

Advancing Climate Science & Service at NOAA's Climate Program Office

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Director, Climate Program Office

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Outline

A Changing Planet Means Changing Conditions

The President's Climate Action Plan

NOAA's Role

CPO Strategic Plan

Climate R&D

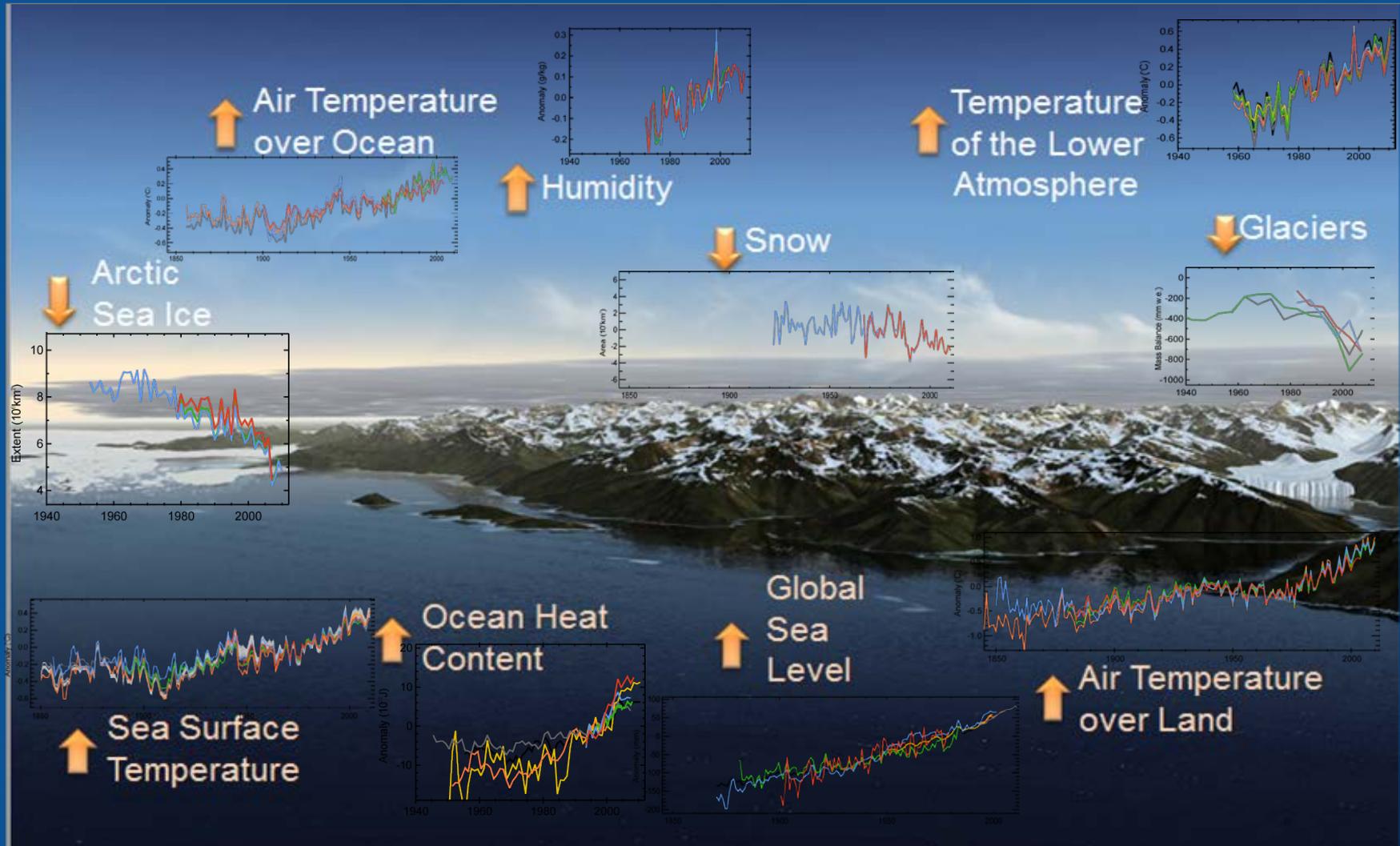
Budget

Take Away Messages



What do we know?

Ten Indicators of Changing Conditions:





Why do we care?

Economies and Livelihoods are at risk



Life and Property



Aviation



Maritime



Space Operations



Forests



Emergency Management



Commerce



Ports



Energy



Hydropower



Reservoir Control



Infrastructure



Construction



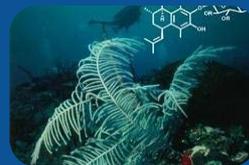
Agriculture



Recreation



Ecosystems



Health

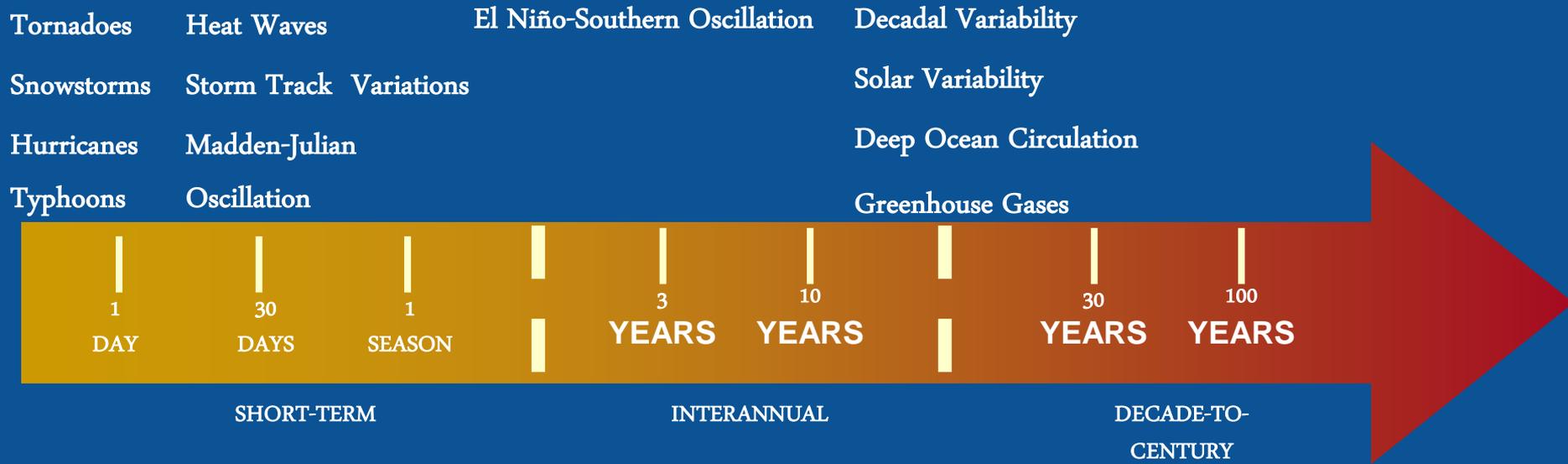


Environment

Careful preparations are required to seize opportunities, and minimize risks and vulnerabilities

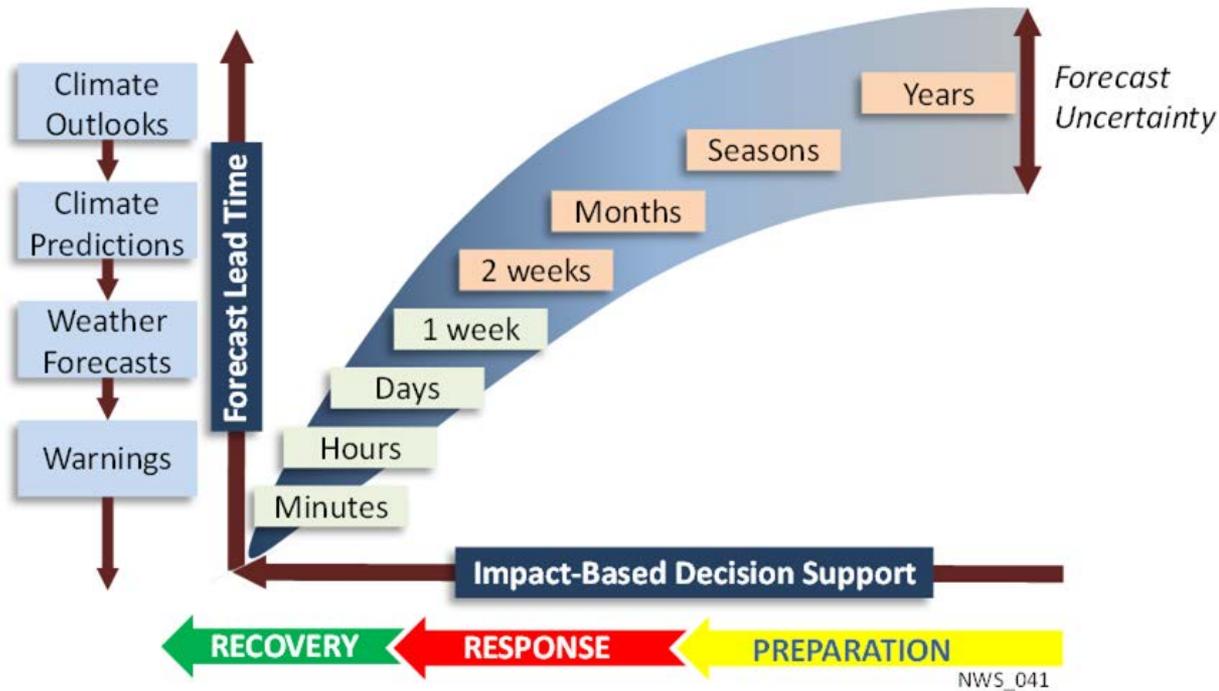


What Climate Phenomena do we work with? Climate Variability and Change are Linked



And Weather to Climate is a Continuum.....

What information is needed for decisions? Timely, credible, useful - across all time scales



e.g. Disaster management planning and response

e.g. Crop Selection, Water management

e.g. Infrastructure development

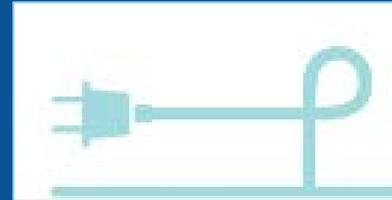
NWS_041

How can the U.S. meet the growing demand? President's Climate Action Plan

Pillar 1: Cut Carbon Pollution in America



Reducing Carbon
Pollution From Power
Plants



Cutting Energy
Waste in Homes,
Businesses, and
Factories



Accelerating Clean
Energy Leadership



Reducing other
Greenhouse Gas
Emissions



Building a 21st Century
Transportation Sector



Federal
Leadership

How can the U.S. meet the growing demand? President's Climate Action Plan

Pillar 2: Prepare the U.S. for the Impacts of Climate Change

Assess the Impacts of Climate Change (NCA)



Support Climate-Resilient Investments

Rebuild and Learn from Superstorm Sandy



Launch an Effort to Create
Sustainable and Resilient Hospitals



Maintain Agricultural Productivity
Provide Tools for Climate Resilience
Reduce Risk of Droughts and Wildfires

How can the U.S. meet the growing demand? President's Climate Action Plan

Pillar 3: Lead International Efforts to Address Global Climate Change

- Enhance multilateral engagement
- Combat short-lived climate pollutant
- Expand clean energy use
- Lead efforts to address climate change through international negotiations
- Expand bilateral cooperation
- Reduce emissions from deforestation
- Negotiate global free trade in environmental goods / services
- Mobilize climate finance



**** Work with other countries to strengthen global resilience to climate change ****

What is the Role of NOAA?

NOAA provides essential environmental information



Observations

Monitoring

Assessment

Modeling

Forecasts and Products

TOP PRIORITIES FOR 2014–2016

1 Make communities more resilient

2 Evolve the Weather Service

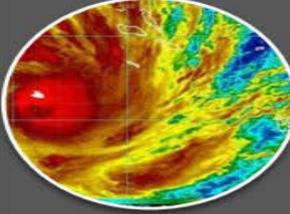
3 Invest in observational Infrastructure

4 Achieve Organizational Excellence

Putting environmental information into the hands of people who need it

What is the role of NOAA?

End-to-End capabilities to enhance climate resilience

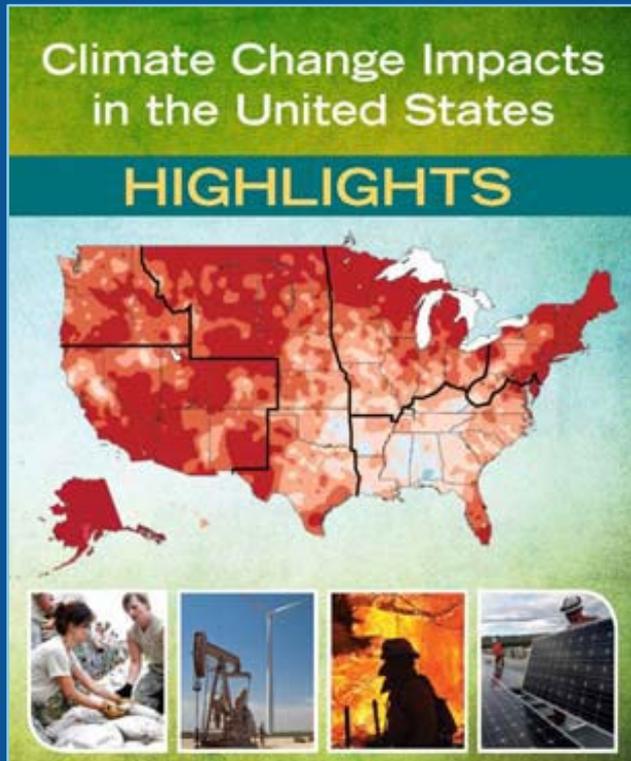
 <p>National Weather Service (NWS)</p>	 <p>Oceanic and Atmospheric Research (OAR)</p>	 <p>National Environmental, Satellite, Data, & Information Service (NESDIS)</p>	 <p>National Ocean Service (NOS)</p>	 <p>National Marine Fisheries Service (NMFS)</p>
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NOAA
Line
Offices

	Observing Systems, Climate Monitoring, and Data Stewardship	Research
	Understanding and Modeling	
	Predictions and Projections	
	Assessments	
	Informing Decisions	
	Communication and Education	

How does NOAA implement the Climate Action Plan?

Example: Support the 3rd National Climate Assessment



- A comprehensive & authoritative scientific report about climate changes that are happening now in the U.S. and that can be expected throughout this century.
- The report - a key deliverable of President Obama's Climate Action Plan— confirms that climate change is affecting every region of the U.S and key sectors of the national economy.
- NOAA's science and observations are an integral part of global efforts to monitor Earth's climate, and have greatly informed the 3rd NCA
- White House/OSTP documents on "globalchange.gov" and "whitehouse.gov"

How does NOAA implement the Climate Action Plan?

Example: 2014 NCA - Resources for Educators:

National Climate Assessment (NCA) Teaching Resources
Learning Pathways to Help Educators Uncover Key Concepts and Underlying Data from the National Climate Assessment

The National Climate Assessment offers a wealth of actionable science about the causes, effects, risks and possible responses to human-caused climate change. NOAA, USGCRP NCAnet Education Affinity Group and members of the CLEAN Network have developed a series of guides for educators that focus on the regional chapters of the Assessment Report, helping to unpack the key messages of each region and point to related, high-quality online resources.

Explore the NCA Report Findings
[Click here to see them all »](#)

Regional support pages

Regions:
Northeast, Southeast and Caribbean, Great Plains, Southwest, Northwest, Alaska, Hawaii and Pacific Islands, Coasts, Ocean

Overview support pages
What is the National Climate Assessment (NCA)?
Additional National Climate Assessment Resources for Educators
The National Climate Assessment and the Next Generation Science Standards

- The Climate Program Office's Climate.gov Education team along with collaborators from inside and outside of Government, has released new digital guides that connect educators to relevant findings of the NCA for each U.S. region.
- Link: <http://www.climate.gov/teaching/2014-national-climate-assessment-resources-educators>
- NOAA, [USGCRP NCAnet Education Affinity Group](#) and members of the [CLEAN Network](#) have developed this series of guides for educators

How does NOAA implement the Climate Action Plan? Example: Climate Resilience Toolkit (CRT)

U.S. Climate Resilience Toolkit

Get Started Taking Action Tools Topics Expertise

About Contact Funding Opportunities Help

Search

Meet the Challenges of a Changing Climate

The Climate Resilience Toolkit provides resources and a framework for understanding and addressing the climate issues that impact people and their communities.

- 1 Identify the Problem
- 2 Determine Vulnerabilities
- 3 Investigate Options
- 4 Evaluate Risks & Costs
- 5 Take Action

Taking Action to Build Resilience

- Dune Migration and Shoreline Protection [Watch Video >](#)
- Pollen and Poison Ivy [Watch Video >](#)
- Climate Outlooks Inform Water Management [Watch Video >](#)
- Louisiana's Front Line-Defense from Storm and Surge [Watch Video >](#)

Data Interaction Tool: Climate Explorer

The Climate Explorer is an interactive web application that presents national and regional maps of climate-related parameters, and location-specific time series of historical temperature and precipitation data.

Get Started

Featured Tools

- CanVis**
A visualization program used to "see" potential impacts from coastal development or sea level rise. Users can... [read more >](#)
- COMET-Farm**
Enables farmers and ranchers to estimate carbon sequestration and greenhouse gas emissions related to annual crop production... [read more >](#)
- Sea Level Rise and Coastal Flooding Impacts Viewer**
Being able to visualize potential impacts from sea level rise is a powerful teaching and planning tool, and the Sea Level... [read more >](#)

A site designed to help people

✓ find and use tools, information, and expertise from across the U.S. federal government via one location:

<http://climate.gov>

✓ *understand* and *manage* their climate-related risks and opportunities

✓ make their communities and businesses more *resilient*

✓ *Themes*

Coastal Vulnerability & Food Security (Nov)

Ecosystem Vulnerability & Water (Dec)

Energy (Jan)

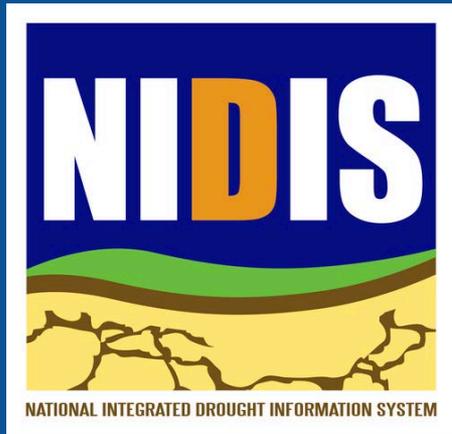
Human Health (Feb)

Transportation & Supply Chain (Mar)



How does NOAA implement the Climate Action Plan?

Example: NIDIS & National Drought Resilience Partnership



National Integrated Drought Information System:

Public Law 113-86; reauthorized in 2014 to

- *integrate information on key indicators of drought / impacts*
- *provide usable, reliable, timely forecasts of drought / impacts*
- *improve national coordination of soil moisture monitoring*

Information sharing and collaboration across all levels of government to promote drought preparedness & planning

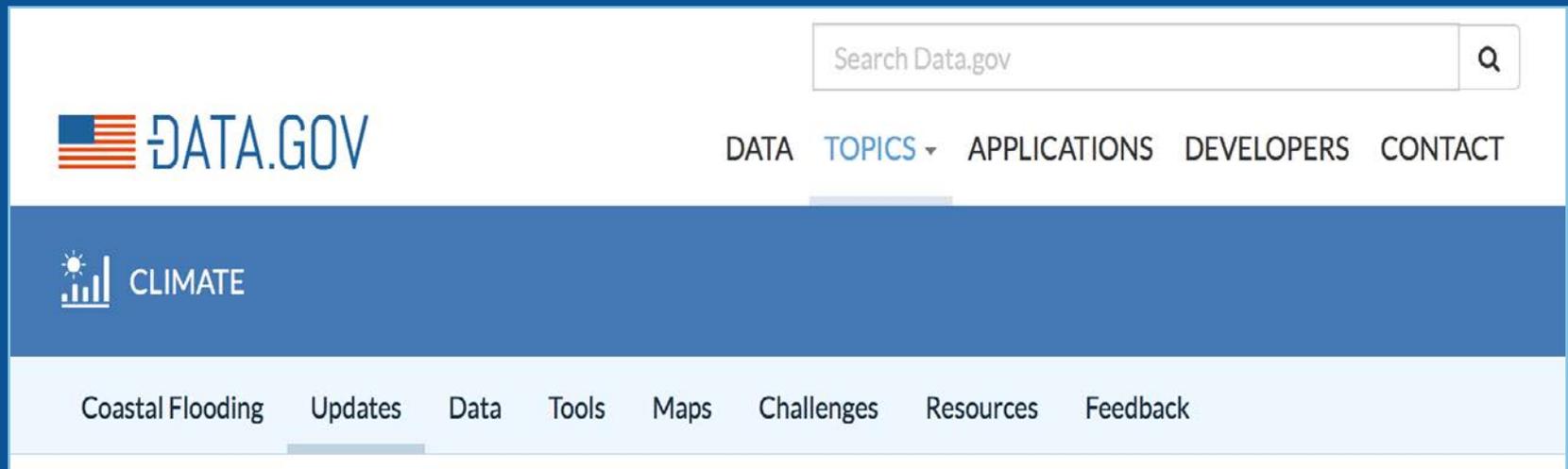


How does NOAA implement the Climate Action Plan?

Example: Climate Data Initiative

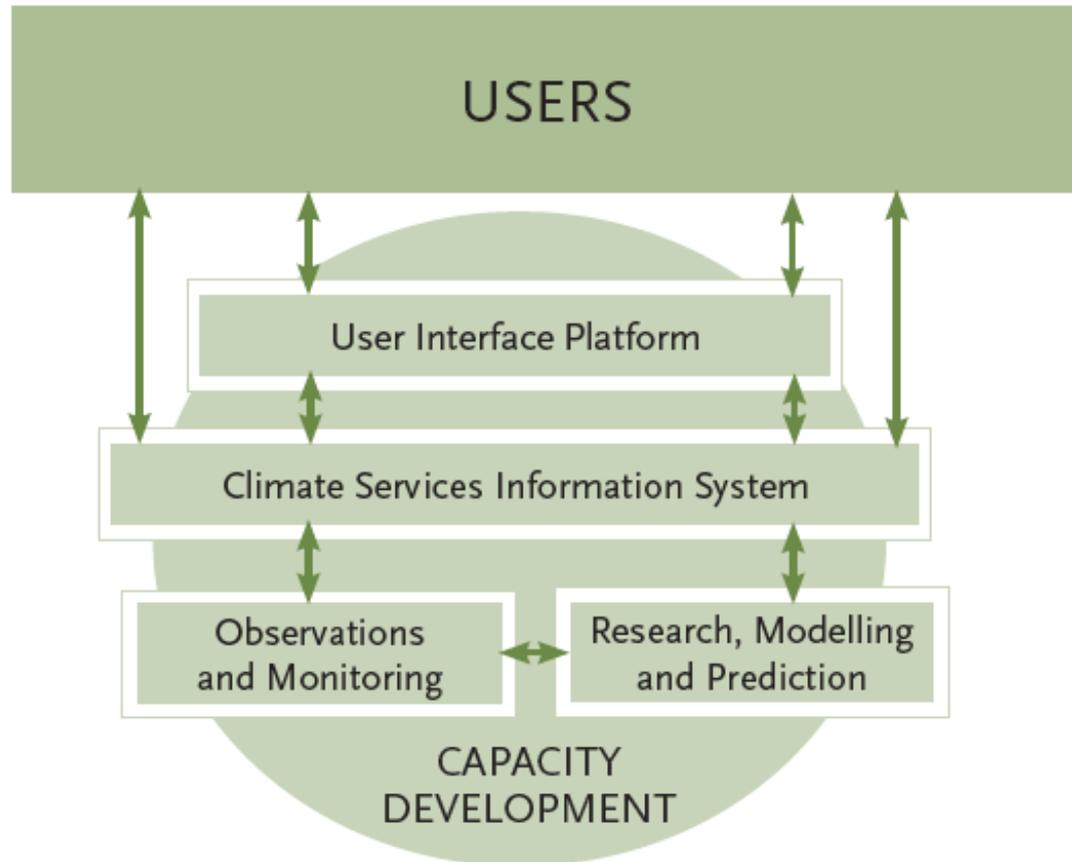
A collaborative effort, led by NASA and NOAA, to spur innovation and advance awareness of climate variability & change. It includes:

- A catalog of climate-related datasets and data <http://climate.data.gov>
- Workshops with data users and data innovators to solve mutual problems
- Seeking commitments from private sector companies and civic innovators



The screenshot shows the Data.gov website interface. At the top right is a search bar labeled "Search Data.gov" with a magnifying glass icon. Below the search bar is the Data.gov logo, which includes the American flag and the text "DATA.GOV". To the right of the logo are navigation links: "DATA", "TOPICS" (with a dropdown arrow), "APPLICATIONS", "DEVELOPERS", and "CONTACT". Below these links is a blue banner with a sun and bar chart icon and the word "CLIMATE". At the bottom of the banner are several sub-links: "Coastal Flooding", "Updates" (which is underlined), "Data", "Tools", "Maps", "Challenges", "Resources", and "Feedback".

How does NOAA implement the Climate Action Plan? Example: The Global Framework for Climate Services



Four Priority Areas:

- Water Resources
- Food Security/Ag
- Human Health
- Disaster Risk Reduction

NOAA engagement

- Global Observations and Research
- Regional Climate Outlook Fora
- Capacity building for forecasters



improved scientific understanding
 assessments of impacts to inform decisions
 climate services to support mitigation, adaptation
 a climate literate public

CLIMATE ADAPTATION & MITIGATION

improved scientific understanding
 assessments of impacts to inform decisions
 climate services to support mitigation, adaptation
 a climate literate public

accurate, reliable data from integrated earth observations

an integrated environmental modeling system

improved scientific understanding
 assessments Identify impacts, inform decisions
 mitigation, adaptation choices supported
 a climate literate public

CLIMATE ADAPTATION & MITIGATION

RESILIENT COASTAL COMMUNITIES & ECONOMIES

resilient coastal communities
 ocean and coastal planning, management
 safe, sound, efficient marine transportation
 improved coastal water quality
 safe, sound arctic access, management

NOAA'S VISION OF THE FUTURE:

RESILIENT ECOSYSTEMS, COMMUNITIES & ECONOMIES

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

reduced loss of life, property, disruption
 improved freshwater management
 transportation efficiency, safety
 healthy people, communities
 productive, efficient economy

WEATHER READY NATION

HEALTHY OCEANS

improved understanding of ecosystems
 recovered, healthy species
 healthy habitats sustain resources, communities
 sustainable fisheries, safe seafood

ENGAGEMENT ENTERPRISE

an engaged, educated public for informed environmental decisions

integrated services for evolving demands of regional stakeholders

international partnerships and policy leadership

modern information technology

diverse, evolving workforce

modern, safe, sustainable facilities

a high performing organization

ORGANIZATION & ADMINISTRATION ENTERPRISE

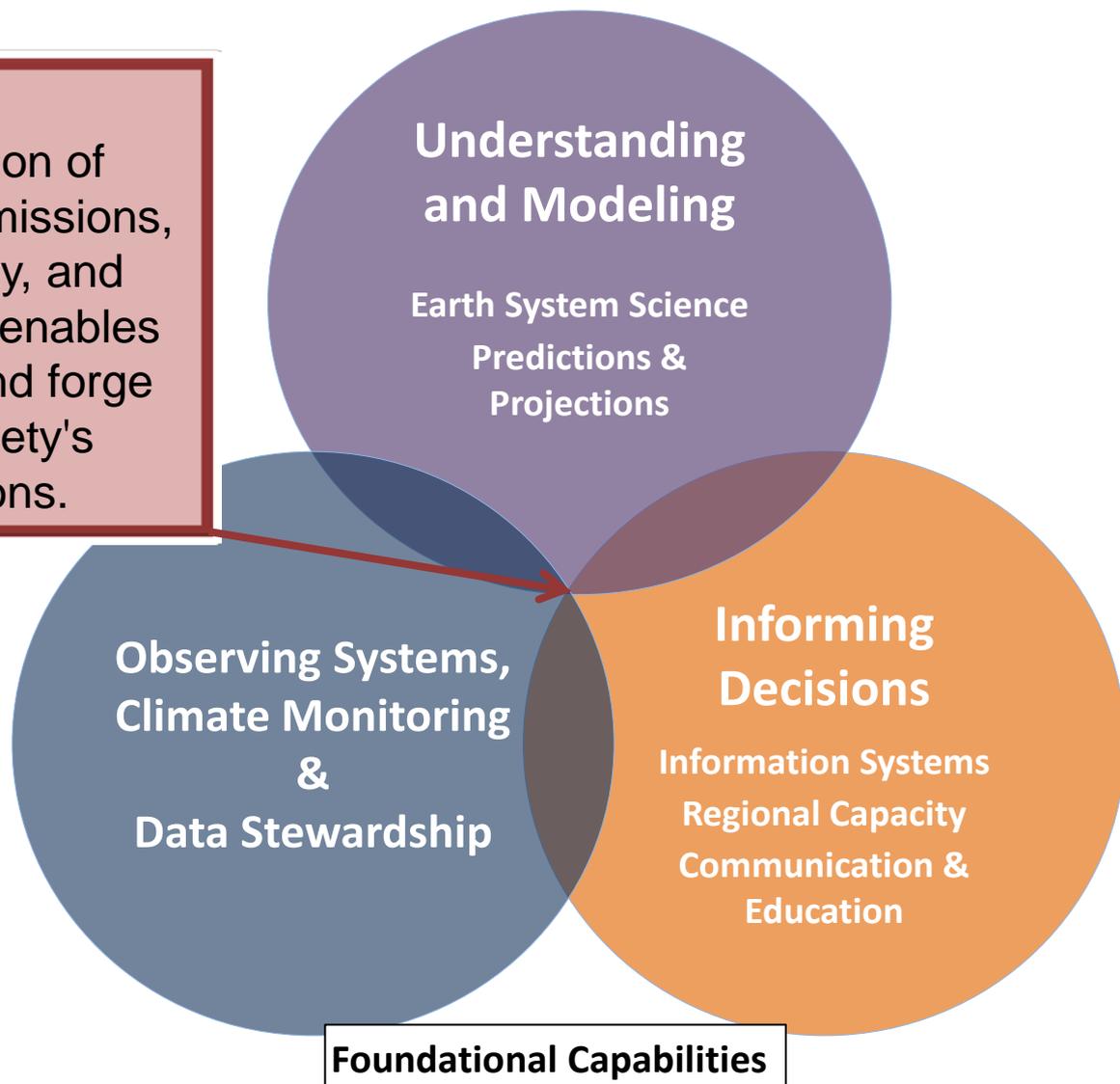




NOAA Climate Program Office (Foundational Capabilities)

CPO's Unique Role

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.



Foundational Capabilities



Why a CPO Strategic Plan?

A simple but powerful approach:

Address the increasing demand for climate information in a tight budget environment

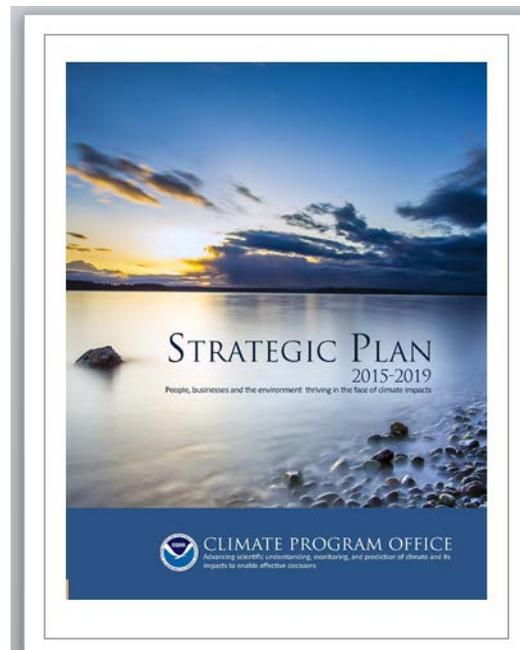
Provide a basis to align CPO priorities in strategy, budget, and performance over the next 5-10 years

Align with the OAR, NOAA and DOC Strategic Plans

Released in June 2014

Tight alignment with OAR Strategic Plan

Basis for CPO Implementation Plan
(currently under development)



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

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



CPO Strategic Goals Framework

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.

PARTNERSHIPS

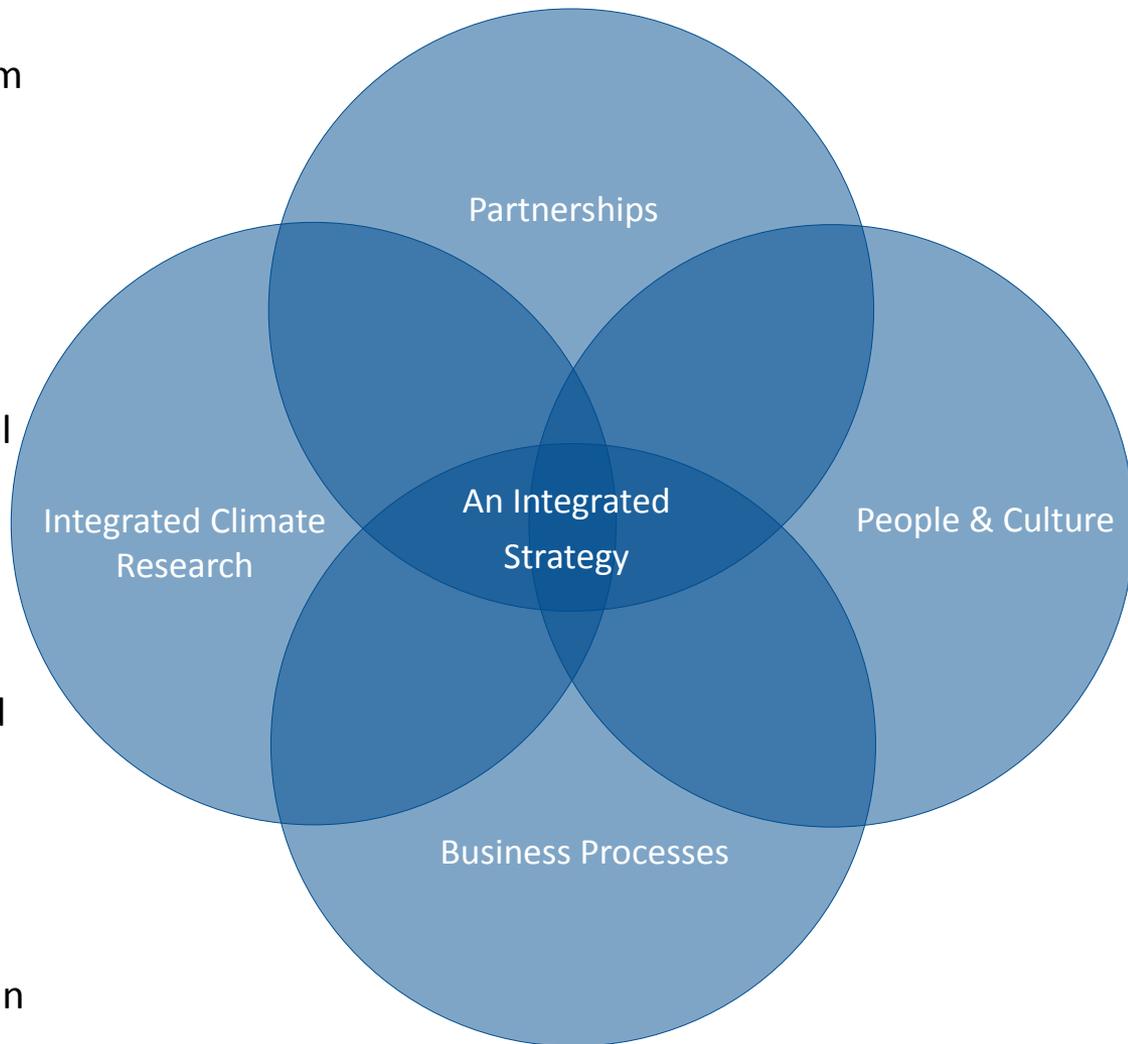
Promote partnerships that build on mutual strengths and interests, and advance the value and impact of CPO work.

PEOPLE & CULTURE

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

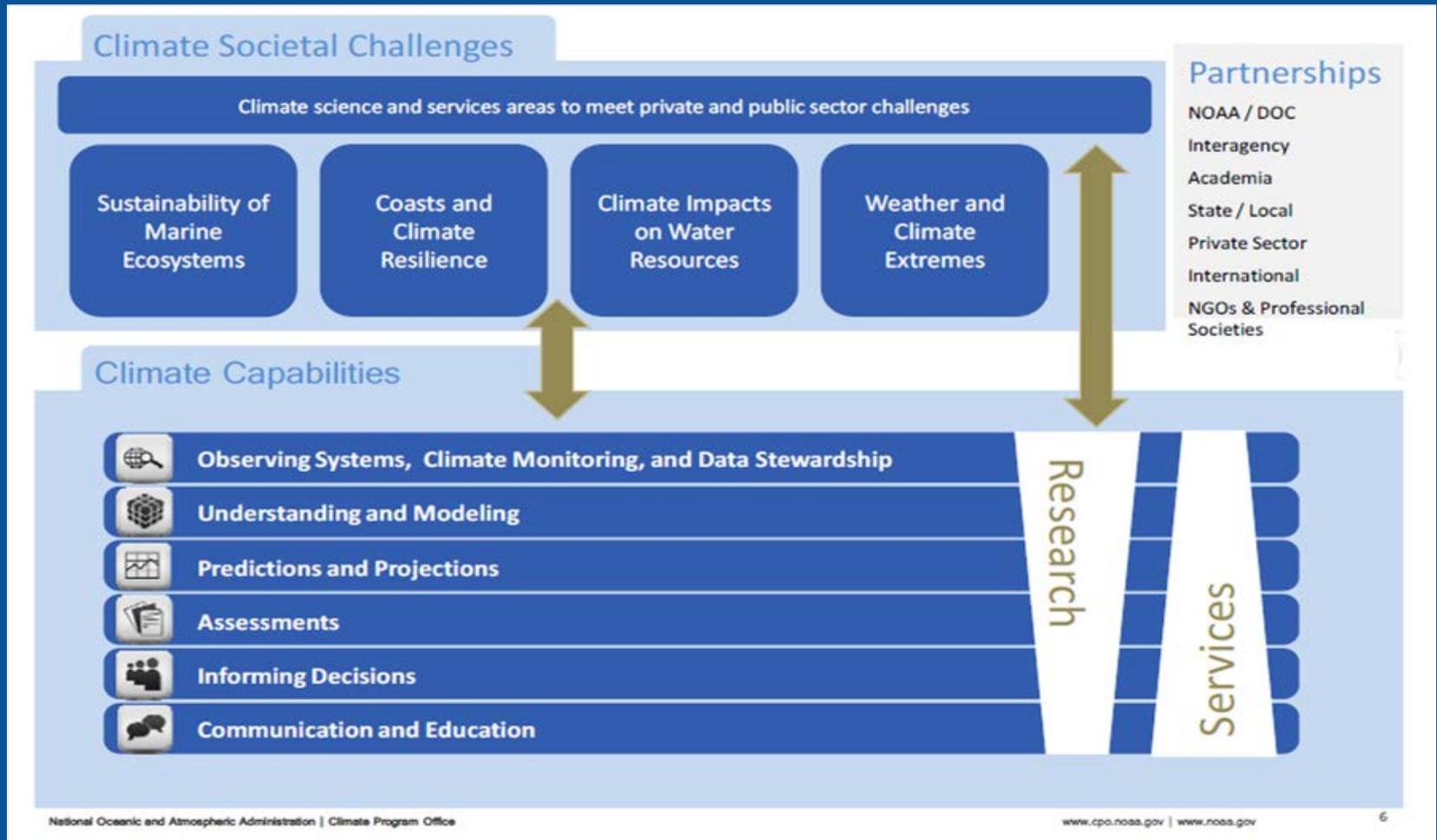
BUSINESS PROCESSES

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



How does NOAA meet society's big challenges ?

Key thematic areas with an end-to-end approach



NOAA Priority: Integrated Information Systems across four (initial) societal challenges

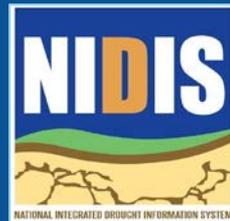
Monitoring & Prediction: Observations



Interdisciplinary research, applications, and assessments:



Integrated Information Systems: Preparedness and Adaptation



Communication and Outreach



Engaging Preparedness & Adaptation Communities:



Partnerships are essential

MUTUAL PRIORITIES supported, leveraged and pursued



Regional Priorities

- Drought
- Aging water infrastructure
- Knowledge gaps
- Evolving conditions
- Assessment



Competitive Research

- Mutual priorities
- Science policy innovations
- Focused, traceable projects



National / International Priorities

National Priorities

- Mission/Mandate
- Core capabilities
- Funding
- USGCRA





CPO Research

One of CPO's key activities is supporting a unique and highly flexible climate research enterprise that focuses on:

- Competitive grant programs that advance and extend NOAA's foundational capabilities
- Research collaboration with other labs and offices in NOAA including GFDL, ESRL, PMEL, AOML, OWAQ, NCEP, NCDC, NOS, and NMFS
- Partnerships with other federal agencies, academia, and the private sector to develop and deliver targeted research and data products
- Research-derived knowledge and information to improve public climate literacy and decision-making needed to maintain resilient economies and environmental services



FY2015 Research Competitions

Climate Observations and Monitoring (COM)

1. Arctic Research Program for 2015-20202.

Earth System Science (ESS)

2. Atmospheric Chemistry, Carbon Cycle, and Climate (AC4): Nitrogen cycle improvements in the GFDL Earth System Models
3. Climate Variability and Predictability (CVP): Climate Process Team: Understanding Processes Affecting Madden-Julian Oscillation Initiation and Propagation
4. Climate Variability and Predictability (CVP): Understanding Arctic Sea Ice Mechanisms and Predictability

Modeling, Analysis, Prediction, and Projections (MAPP)

5. Process-oriented evaluation of climate and Earth system models and derived projections
6. North American Multi-Model Ensemble system evaluation and application
7. Advancing a common software modeling and data infrastructure for NOAA's global models

Climate and Societal Interactions (CSI)

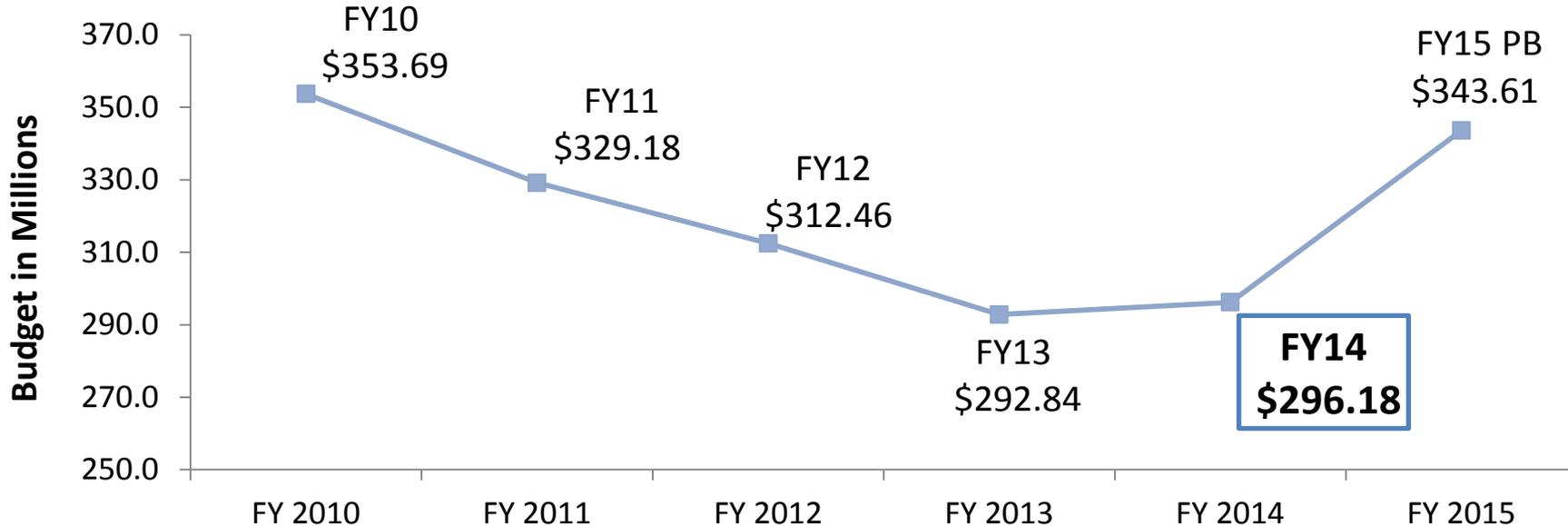
8. COCA – Supporting Resilient Coastal Communities and Ecosystems in a Changing Climate: Understanding climate-related human health risks within the coastal environment
9. RISA – Regional Integrated Sciences and Assessments
10. SARP – NIDIS: A National Drought Monitoring and Risk Management Center



Climate Goal Budget

- For the high level “Climate Goal” budget we will refer to the number NOAA reports for the U.S. Global Change Research Program (USGCRP).
- Funding for most Climate Goal activities remained relatively flat.

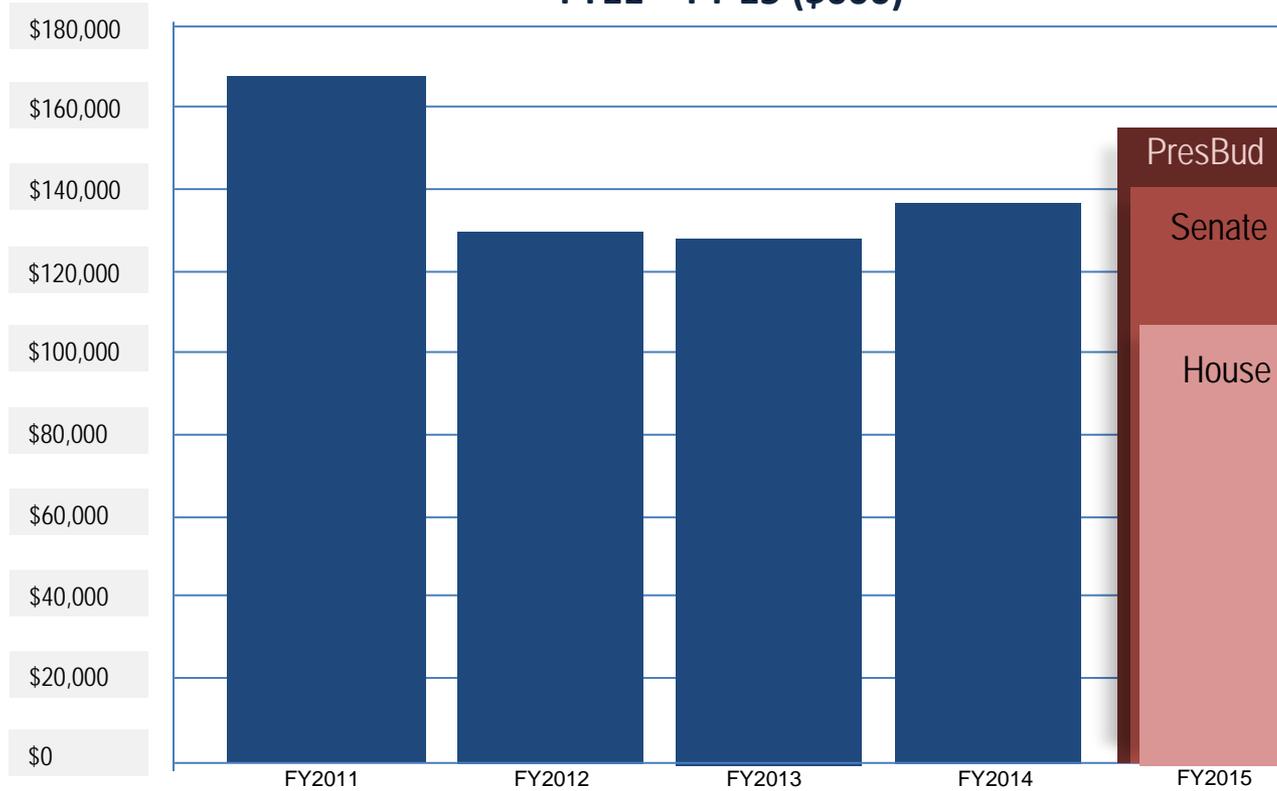
NOAA's USGCRP Budget Trends





CPO Budget

Climate Program Office Appropriated Funding FY11 – FY 15 (\$000)



■ CPO Appropriation FY14	\$136,500
■ President's Budget FY15	\$154,163
■ Senate mark FY15	\$141,347
■ House mark FY15	\$109,000



Take Away Messages

- **The U.S. is working to meet the growing demand for climate information through the President's Climate Action Plan.**
- **NOAA/CPO contributions to the PCAP are both national and international in scope:**
 - ***National Climate Assessment***
 - ***National Integrated Drought Information System***
 - ***Climate Resilience Toolkit***
 - ***Climate Data Initiative***
 - ***Global Framework for Climate Services***
- **CPO is spearheading initiatives that will strengthen climate science and service at NOAA to make the nation more resilient to climate variability and change.**
- **Partnerships are essential to ensure that mutual priorities can be supported and advanced.**

Extras





Take Away Messages

Top CPO priorities for 2014-2016 align with Dr. Sullivan's priorities:

- **Climate Resilience**
 - **Integrated information systems focused around Societal Challenges.**
- **Foundational Capabilities**
 - **Invest in research, observations, assessments, and modeling.**
- **Transition Activities**
 - **Align NOAA's research and operational missions.**
- **Organizational Excellence**
 - **Improve business practices, staffing, recruiting work/life balance.**