NOAA Ocean, Coastal, and Great Lakes Acidification Research Plan: 2020-2029 Highlights

Why acidification science matters?

Ocean, coastal, and Great Lakes acidification represents the changes in water chemistry resulting in ecological impacts with cascading social and economic effects. With a $1 billion U.S. shellfish industry and hundreds of thousands of jobs at risk, understanding acidification in the oceans and Great Lakes is important to protecting our economies and well-being. This plan focuses on acidification research to understand the ecosystem-related impacts to commercial activities, subsistence and recreational fishing, tourism, and social and cultural identities.

Our changing waters

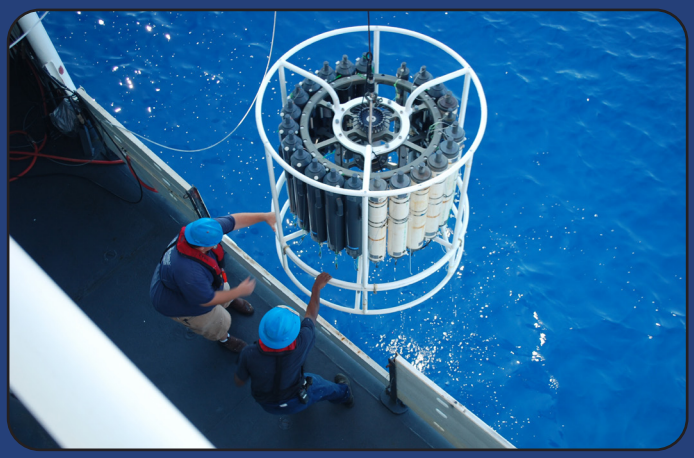
Acidification is driven primarily by absorption of carbon dioxide (CO_2) gas from the atmosphere by the ocean and Great Lakes. This fundamentally changes water chemistry and can make it difficult for some living organisms like coral reefs and shellfish to grow and maintain their shells and skeletons. It can also affect the development and behavior of certain fish and harmful algae.

Research progress

Over the last decade, NOAA has monitored chemistry changes around the nation including in *remote coral reef ecosystems*, documented how ocean chemistry has *changed over the past century*, and increased understanding of how ocean and coastal acidification may *impact valuable U.S. fisheries*. While much research has been carried out, more is needed to fully understand the impact acidification has on all ecologically and economically important marine and freshwater species and ecosystems.

Congressional Direction

The Federal Ocean Acidification Research and Monitoring Act of 2009 (Act 33; U.S.C. Chapter 50, Sec. 3701-3708) directs NOAA to actively monitor and research ocean acidification to understand the consequences for marine organisms; to evaluate the ecosystems and socioeconomic impacts; and to identify adaptation strategies and techniques for conserving marine ecosystems. Given NOAA's research and management role in the Great Lakes, the plan directs works in this freshwater system, as well.



Scientists collect water samples to measure ocean acidification from a NOAA vessel.

NOAA research suggests that the Dungeness crab fishery, the most valuable on the West Coast, may decline due to ocean acidification.

Collaborating across the U.S.

The NOAA Ocean, Coastal, and Great Lakes Acidification Research Plan **is an agency-wide strategy, written by nearly 70 federal researchers and academic partners, to guide acidification science for the coming decade. The plan is comprised of chapters, each focusing on a different U.S. region, as well as a *national chapter*, which draws upon all of the regional and open ocean needs to identify research priorities for the entire U.S.**

Observing and Predicting Acidification and Environmental Change

Expand and advance acidification observing systems and technologies

Enhance foundational understanding and the ability to predict acidification

Support data management and synthesis efforts to ensure data are transitioned to useful products

Understanding Biological Sensitivity and Ecosystem Response

Understand and predict species, community, and ecosystem response

Determine the adaptive capacity of ecologically and economically important species

Evaluate acidification impacts in combination with other environmental stressors

Supporting Management, Adaptation, and Resilience

Integrate scientific knowledge into social, cultural, and economic frameworks

Create products and tools to directly address adaptation and management needs

Assess the vulnerability of communities to acidification in combination with other environmental changes

Research by Region

Learn about plans for research in each region by clicking on the images below

ENVIRONMENT — Observations and predictions are important to tracking the progression of acidification and informing management choices

SENSITIVITY — Understanding species, community, and ecosystem response and the species' adaptive capacity aid in developing conservation, restoration, adaptation, and mitigation plans

HUMAN DIMENSIONS — Translating scientific results to determine the social, cultural, and economic impacts help to prepare communities and industries for future change