

Resiliency and Adaptation to Climate Change and Ocean Acidification

Margaret Davidson
Director, Coastal Services Center, NOAA

Matt Larsen
Associate Director, Climate and Land Use Change, USGS

Resiliency and Adaptation to Climate Change and Ocean Acidification Strategic Action Plan (SAP 5)

National Ocean Council

Resiliency and Adaptation to Climate Change and Ocean Acidification Strategic Action Plan

Objective

Strengthen resiliency of coastal communities and marine and Great Lakes environments and their abilities to adapt to climate change impacts and ocean acidification.

Executive Summary

[To be written.]

Overview of the Priority Objective

The ocean plays a central role in shaping the Earth's climate and influencing climate variability. Because of this important relationship and the ecosystem services that the ocean, our coasts, and Great Lakes provide, global climate change and its associated impacts as well as ocean acidification pose some of the most serious threats to these ecosystems and coastal communities. Warming ocean temperatures have a profound impact on the distribution of rainfall over land, the melting of ice sheets, and the distribution and productivity of species. Sea-level rise, increased severe storm events, rapid erosion, and salt water intrusion threaten low-lying coastal communities with the destruction of infrastructure, flood inundation, the potential displacement of millions of people, and the loss of key species and habitats. At the same time, climate change is predicted to lower the water levels of the Great Lakes, thereby altering water cycles and supply, habitat, and economic uses of the Lakes. In addition, ocean acidification is expected to have significant and largely negative impacts on the marine food web, ocean ecosystems as a whole, and biological diversity in general. Since climate change and ocean acidification may have widespread impacts, increased coordination of monitoring and mapping efforts and improved is vital to understanding of the changes in the ocean are vital minimizing these minimize impacts on our marine and Great Lakes ecosystems and coastal communities. We have an opportunity and a responsibility to develop strategies for reducing the vulnerability, increasing the resilience, and improving adaptation of human and natural systems to climate change impacts, as well as for mitigating the effects of climate change itself.

The Plan Should Address:

- Research, observations and modeling needed to forecast regional and local scale climate change impacts and related vulnerabilities for natural resources, health, infrastructure, and livelihoods, including social and economic impacts;
- Better integration of ocean and coastal science into the broader climate dialogue and measures to improve understanding of the connections among land, water, air, ice, and human activities;

Objective: Strengthen resiliency of coastal communities and marine and Great Lakes environments and their abilities to adapt to climate change impacts and ocean acidification.

Resiliency and Adaptation to Climate Change and Ocean Acidification Strategic Actions

Observe
Understand
Forecast
Assess
Provide
Adapt

National Ocean Council

Resiliency and Adaptation to Climate Change and Ocean Acidification Strategic Action Plan

Objective

Strengthen resiliency of coastal communities and marine and Great Lakes environments and their abilities to adapt to climate change impacts and ocean acidification.

Executive Summary

[To be written.]

Overview of the Priority Objective

The ocean plays a central role in shaping the Earth's climate and influencing climate variability. Because of this important relationship and the ecosystem services that the ocean, our coasts, and Great Lakes provide, global climate change and its associated impacts as well as ocean acidification pose some of the most serious threats to these ecosystems and coastal communities. Warming ocean temperatures have a profound impact on the distribution of rainfall over land, the melting of ice sheets, and the distribution and productivity of species. Sea-level rise, increased severe storm events, rapid erosion, and salt water intrusion threaten low-lying coastal communities with the destruction of infrastructure, flood inundation, the potential displacement of millions of people, and the loss of key species and habitats. At the same time, climate change is predicted to lower the water levels of the Great Lakes, thereby altering water cycles and supply, habitat, and economic uses of the Lakes. In addition, ocean acidification is expected to have significant and largely negative impacts on the marine food web, ocean ecosystems as a whole, and biological diversity in general. Since climate change and ocean acidification may have widespread impacts, increased coordination of monitoring and mapping efforts and improved is vital to understanding of the changes in the ocean are vital minimizing these minimize impacts on our marine and Great Lakes ecosystems and coastal communities. We have an opportunity and a responsibility to develop strategies for reducing the vulnerability, increasing the resilience, and improving adaptation of human and natural systems to climate change impacts, as well as for mitigating the effects of climate change itself.

The Plan Should Address:

- Research, observations and modeling needed to forecast regional and local scale climate change impacts and related vulnerabilities for natural resources, health, infrastructure, and livelihoods, including social and economic impacts;
- Better integration of ocean and coastal science into the broader climate dialogue and measures to improve understanding of the connections among land, water, air, ice, and human activities;

Resiliency and Adaptation to Climate Change and Ocean Acidification Strategic Actions

Action 1: Strengthen and integrate observations from the Nation's protected areas, research sites, and observing systems into a coordinated network of "sentinel sites" that track changes in the condition of ocean, Great Lakes and coastal environments and communities for use in early-warnings, forecasts, vulnerability assessments, and evaluation of adaptation to impacts of climate change and ocean acidification.

Action 2: Understand the impacts of climate change, sea and lake level change and ocean acidification to support forecasts, vulnerability assessments, and adaption actions.

Action 3: Forecast the impacts of climate change, sea and lake level change, and ocean acidification at temporal and spatial scales relevant for use in vulnerability assessments and adaption decision-making.

Action 4: Assess the vulnerability of the coastal, Great Lakes, and ocean environments and communities to help decision makers plan and implement actions that reduce risks and increase adaption in a changing climate.

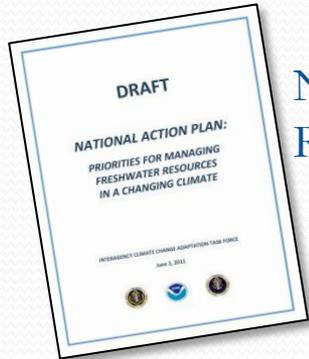
Action 5: Provide accessible, timely, and relevant climate change and ocean acidification information, tools, guidance, and services to support decision making at all scales.

Action 6: Design, implement, and evaluate adaptation strategies in order to reduce vulnerabilities and promote risk-wise decisions.

Intersection With Other SAP's

- Strategic Action Plan 7: Water Quality and Sustainable Practices on Land
 - Action 5: Assess public and wildlife health risks of impaired coastal and Great Lakes waters. SAP 5 Action 4 includes an assessment of the vulnerabilities of the coastal, Great Lakes and ocean environments.
 - Action 6: Provide warning and reduce public health risks of impaired coastal and Great Lakes waters. SAP 5 Action 6 envisions using information to reduce vulnerabilities and promote risk-wise decisions.
- Strategic Action Plan 8: Changing Conditions in the Arctic
 - Action 2: Observe and forecast Arctic sea ice. SAP 5 Action 1 proposes to track changes in the condition of the ocean.
- Strategic Action Plan 9: Ocean, Coastal, and Great Lakes Observations, Mapping, and Infrastructure
 - Action 3: Use advanced observation and sampling technologies to observe and study global processes. SAP 5 Action 1 intends to integrate observations from the Nation's protected areas, research sites, and observing stations in order to track changes in the condition of ocean, Great Lakes and coastal environments.

Intersection with Other Interagency Plans

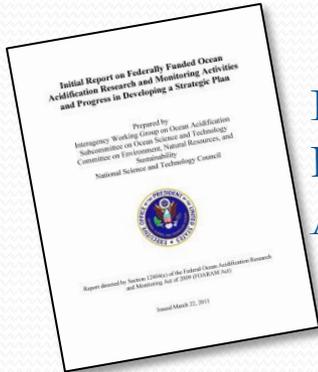


National Action Plan: Priorities for Managing Freshwater Resources in a Changing Climate

Strategic Action Plan 5 intersects with:

- Recommendation 1: Establish a planning process to adapt water resources management to a changing climate. SAP 5 Action 2 calls on the use of updated science and information to support adaptation actions.
- Recommendation 2: Improve water resources and climate change information for decision making. SAP 5 Action 5 includes providing information on climate change and ocean acidification to decision makers at all scales.
- Recommendation 3: Strengthen assessment of vulnerability of water resources to climate change. SAP 5 Action 4 includes an assessment of the vulnerabilities of the coastal, Great Lakes and ocean environments.

Intersection with Other Interagency Plans



Interagency Working Group on Ocean Acidification's Strategic Plan for Federal Research and Monitoring on Ocean Acidification

Strategic Action Plan 5 intersects with:

- Theme 1: Monitoring of Ocean Chemistry and Biological Impacts. SAP 5 Action 1 calls for tracking changes in the condition of the ocean.
- Theme 2: Research to Understand Responses to Ocean Acidification on Marine Ecosystems. SAP 5 Action 2 calls on the use of updated ocean acidification science to conduct vulnerability assessments.
- Theme 3: Modeling to Predict Changes in the Ocean Carbon Cycle and Impacts on Marine Ecosystems and Organisms. SAP 5 Action 3 calls for forecasting the impacts of ocean acidification for use in vulnerability assessments.
- Theme 5: Assessment of Socioeconomic Impacts and Development of Strategies to Conserve Marine Organisms and Ecosystems. SAP 5 Actions 4 calls for an assessment of the vulnerabilities of ocean environments to help decision makers reduce risks.
- Theme 6: Education, Outreach, and Engagement Strategy on Ocean Acidification. SAP 5 Action 5 calls for accessible, timely and relevant ocean acidification information to be disseminated to decision makers at all scales.

Intersection with Other Interagency Plans



U.S. Global Climate Research Program's DRAFT Strategic Plan 2012-2021

Strategic Action Plan 5 intersects with:

- **Goal 2: Inform Decisions:** Provide the scientific basis to inform, support, and enable timely decisions on adaptation and mitigation. SAP 5 Action 5 calls for accessible, timely and relevant information to be used to support decision makers at all scales.
- **Goal 3: Sustain Assessment:** Build sustained assessment capacity that improves the nation's ability to understand, anticipate, and respond to global and climate change impacts and vulnerabilities. SAP 5 Action 1 calls for tracking the changes in the conditions of the oceans, Great Lakes and coastal communities for use in early-warnings, forecasts, vulnerability assessments, and evaluation of adaptation to impacts of climate change and ocean acidification.

Intersection with Other Interagency Plans



- The National Climate Assessment recognizes the high potential for duplicative efforts between their objectives and Strategic Action Plan 5. As a result, the NCA calls for early coordination between themselves and the National Ocean Council.
- One of the key objectives of the National Climate Assessment is to establish an ongoing, national-scale, consistent and replicable approach to assessing current and projected climate impacts and climate-related risk in the context of other stressors. The intent of this effort is to identify opportunities as well as risks associated with changes in climate conditions. An ongoing component will be work towards attribution/explanation of events and trends that are observed in the climate system. This information will be used to prioritize federal activities that support adaptation and mitigation decisions made within the states, regions and sectors and to constantly reassess priorities for federal science investments.

Questions?

Margaret Davidson

Margaret.davidson@noaa.gov or 843-740-1220

Matt Larsen

mclarsen@usgs.gov or 703-648-5215