

# Advancing Climate Science & Services at NOAA's Climate Program Office

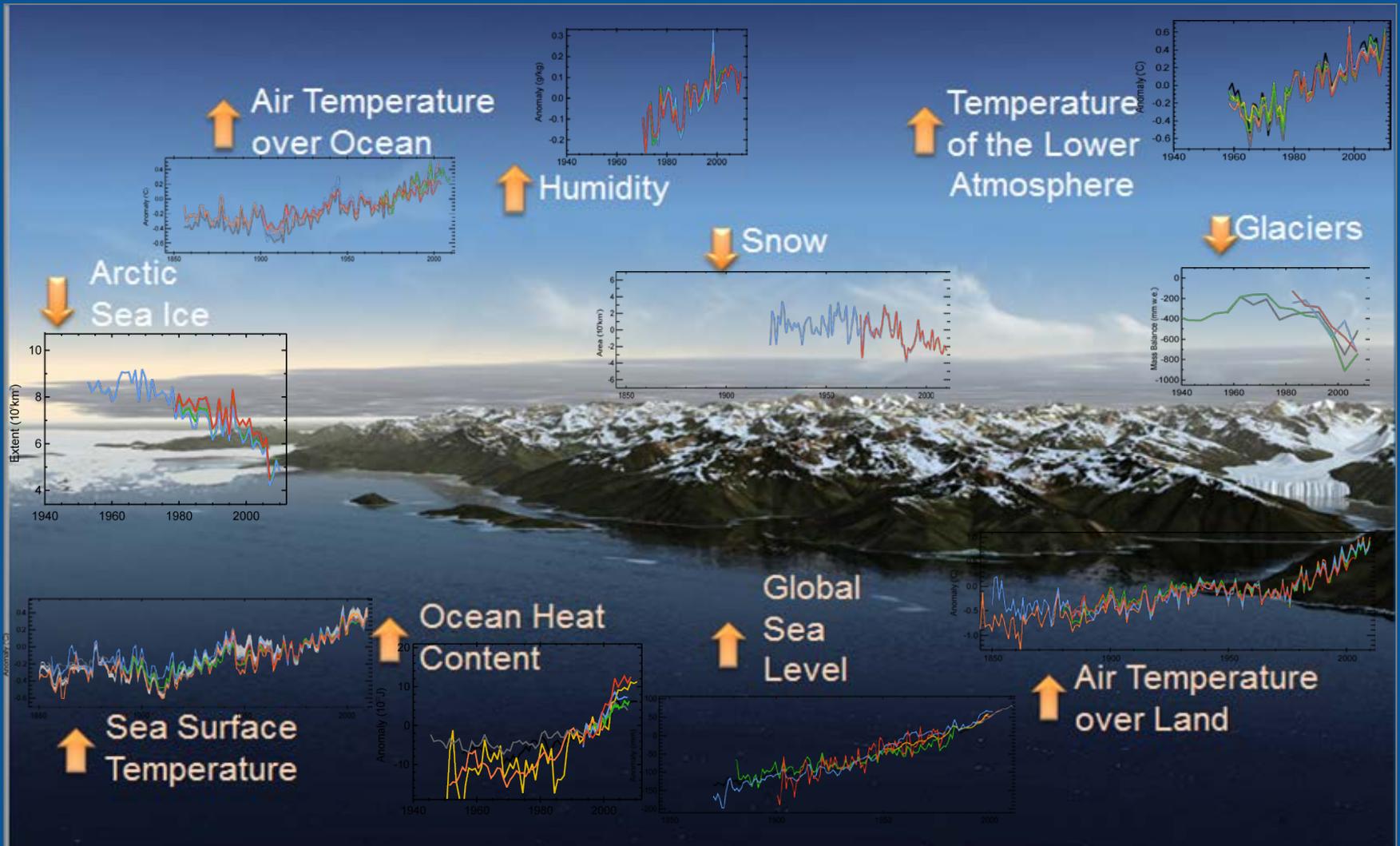
**Dr. Wayne Higgins**

**Director, Climate Program Office**

November 9, 2015

# What do we know?

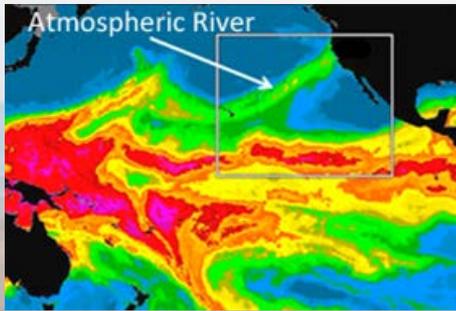
## Ten Indicators of Changing Conditions:



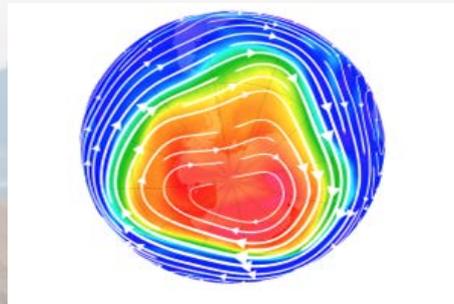
# What do we know?

Phenomena that affect climate and extremes from weeks to seasons:

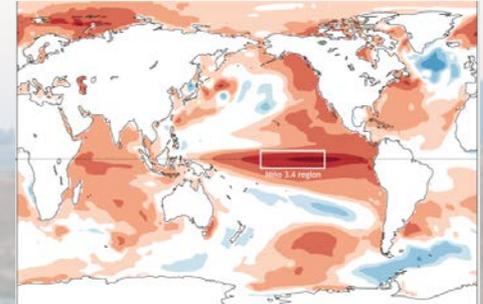
Tropical-extratropical interactions



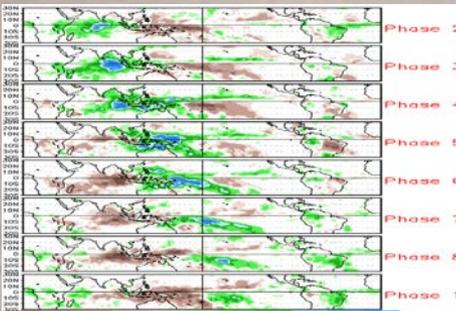
Troposphere-stratosphere interactions



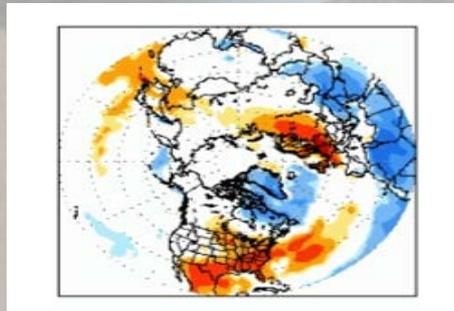
El Niño Southern Oscillation



Madden-Julian Oscillation (MJO)



North Atlantic Oscillation



Ocean-, ice-, and land-atmosphere interactions



WEEKS

SEASONS

# Why do we care?

## Economies and Livelihoods are at risk



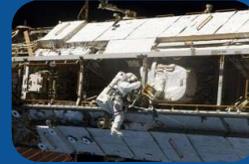
Life and Property



Aviation



Maritime



Space Operations



Forests



Emergency Management



Commerce



Ports



Energy



Hydropower



Reservoir Control



Infrastructure



Construction



Agriculture



Recreation



Ecosystems



Health

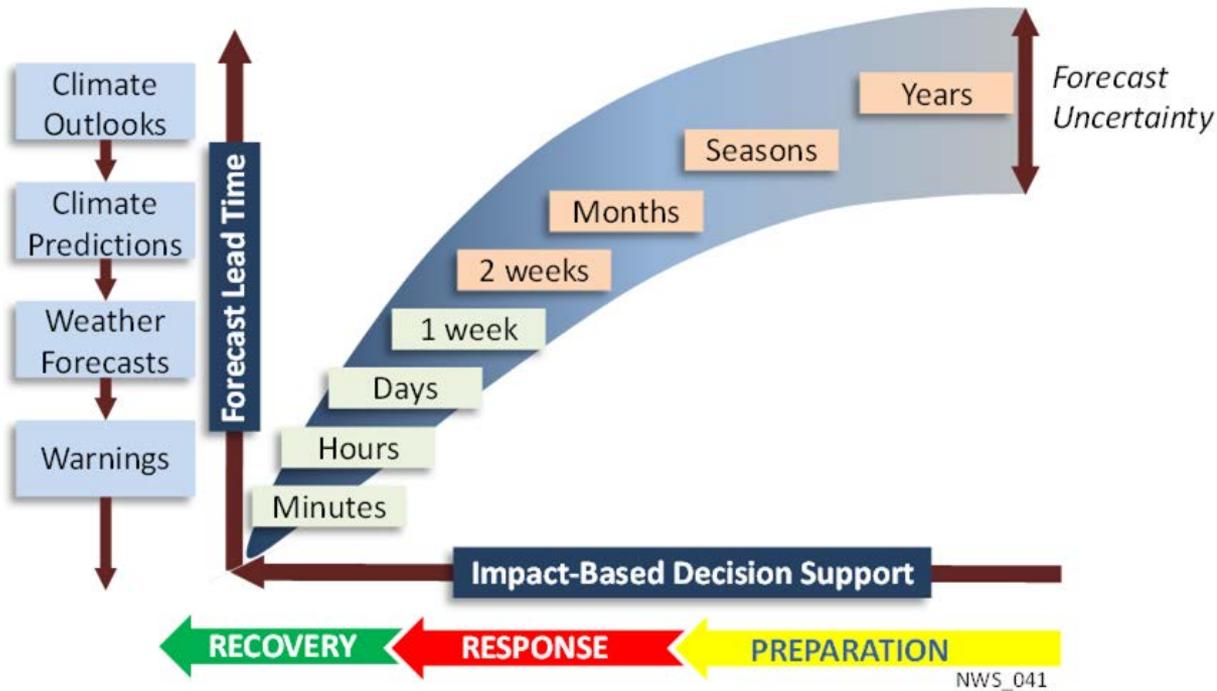


Environment

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

# What 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

# 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



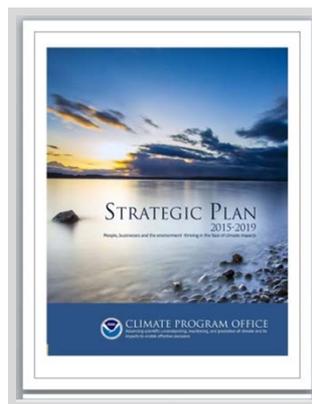
# What is the Role of OAR's Climate Program Office?

## VISION

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

## MISSION

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

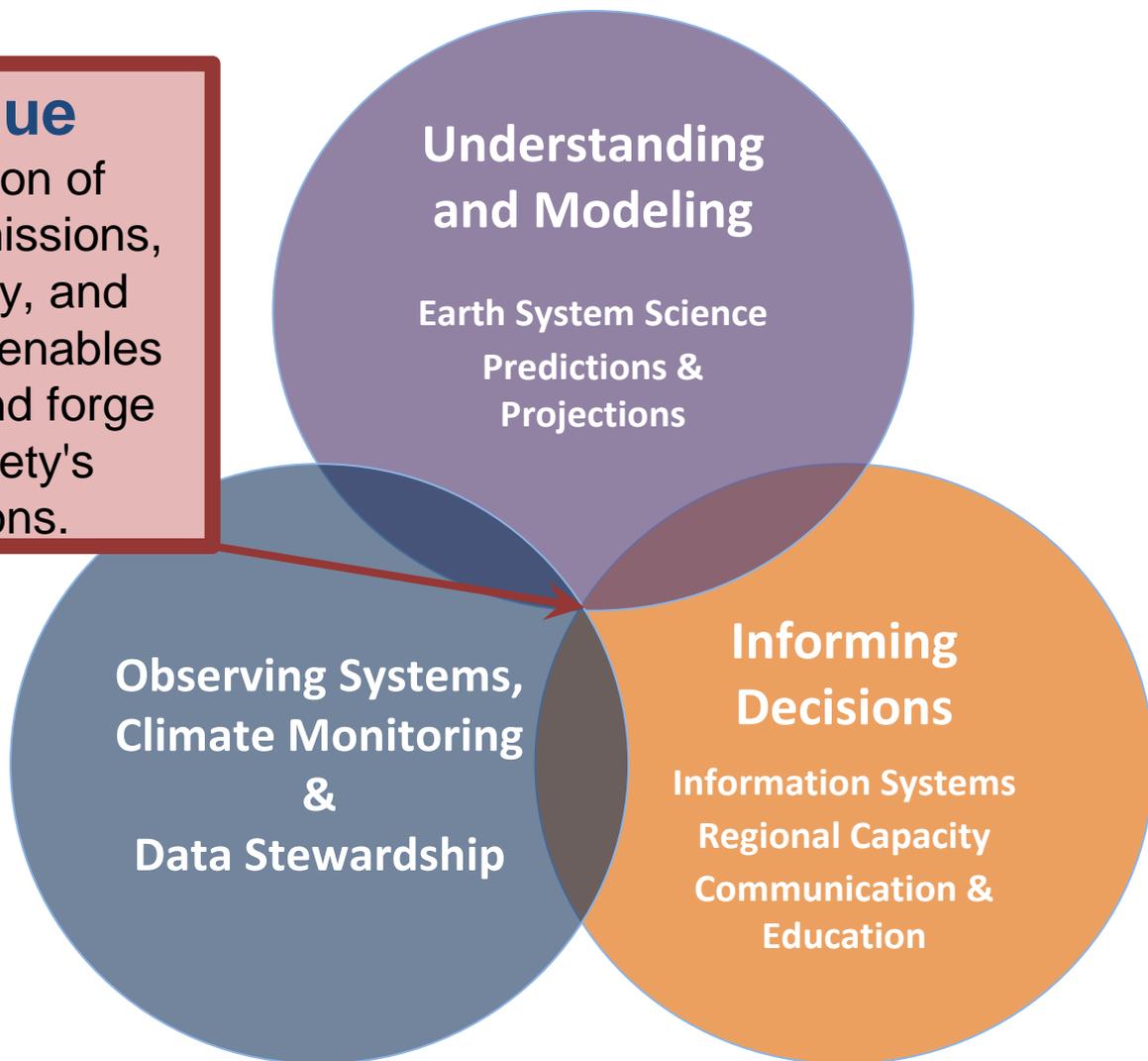




# What is the Role of OAR's Climate Program Office?

## CPO's Unique Value

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.





# CPO Alignment with NOAA Priorities

## Provide information and services for improved community resilience.

- National Integrated Drought Information System (NIDIS) and Drought.gov
- Climate.gov and the U.S. Climate Resilience Toolkit
- Programs such as RISA, COCA and SARP bridge the gap between scientists, decision makers

## Evolve the National Weather Service

- Implementing CPO – NWS Climate Program MOU
- Transition Products (e.g. MAPP-CTB) – Modeling, Ensembles, Seasonal Forecast Products
- Service Level Agreement (FY15; FY16)

## Invest in observational infrastructure

- TPOS 2020, Tropical Pacific Observing Systems
- Arctic R&D; observations

## Achieve organizational excellence

- Bi-laterals with other NOAA LO's, including planning (e.g. AOP's)
- Host / Support Interdisciplinary teams (e.g. The Drought Task Force)
- Support major interagency initiatives (e.g. President's Climate Action Plan; USGCRP; NCA)



# CPO-NWS Climate Services Program MOU

- MOU signed in FY15 to advance end-to-end climate services
- FY15:
  - CPO supported 35 NWS projects, including several transition projects to CTB (e.g. NMME).
- FY16:
  - CPO and NWS Climate Program designed a new NWS requirement-by-requirement approach with key subject matter experts in both LO's to identify gaps and projects to address the gaps
    - ✓ Examples include reanalysis, CFSv3, NMME and climate products
    - ✓ 3 phases: continuations; gap projects; new grants
    - ✓ The approach involves transition activities for most of the CPO Programs
  - Garnering external advice from the Climate Working Group (Nov 17-19)



# CPO Research

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

- Competitive grant programs and other types of support that advance and extend NOAA's foundational capabilities. Annual FFO.
- Tighter integration between CPO's observing, modeling, earth system science, and decision research
- Research collaboration with labs, line offices and others across NOAA
- 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



# New FY15 Research Investments

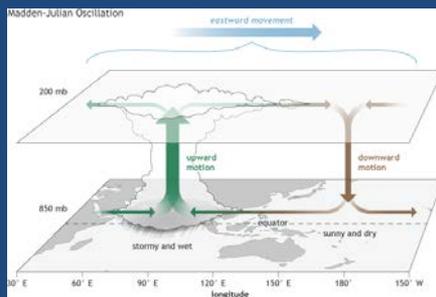
## 53 new NOAA Climate Program Office multi-year projects to advance climate research, improve community resilience

### OBSERVING



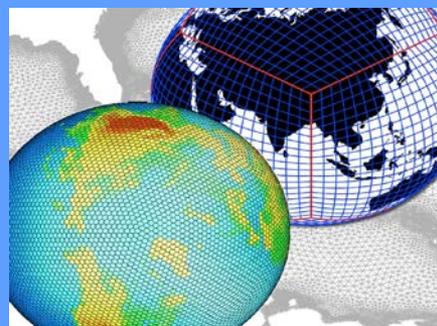
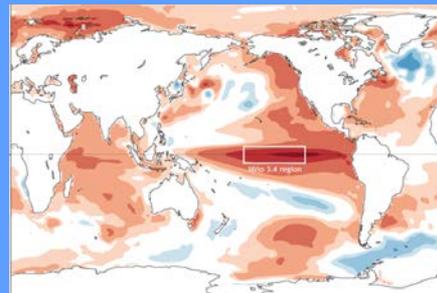
Develop new climate monitoring indices and collect observations on Pacific Arctic sea ice loss

### UNDERSTANDING



Understand and model processes for sea ice, tropical variability and the nitrogen cycle

### MODELING



Advance NMME system predictions and NOAA models via new metrics infrastructure

### INFORMING



Health and coastal ecosystems; 5 new RISA teams; a new drought risk center



# FY16 Research Competitions

## Climate Observations and Monitoring (COM)

1. *In Situ* Technologies to Contribute to the Tropical Pacific Observing System 2020 Project

## Earth System Science (ESS)

2. Atmospheric Chemistry, Carbon Cycle, & Climate (AC4): Fires in the Western US: Emissions and Chemical Transformations
3. Climate Variability & Predictability (CVP): AMOC-Climate Linkages in the N. and/or S. Atlantic

## Modeling, Analysis, Prediction, and Projections (MAPP)

4. NOAA Climate Test Bed - Accelerating Transition of Research into Operations
5. Research to Advance Prediction of Subseasonal to Seasonal Phenomena

## Climate and Societal Interactions (CSI)

6. COCA – Ecosystem Services for a Resilient Coast in a Changing Climate
7. RISA – Regional Integrated Sciences and Assessments - Existing Regions
8. RISA – Regional Integrated Sciences and Assessments - New Regions
9. SARP – NIDIS: Coping with Drought
10. SARP - Water Resources and Extreme Events



# Some Future Opportunities & Challenges

- Observations: Redesign of the Tropical Pacific Observing System (TPOS 2020); deep ocean measurements; increased Arctic observations; rapidly changing technologies (e.g. sensors; autonomous vehicles).
- Research: Advancing understanding of Earth System Science; Sources of predictability for subseasonal to decadal phenomena; AMOC-Climate Linkages; Fires in the Western US (e.g. emissions, air quality).
- Modeling and Prediction: Advancing development of Integrated Earth system model and prediction capabilities, including Total Water Prediction and characterizing uncertainties.
- Communication & Education: Next phases of Climate Resilience Toolkit; Climate.gov
- Public/Private Sector Partnerships: Emerging Private Sector for Climate (meeting the rising demand for information, tools, expertise).
- Climate Services Development: Assessments; Regional Integrated Sciences and Assessments; Integrated Information Systems (NIDIS; Heat- Health; Total Water); Ecosystem Services for Resilient Coasts; Water Resources and Extreme Events; NOAA, Interagency and Global Frameworks .
- Programmatic: Aligning and balancing service needs, research opportunities; transition, including funding responsibilities with partners; competitive vs. non-competitive and extra- vs. intramural support

# Extras

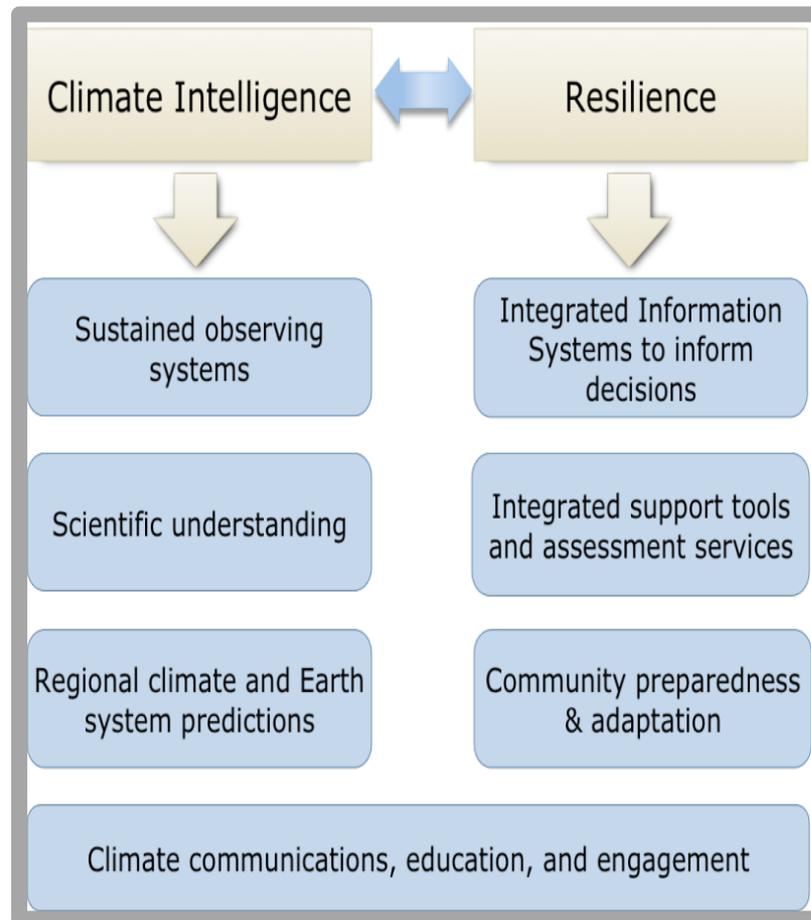
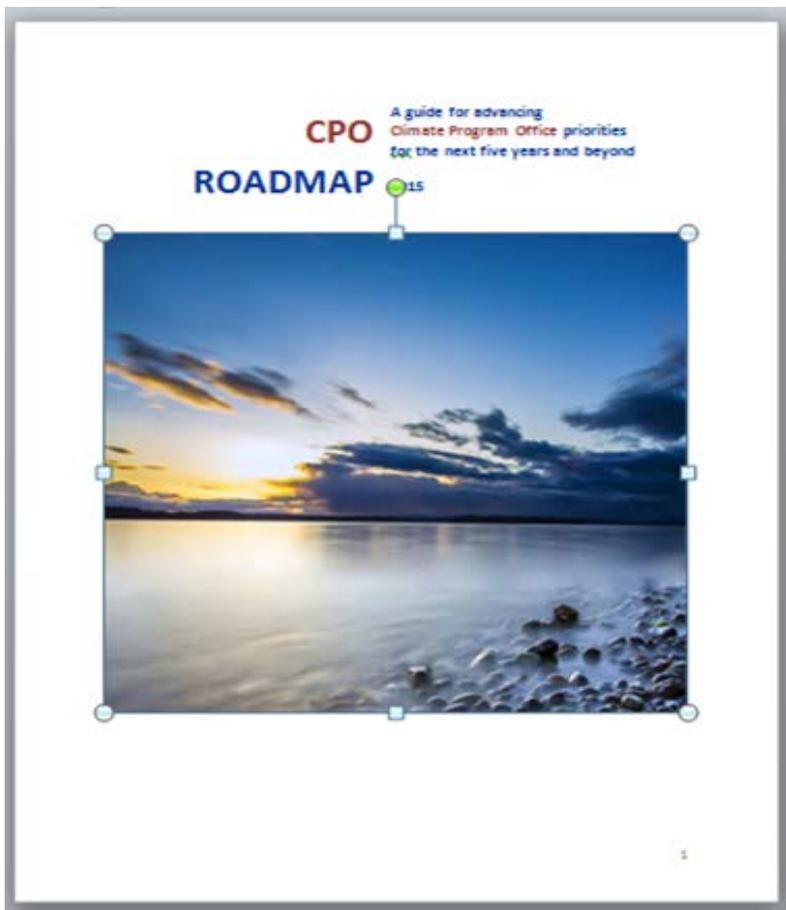
# CPO Realignment

- The Planning and Programming Division (PPD) will move into the Director's Office to assist cross-CPO planning activities, performance measure development, and support cross-NOAA climate requirements.
- The Communications/Education (COMM/ED) Program will move from the Director's Office to become the Communications, Education and Engagement Division (CEE). Creating a new CEE Division both recognizes the importance of CEE activities, and gives CEE the same organizational standing as the other Divisions within CPO.
- NIDIS will move from the Climate Assessments and Services Division (CASD) back into the Director's Office, where it was originally located, to more effectively facilitate the development of other Integrated Information Systems (IIS's).
- Lead coordinators for heat-health and water IIS's will report to the Senior Advisor for Climate within the Office of the Director.



# Why a CPO Roadmap?

A guide for advancing CPO priorities for the next five years and beyond



**Includes priorities, strategies, and actions leading to key outcomes**