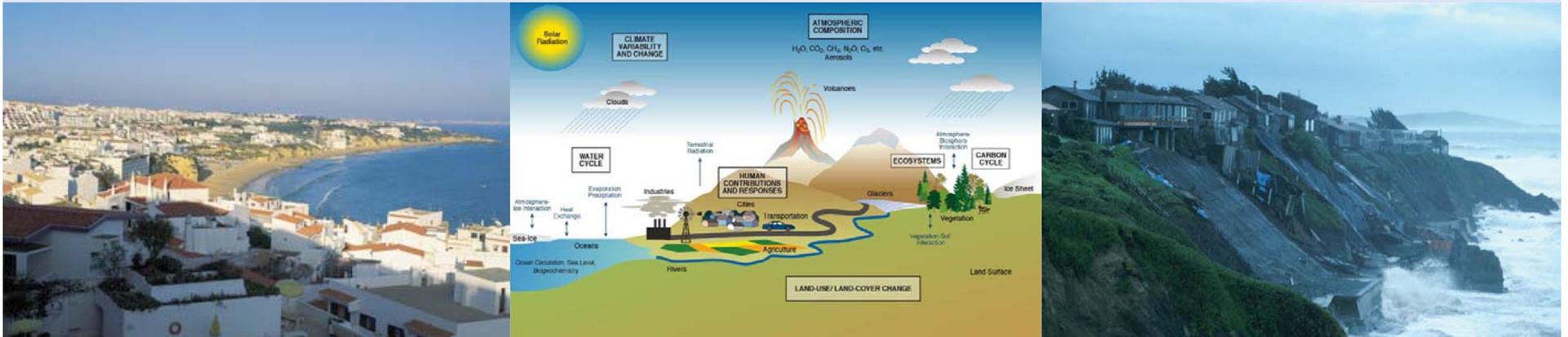




The NOAA Climate Program:

Building bridges between climate and coastal resource management



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Coastal Program Managers Meeting
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Outline

- NOAA's Climate Mission and Program
- Climate impacts in coastal regions
- NOAA Climate Program activities focused on impacts and adaptation in the coastal sector
 - Sectoral Applications Research Program (SARP)
 - Regional Integrated Sciences and Assessment (RISA)
 - Transition of Research Applications to Climate Services (TRACS)
 - Pacific Region Integrated Climatology Information Products
 - North Pacific Climate Regimes and Ecosystem Productivity
- The Future



NOAA's Mission and Goals

To understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social and environmental needs



- **Climate** →
- Commerce and transportation
- Ecosystems
- Weather and water
- Mission support



NOAA's Climate Mission

*Understand Climate Variability and Change to
Enhance Society's Ability to Plan and Respond*

OUTCOMES

- A predictive understanding of the global climate system on time scales of weeks to decades with quantified uncertainties sufficient for making informed and reasoned decisions
- Climate-sensitive sectors and the climate-literate public effectively incorporating NOAA's climate products into their plans and decisions





NOAA Climate Program Strategy and Associated Matrix Program Efforts

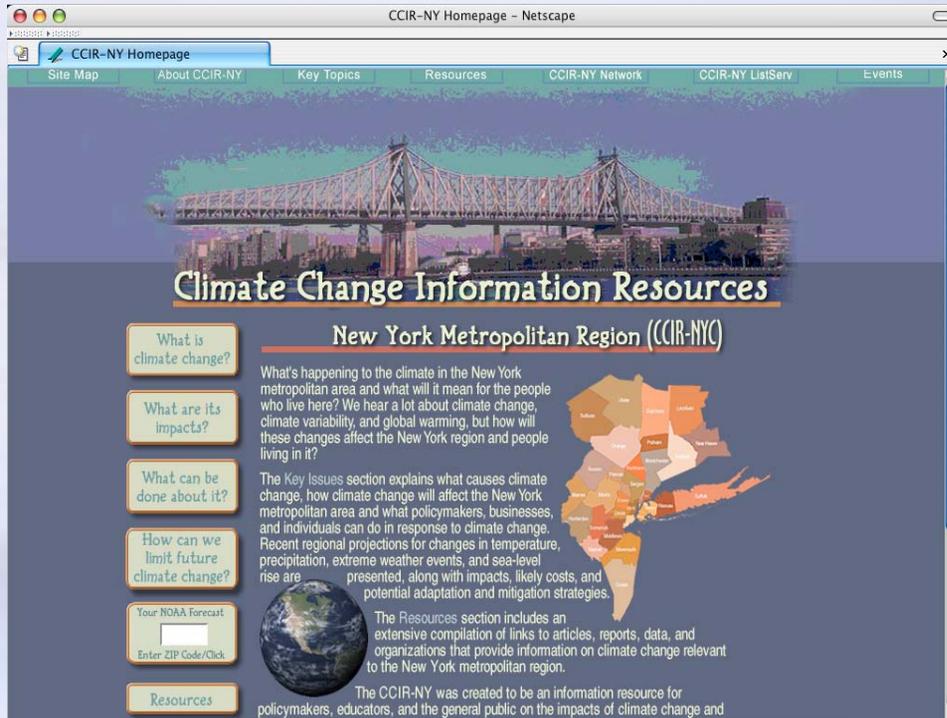
1. Describe and understand the state of the climate system through integrated observations, analysis, and data stewardship (**Climate Observations and Analysis**)
2. Reduce uncertainty in the information on atmospheric composition and feedbacks that contribute to changes in Earth's climate (**Climate Forcing**)
3. Provide climate forecasts for multiple time-scales to enable regional and national managers to better plan for the impacts of climate variability, and climate assessments and projections to support policy decisions with objective and accurate climate change information (**Climate Change Predictions and Projections**)
4. Understand and predict the consequences of climate variability and change on marine ecosystems (**Climate and Ecosystems**)
5. Provide information and tools to support decision makers in improving management of risks to the U.S. economy in sectors and areas that are sensitive to impacts from weather and climate (**Regional Decision Support**)**



Climate Decision Support Tools

Problem:

- Climate variability and climate change have near and long-term implications for decision-makers in the NYC metropolitan region.
- Little usable information is accessible on climate variability and climate change to decision-makers in the region.



Users:

- City, municipal & county planners
- Natural resource managers (e.g. National Park Service, Army Corps)
- Transportation Managers (e.g., Port Authority of NY & NJ)
- Water & waste managers
- Educators & citizens

Solution:

- Convened policy-makers, managers, and other decision-makers in the NYC metro region to understand their information needs
- Built a web site to begin to provide the types of climate change information needed by urban decision-makers.



How the NOAA Climate Program Does Business

- **Program Management and Competitive Research Grants**
 - Climate Program Office (CPO)

- **Partnerships with Stakeholders**
 - US Climate Change Science Program (CCSP)
 - Western Governors' Association
 - Coastal Services Center
 - Universities, private industry and NGOs

- **Laboratories and Centers**
 - Office of Ocean and Atmosphere Research
 - Research Laboratories – Boulder, Seattle, Miami, Princeton
 - National Weather Service
 - Climate Prediction Center, Environmental Modeling Center, Regional/Local Offices
 - National Environmental Satellite and Data Information Services:
 - Data Centers, Satellite data analysis

- **Cooperative Institutes**
 - A dozen hosted at universities across the country

- **Facilities**
 - Ships, Aircraft, Satellites, Supercomputers



Climate Influences Key Processes in Coastal Regions

- Sea level
- Precipitation patterns and associated effects on freshwater, nutrient, and sediment flow
- Ocean temperature
- Circulation patterns
- Frequency, track and intensity of coastal storms
- Levels of atmospheric CO₂ and ocean acidification





Climate Impacts Systems and Activities of Socio-economic Value in Coastal Regions

- Shorelines and developed areas
- Wetlands
- Estuaries
- Coral Reefs
- Ocean Margins and Fishery Resources
- Growth and development
- Natural hazard preparedness
- Conservation
- Energy
- Tourism
- Public health

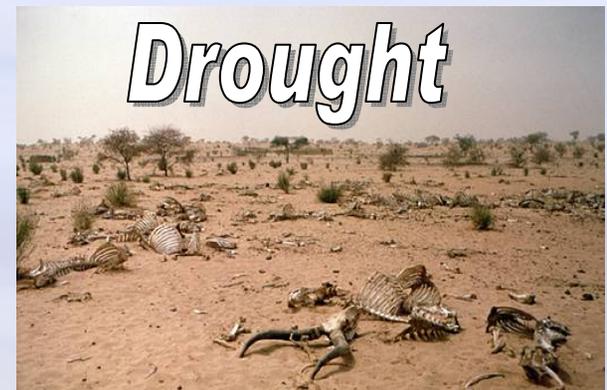
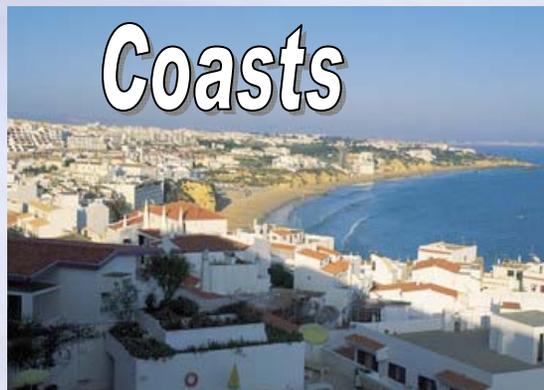




Sectoral Applications Research Program (SARP)

Objective: Catalyze and support applied, interdisciplinary research, innovative outreach and education activities designed to enhance the capacity of key socio-economic sectors to respond to and plan for climate variability and change through the use of climate information and related decision support resources

Methods: Competitive research funding for integrated projects in the physical, natural and social sciences, and focused partnerships with academia; NGOs; private sector; governments at the local, state and Federal levels





SARP Coastal Project: Decision Support Research on Impacts and Adaptation

- FY 2006: Funded projects focus on the impact and use of climate information in coral reef management and coastal hazard mitigation

Partners include WWF, TNC, ISET, NOAA Coral Reef Program, NESDIS, NOAA Earth System Research Lab and decision makers in Florida and Asia

- FY 2007: Funding competition solicited projects focused on the role of climate and climate information in coastal hazard resilience across multiple time scales, including those related to sea level rise, inundation and extreme events (funded projects will be announced soon!)
 - Impact studies (including vulnerability, potential value of climate information, and assessments of decision making needs)
 - Decision support tools to help planners consider sea level rise
 - Education/outreach/extension materials and methodologies focused on impacts and adaptation options

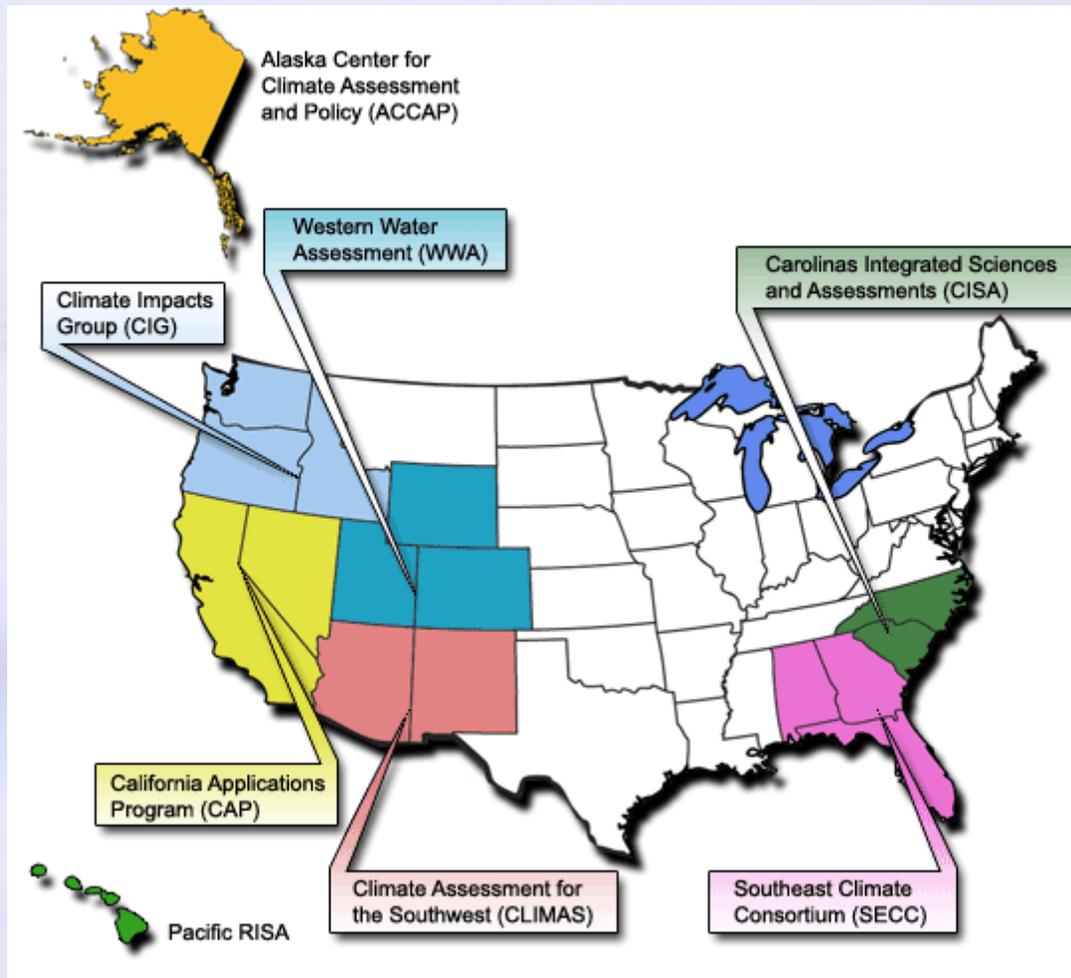


SARP Coastal Project: Building Connections with Stakeholders and Partners

- Sector requirements workshops: 1) “Climate and Water Resource Management” (May 5, 2005; Tucson, Arizona); 2) “Exploratory Discussion on the Potential Implications of Climate Variability for Coastal and Marine Resource Management and Conservation” (June 6, 2005; Silver Spring, Maryland with The Nature Conservancy); and 3) “Sea Level Rise” (May 12, 2005; Silver Spring, Maryland).
- Joint announcement on sea level rise with NOAA Coastal Services Center (CSC) and National Climatic Data Center (NCDC)
- Workshop on Climate Science and Services: Coastal Applications for Decision Making through Sea Grant Extension and Outreach (April 10-12, 2007), in partnership with Sea Grant and CSC
- 2007 Social Science Fellowships in the National Estuarine Research Reserve System, in partnership with NOAA Office of Coastal Resource Management and CSC



Regional Integrated Sciences and Assessments (RISA)



- NOAA supports **university-based teams across the U.S.** to analyze how climate impacts key sectors within a region and how climate information could help with resource management and planning within that region.

- RISAs create **strong university partnerships with federal, state, and local stakeholders** within a region.

- Example topics covered include: **Agriculture, Wildland Fire, Water Resources, Drought Planning, Fisheries, Public Health, Coastal.**

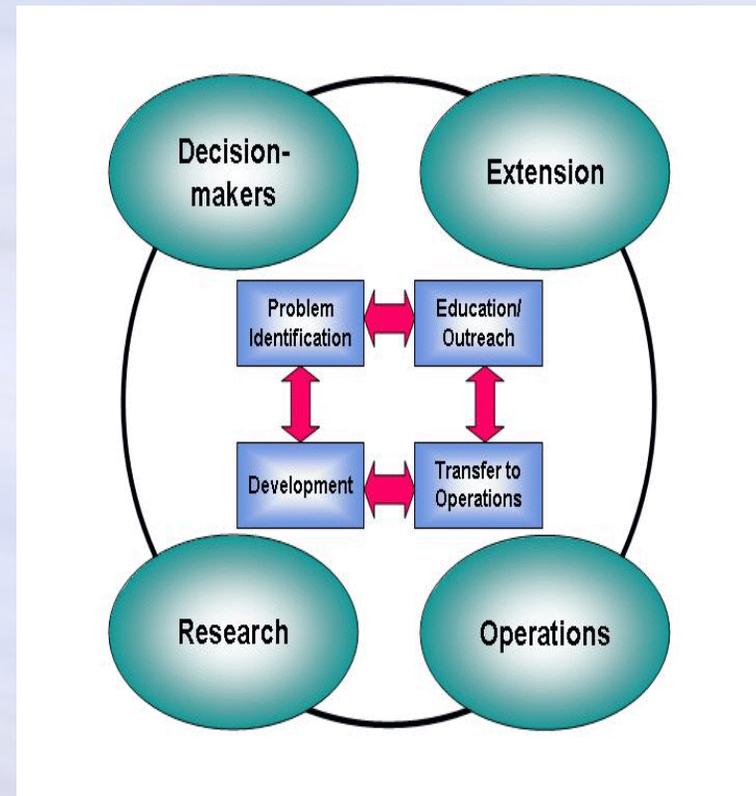


Transition of Research Applications to Climate Services (TRACS)

➤ TRACS Program Mission:

- is to transition experimentally mature climate tools, methods, and processes,
- from research mode into settings where they may be applied in an operational and sustained manner,
- generating continuous delivery of useful climate information products and services to local, regional, national, and international decision and policy makers.
- TRACS seeks not only to support implementation of these transitions,
- but also to learn from doing how better to accomplish technology transition processes for public goods applications and improved risk management.

- ## ➤ Program Method:
- Projects selected through an open funding competition

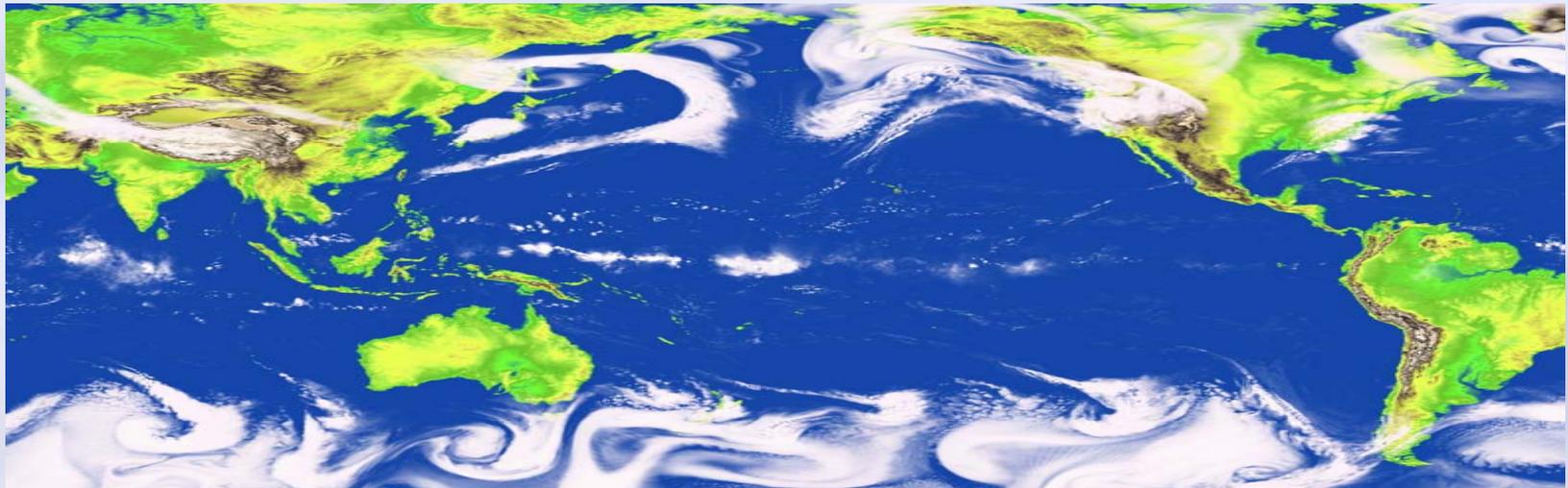




PRICIP

Pacific Region Integrated Climatology Information Products

Analyze patterns and trends of storm frequency and intensity - “storminess”- in historical records collected throughout the Pacific region; integrate the results of these analyses; and develop a suite of information products that can be used by emergency managers, mitigation planners, and other decision-makers.



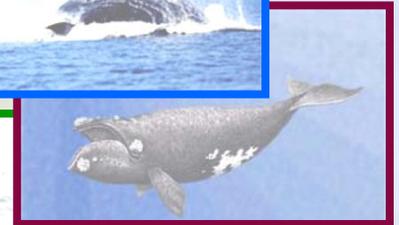


North Pacific Climate Regimes and Ecosystem Productivity

Mission: Conduct research on climate variability and ecosystem response in the North Pacific to improve scientific understanding and guidance for resource managers.

Operations: Collect information from surveys, transects and biophysical moorings in climate-sensitive, large marine ecosystems; analyze results; develop climate-ecosystem indices of ecosystem status and models to predict future states of the ecosystem and individual populations of living marine resources.

Biophysical observations in the eastern Bering Sea and northwestern Gulf of Alaska helped determine Arctic warming and its effects.



Products: Climate-ecosystem indices and forecasts for the North Pacific Fishery Management Council; data streams for AOOS and IOOS; web-based information for stakeholders and public.

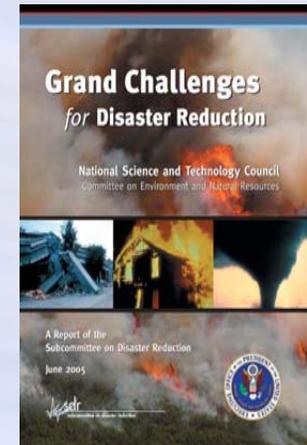
NPCREP supported through the NOAA Climate and Ecosystem Program





The Future

- Work with partners within and outside of NOAA to develop an enhanced understanding of climate-related information needs in the coastal sector, and to address these needs through applied research, decision support and outreach
- Enhance integration across coastal efforts within the Climate Program and with other NOAA Mission Goals in the context of community resilience
- Address the socio-economic aspects of climate in coastal regions in addition to the development of new products (e.g., improved forecast products, coastal climatologies)





Pathways for Addressing the Socio-economic Aspects of Climate in Coastal Regions

- The development of new stakeholder dialogues and partnerships that link NOAA research/operations and university climate scientists with coastal resource managers and planners, and the enhancement of the climate/coastal hazards/resilience elements of existing dialogues, including those underway through CPO and other NOAA programs (e.g., Coastal Storms Program, Coastal Zone Management act activities, Sea Grant, Marine Sanctuary Program, IOOS, State-based mitigation efforts)
- Assess the social and economic impacts of climate-related coastal hazards, and advance the inclusion of climate issues and information in other coastal assessment processes, many of which do not currently address climate in an explicit manner
- Multidisciplinary research on climate vulnerability/resilience, including adaptation options, in the context of multiple social, economic, and environmental stressors, and the development of decision support tools/resources that incorporate this research
- Outreach and education activities (in conjunction with NOAA partners) designed to raise awareness of the role of climate in coastal hazards and the potential value of climate information in the development of community resilience (communities must know the timing/patterns, impact and potential adaptations related to specific coastal hazards, such as sea level rise, inundation and extreme events) , and the general public