of every opportunity to submit CPO nominations for NOAA awards.
- 3.12 Encourage and support recognition of CPO employees by external organizations, as appropriate

4.0 BUSINESS PROCESSES

Adapt CPO's infrastructure, management practices, and business processes to sustain high performing and responsive programs, products, and services.

The core strategies in Goal 4 are to provide the leadership and mechanisms to enable CPO mission accomplishment. Formalizing and implementing processes and systems for engaging with partners and stakeholders, and ensuring adequate funding for an integrated climate research program that enables effective decision making are targets for our business process strategy. Finally, aligning the organizational structure with mission needs is a critical component of this goal.

CPO will pursue the following strategic objectives to advance its Business Processes:

Priority Setting

- 4.1 Increase transparency and participation within CPO in setting Program priorities.
 - 4.1.1 Implement a transparent system for setting and adjusting priorities.
 - 4.1.2 Clearly and routinely articulate priorities to staff and communicate changes as necessary.
- 4.2 Define processes for enabling stakeholders, other line offices, and labs to contribute input and shape research priorities.
- 4.3 Operate with clear program priorities that reflect a balance across CPO's integrated climate portfolio.
- 4.4 Incorporate, as appropriate, elements of climate-related Federal initiatives into CPO planning and activities.

Workload Management

- 4.5 Align workloads and resources with mission priorities, strategic plan and implementation plan.
 - 4.5.1 Embed planning, administrative and communications staff in research divisions to improve and maintain alignment.
 - 4.5.2 Communicate clear expectations of each program's size, funding, staffing, and objectives.
 - 4.5.3 Allow for new innovations to arise and be vetted across Divisions and with leadership.
- 4.6 Increase the percentage of time employees spend on mission critical work by minimizing bureaucratic and administrative tasks and emphasizing outcomes over process.
- 4.7 Define an annual timeline (Gantt Diagram) at the beginning of the fiscal year for all core office activities (administrative and management alike) ensuring these are distributed across the year to achieve a manageable workload.

Program Management

- 4.8 Manage administrative overhead to improve CPO management of grants, finances, and staffing by streamlining processes and implementing electronic processing to the extent possible.
- 4.9 Provide improved infrastructure and support for proposal review process.
- 4.10 Convene bi-monthly program manager meetings for exchange of information and brainstorm on new directions and opportunities.

- 4.11 Improve coordination and communication between grants staff, program managers and the NOAA Grants Management Division.

Relationship & Partnership Management

- 4.12 Dedicate people, travel and meeting resources to relationship development and management at all program levels.

Funding

- 4.13 Secure funding and resources to advance mission goals.
 - 4.13.1 Obtain and leverage resources through collaborative partnerships agreements, including service level agreements and memoranda of understanding.
 - 4.13.2 Build popular support amongst external stakeholders, DOC, the Office of Management and Budget (OMB), and Congress by addressing issues of high value to society and effectively communicating these efforts through new and existing outreach mechanisms.
 - 4.13.3 Secure adequate high performance computing resources to meet growing earth system modeling needs.
 - 4.13.4 Actively pursue new funding lines for new or under-supported areas of research with program manager involvement.
- 4.14 Evolve Federal Funding Opportunity (FFO) language to better address applicants needs
 - 4.14.1 Include a checklist for applicants and develop a FFO that displays more uniformity of formats and requirements across programs.
 - 4.14.2 Explore the development of more uniform procedures for Federal and non-Federal FFO applicants.
- 4.15 Implement mechanisms to make funding decisions fully transparent within CPO, NOAA, and beyond.
 - 4.15.1 Issue an Annual Report that highlights projects funded, their accomplishments, and the criteria applied in their selection.

Infrastructure

- 4.16 Advance the IT infrastructure practices and processes to effectively perform mission work and career development.
- 4.17 Adopt state-of-the-art technologies that support telework, remote collaboration, and virtual meetings.
- 4.18 Increase efficiency through introduction of an improved electronic awards management system.
- 4.19 Evolve office space infrastructure to effectively meet CPO goals for people and business practices.