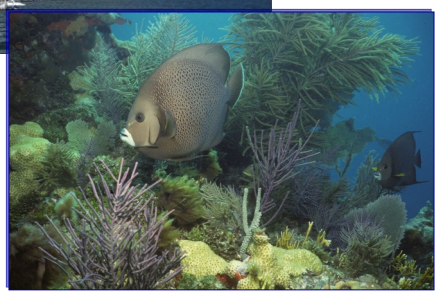
# INTEGRATED MARINE PROTECTED AREA CLIMATE TOOLS

Climate-based decision support for resource managers, scientists, and stakeholders

Entrusted with stewardship of many of the most ecologically, economically and socially important marine resources in the U.S., managers of marine protected areas (MPA), such as the NOAA National Marine Sanctuaries, need relevant, reliable, and understandable information to actively engage stakeholders and the public about the threats posed by climate variability and change. Unfortunately, much of this information is distributed across multiple sources, making integrated climate-ecosystem assessments difficult at best.

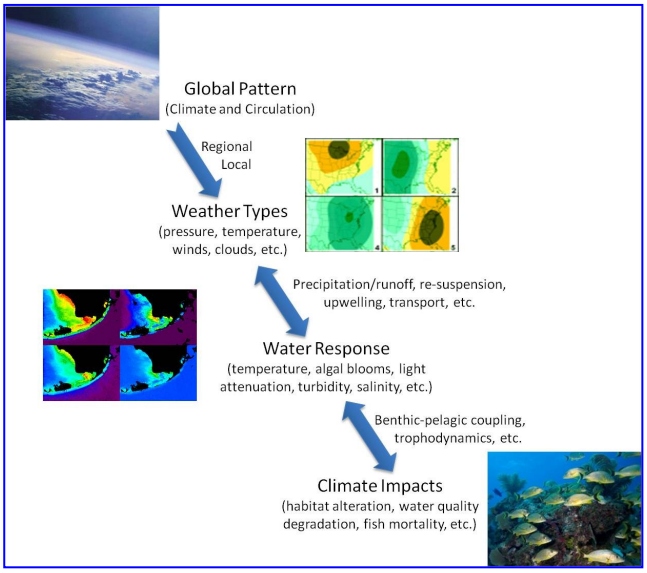


## WHAT IS IMPACT:

Integrated MPA Climate Tools (IMPACT) is a NOAA-wide and academic partnership project that utilizes existing NOAA core capabilities to develop a framework for the integration, analysis and communication of climatological, oceanographic, and ecological data; to foster the development of integrated information products; and to refine those products based on an open dialog between scientists and MPA managers. Tools will be based on scaled, integrated climatologies that help managers, scientists, and the public improve climate literacy, build and understand ecological response scenarios, as well as inform assessments of climate impacts, fully integrating existing coastal monitoring and observational networks in near-real time.

*What are the tools?*

- Climatologies (historical events, averages, extremes, trends) of environmental and ecological elements, integrated at the scale of an MPA.
- Conceptual and probabilistic models to build climate - ecosystem response scenarios for MPA managers at the regional, state and local level.
- MPA assessment reports on climate scenarios and system response, including eco-climate forecasts that describe the interactions between weather/climate and changes in water quality, habitats, and resources.




*Idealized example of how multiple factors are integrated across spatial scales to drive localized climate impacts. Many assessments neglect one or more of the intermediate steps.*

## WHY IMPACT IS NEEDED:

Managers need understandable and interpretable climate information for decision making. Developing and delivering information on changes in things like temperature, sea level, precipitation, chemistry, and circulation and how these variables drive ecosystem impacts is critical to improving climate literacy and to designing and implementing effective climate change management strategies.

IMPACT answers questions such as:

- *How quickly and how much is climate changing across and within an MPA?*
- *Is an entire MPA being affected equally by change?*
- *What climate elements are the most important drivers of ecological impacts?*

IMPACT addresses NOAA's Climate Adaptation and Mitigation, Resilient Coastal Communities and Economies, and Healthy Oceans strategic goals by providing integrated assessments of the climate system, identifying and understanding climate impacts on marine and coastal ecosystems, informing decisions and management at many levels, improving climate literacy, and providing sustained, reliable, and timely climate services to support resilient ecosystems and associated communities.

## WHERE CAN IMPACT BE USED:

IMPACT is being piloted in South Florida, but is being designed for application to the management and decision-support of any MPA.

## WHO WILL BENEFIT FROM IMPACT:

- National and regional planners who must identify and reconcile gaps in current climate/ecosystem monitoring and enhance assessment efforts.
- MPA managers who must incorporate climate change into long-range management plans, or who must be able to translate climate information into ecosystem impact stress mitigation efforts.
- Scientists who need to identify and/or better quantify the relationships between climate and ecosystem at various scales.
- Stakeholders and the public who may gain more resilient ecosystems, and who will become better informed about climate impacts.

## MORE INFORMATION ON IMPACT: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