

# The Climate Program Office and the Role of Climate Observations and Monitoring

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**Climate Observation Division Virtual Briefing**

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# Outline

- **NOAA's Role in Climate**
- **CPO's Role**
- **CPO Climate Research**
- **CPO's Investment in Observations**
- **Take Away Messages**



# The Rising Demand for Climate Information

COMMERCE



COASTS



RECREATION



ECOSYSTEMS

**THERE IS AN URGENT AND GROWING NEED FOR RELIABLE, TRUSTED, TRANSPARENT, AND TIMELY CLIMATE INFORMATION ACROSS ALL SECTORS OF OUR ECONOMY.**



ENERGY

FARMING



HEALTH

PRIVATE SECTOR



# What is the role of NOAA?

America's Environmental Information Agency

**ENVIRONMENTAL INTELLIGENCE**



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



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

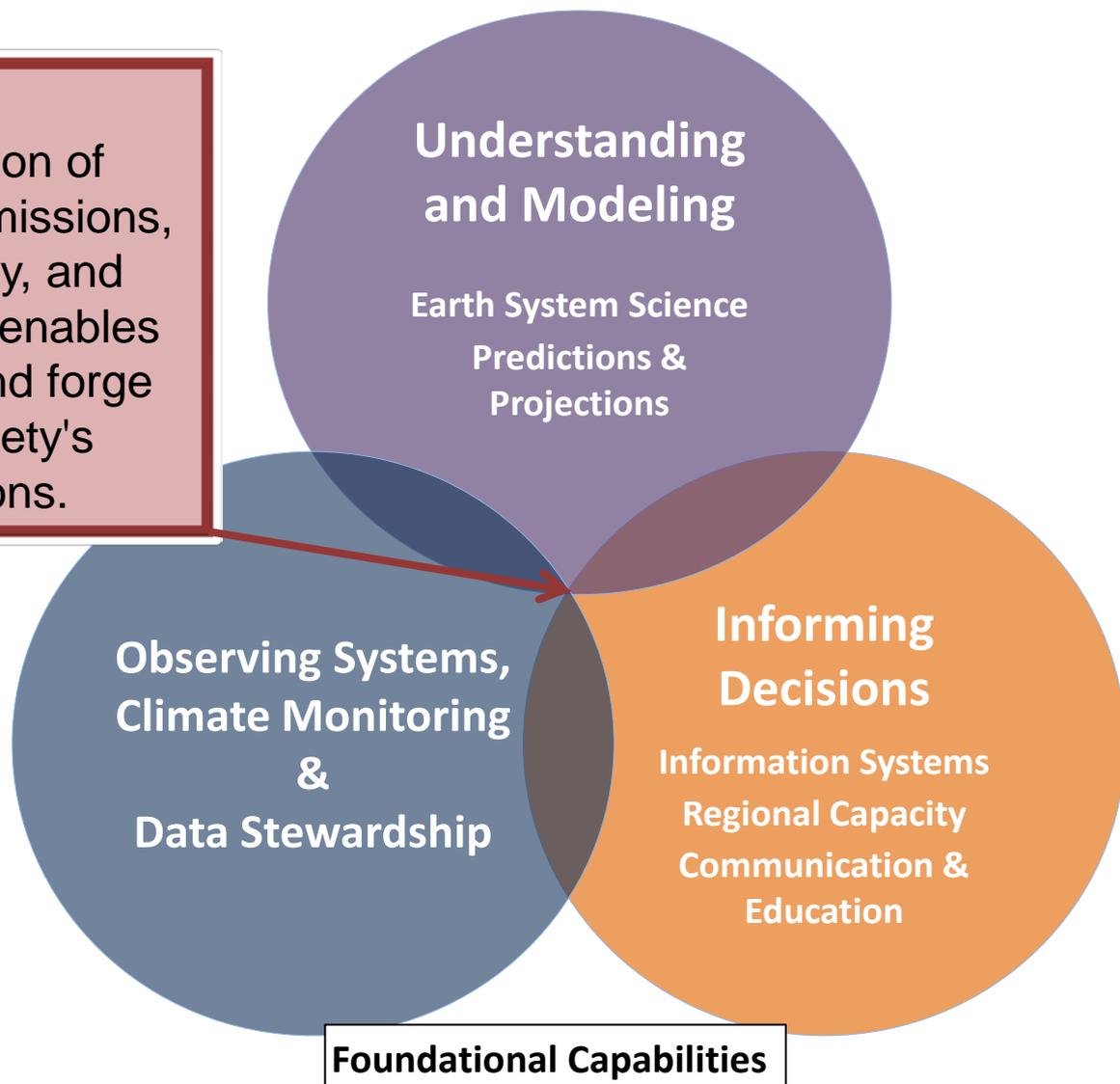




# NOAA Climate Program Office (Foundational Capabilities)

## 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

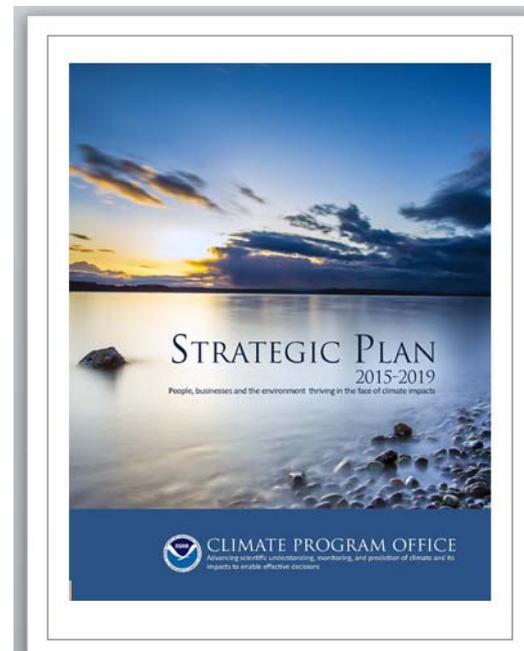
Provide a basis to align CPO priorities in strategy, budget, and performance over the next 5-10 years

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

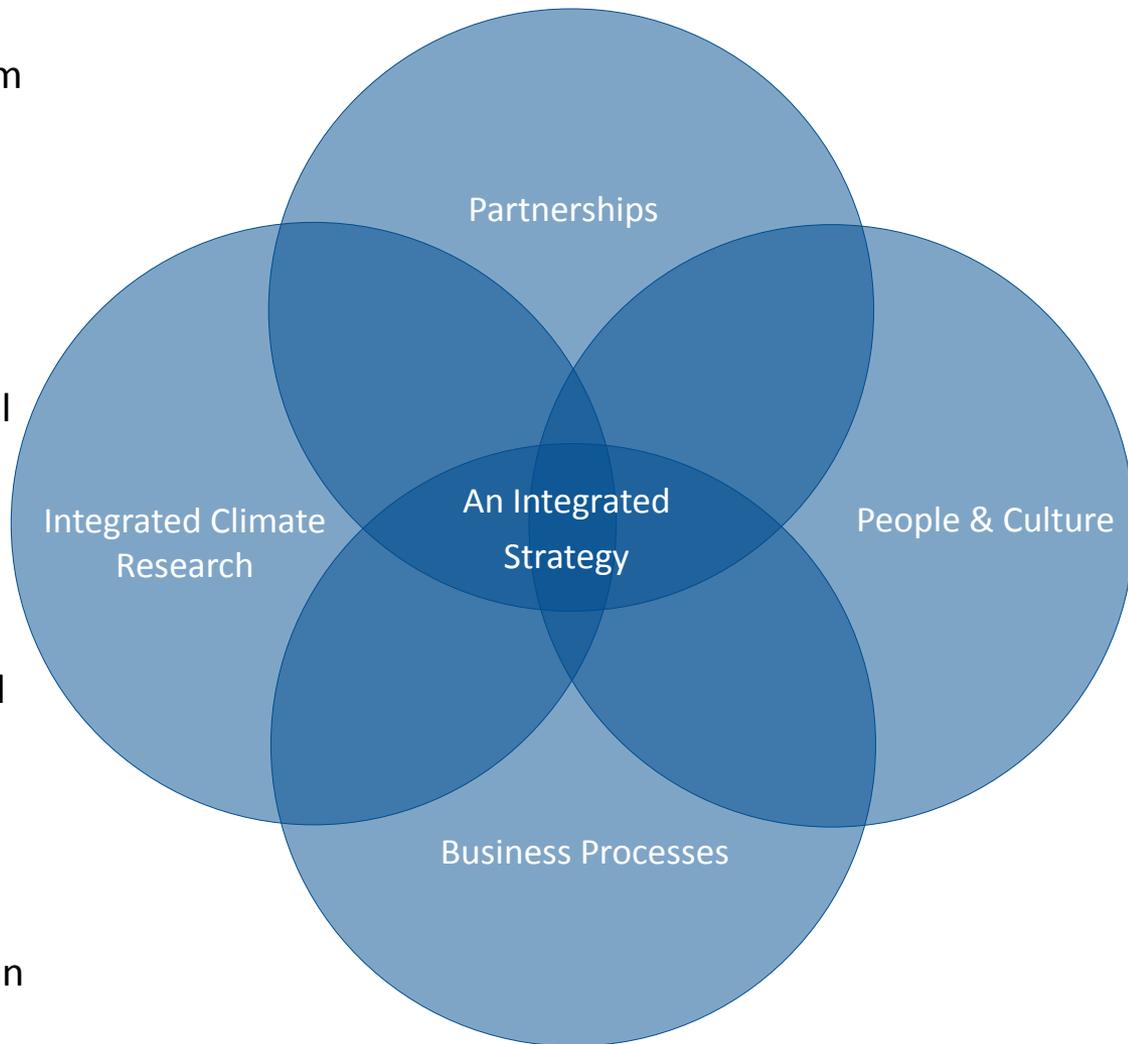
Promote partnerships that build on mutual strengths and interests, and advance the value and impact of CPO work.

## 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.



# Climate Capabilities & Societal Challenges

## Climate Societal Challenges

Climate science and services areas to meet private and public sector challenges

Sustainability of  
Marine  
Ecosystems

Coasts and  
Climate  
Resilience

Climate Impacts  
on Water  
Resources

Weather and  
Climate  
Extremes

## Partnerships

- Private Sector
- DOC/NOAA
- Federal Agencies
- State/Local
- International
- Academia
- NGOs & Professional Societies

## Climate Capabilities



Observing Systems, Climate Monitoring, and Data Stewardship



Understanding and Modeling



Predictions and Projections



Assessments



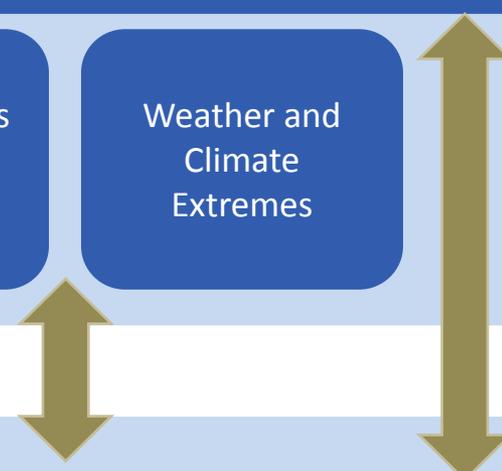
Integrated Service Development and Decision Support



Communication and Education

Research

Services





## **Observing Systems, Climate Monitoring & Data Stewardship**

- Evolve the ocean, atmosphere, land, Arctic and relevant biogeochemical and biological observing systems.
- Promote international integration and delivery of climate data through best practices of data acquisition, quality control, and accessibility.

## **Understanding and Modeling**

### ***Earth System Science***

- Improve understanding and modeling of key processes and phenomena
- Advance the development of climate and Earth System Models.

### ***Predictions & Projections***

- Advance climate and Earth system predictions from global to regional scales on sub-seasonal to decadal timescales.

# Partnerships allow for 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



## International/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
- Tighter integration between CPO's observing, modeling, earth system science, and decision research
- 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, the private sector and the international community 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 2015-2020.

## 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



# CPO Supports Observing

- A unique role of NOAA is developing and sustaining observing systems to monitor climate variability and change, enabling and supporting a vibrant research program to increase our understanding, improving our modeling and prediction capabilities, and contributing helpful products and services to decision-makers.
- CPO is invested in observations and is committed to maintaining world-class climate research and observations.

# COD Strategic Goals Framework



## OBSERVING SYSTEM

Sustain, with national and international partners, an evolving in situ global observing system adequate to monitor, understand, and support prediction of the Earth system.

## INFORMATION AND PRODUCTS

Expand the range of observation-based products and analyses to describe global and regional patterns of climate variability and change, and use these to educate and inform others about the changing state of the climate, and COD's foundational role in observing.

## PARTNERSHIPS

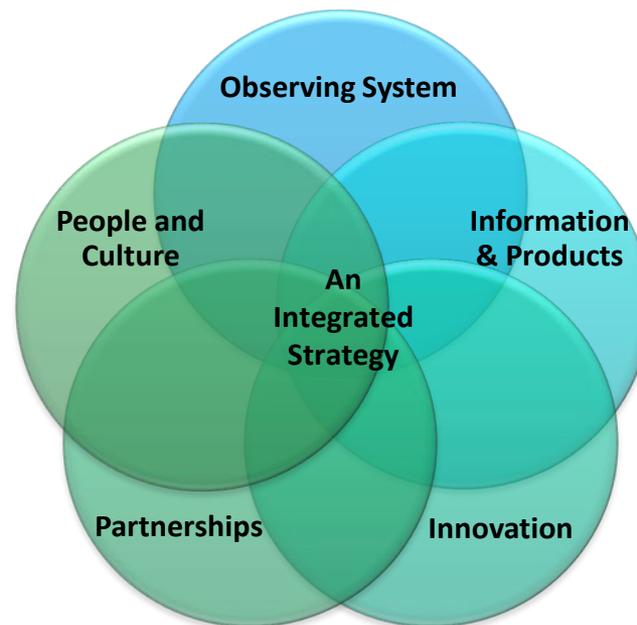
Collaborate with interagency, federal, international, academic, and private sector partners to develop solutions for sustaining and evolving the global in situ observing system and leverage federal observing investments.

## INNOVATION

Leverage innovative practices and new technologies to improve system efficiency, timeliness, effectiveness, reduce reliance on ship resources, and catalyze new applications of observational capabilities.

## PEOPLE & CULTURE

Strengthen the workforce and supporting infrastructure to sustain leadership in global climate observing and related research.



- The COD Strategic Plan Division-wide (Ocean, Arctic, Monitoring)

# COD's Contributions to the Societal Challenges

## Climate Societal Challenges

Sustainability of  
Marine  
Ecosystems

Coasts and  
Climate  
Resilience

Climate Impacts  
on Water  
Resources

Weather and  
Climate  
Extremes

## Partnerships

Private Sector  
DOC/NOAA  
Federal Agencies  
State/Local  
International  
Academia  
NGOs & Professional  
Societies



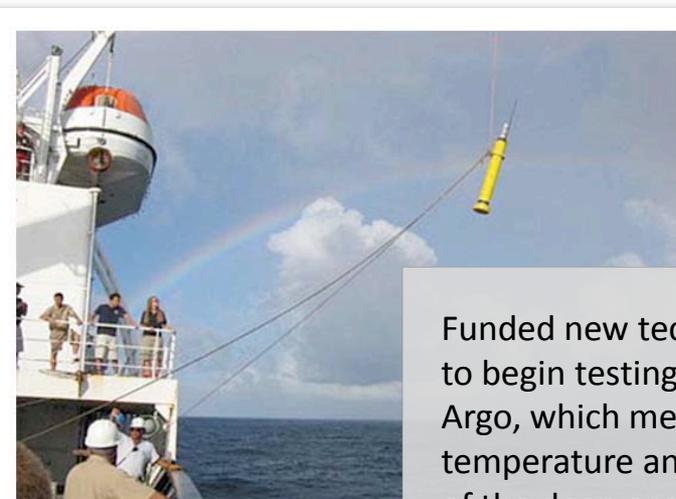
COD activities are foundational to all of these societal challenge areas.

- **Marine Ecosystems**: Systematic Arctic marine ecosystem observations in time; California Current observations of physical and biological; ocean carbon observations for ocean uptake and distribution of carbon; global observations of ocean condition.
- **Coasts**: Global tide gauge network for global, local sea-level changes and satellite validation; wind products and ocean measurements for global, regional sea-level variability and predictions; ocean T, S information contributing to sea level change; ocean obs for global and coastal ocean models; Arctic sea ice observations for coastal flooding forecasts.
- **Water Resources**: Ocean observations (e.g. SST, TAO) for operational prediction and predictability studies; drought research; paleo-climate products focusing on drought conditions.
- **Extremes**: Extreme data set development and analyses; ocean observations for operational prediction and predictability studies of weather and climate extremes.



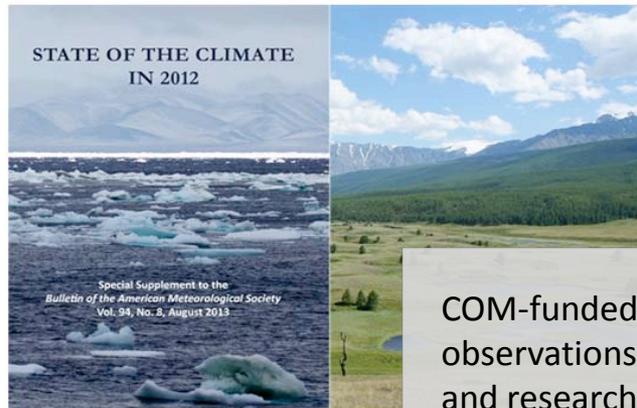
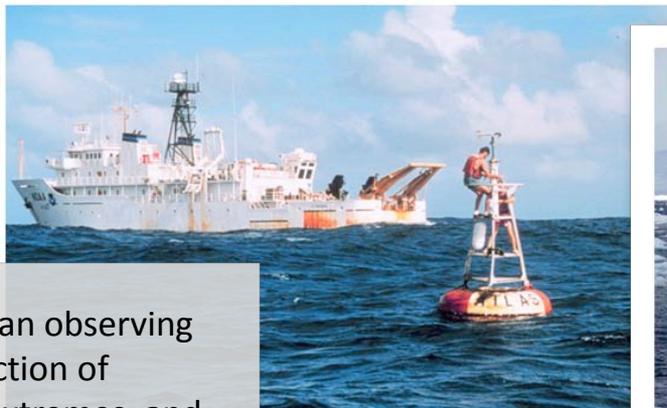
# COD Successes: Observations and Monitoring

Contributes annually to the Arctic Report Card — an update on the current state of the Arctic



Funded new technology to begin testing Deep Argo, which measures the temperature and salinity of the deep ocean

Maintains ocean observing sites for prediction of weather and extremes, and for monitoring and researching long-term changes



COM-funded observations, monitoring and research contribute to the annual BAMS *State of the Climate* report



# Some CPO Future Directions

## Observations

- **Developing a sustainable ocean observing system through testing and implementation of new technologies**
- **Tropical Pacific Observing System (TPOS) 2020**
- **A global array of deep profiling floats**
- **Observations to improve sea ice forecasting in the Arctic**

## Research & Development

- Extend operational weather forecast skill beyond current limits (weeks 3-8)
- Arctic research initiative to improve understanding, modeling and prediction of a rapidly changing Arctic
- NOAA global modeling strategy that spans the weather to climate continuum

## Services & Partnerships

- President's Climate Action Plan (e.g. Climate Resilience Toolkit)
- Interagency (USGCRP) – Sustained National Climate Assessment; Sustained Indicators System
- NIDIS Regional Pilots
- Regional Engagement (e.g. RISA) for preparedness and adaptation



# Take Away Messages

- **CPO is spearheading initiatives that will strengthen climate science and service at NOAA to make the nation more resilient to climate variability and change.**
- **CPO is strengthening its leadership role for climate within NOAA, and in the broader national and international communities.**
- **CPO is responding to the increasing demand from the White House and the private sector for climate information and services which underscores the value of these cross-agency integration initiatives and supports the President's Climate Action Plan.**
- **CPO's investments in foundational capabilities has allowed CPO to take a leadership role in climate, with invests in *observations*, earth system science, modeling, predictions and projections, and decision support.**



# CPO – Invested in Observations

- The ocean and Arctic observing systems provide information for climate research and prediction, and also for weather, ecosystems, commerce, and the environment.
- The wider use of the observing system and related data and products should be even better emphasized to address current and evolving climate challenges.
- NOAA has developed a leadership position in global ocean observing and now is targeting to expand that leadership in the Arctic and other areas.
- CPO is committed to:
  - maintaining world-class climate research, observations, data and products, and
  - communicating the value and impact of the climate observing system.