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Alaska Ocean Acidification Network

Working to Understand Ocean Acidification to Help Alaskans Adapt

Why is Ocean Acidification a Concern for Alaska?

Scientists estimate that the ocean has increased in acidity by 30% over the last 300 years due to increased carbon dioxide in the atmosphere from human activities. Higher acidity water affects the ability of shell-building organisms to develop and maintain their shells, and may also affect the behavior of some fish species. Since the most susceptible species are often key components of the food chain, researchers expect the effects of ocean acidification (OA) to be felt throughout the ecosystem. Alaska is predisposed to OA due to its colder water temperature, making it likely that we will feel the effects sooner and more intensely than other regions. This could dramatically affect the lives and livelihoods of Alaskans, including the $6 billion Alaska seafood industry.

What is the Network?

The Alaska Ocean Acidification Network was developed to expand the understanding of OA processes and consequences in Alaska, as well as potential adaptation and mitigation actions. The network helps connect scientists and coastal communities to identify knowledge gaps, recommend regional priorities, share data, and disseminate information throughout Alaska.

What You Can Do

- Learn more on the network website
- Join the list serve
- Connect with OA experts using the 'Expertise Database'
- Host a speaker in your community
- Let your elected officials know you care about these issues
- Support the transition to clean energy to drive down carbon emissions

Partners

- Alaska Bering Sea Crabbers
- Alaska Marine Conservation Council
- Alaska Marine Highway System
- Alaska Longline Fishermen's Association
- Alaska Sea Grant
- Alaska Shellfish Growers Association
- Aleut Community of St. Paul
- Alutiiq Pride Marine Institute
- Bering Sea Fisheries Research Foundation
- Hakai Institute
- Kachemak Bay Research Research
- Kodiak Area Native Association
- Meridian Institute
- NOAA Alaska Fisheries Science Center
- NOAA Kasitsna Bay Lab
- NOAA Ocean Acidification Program
- North Pacific Research Board
- Northern Latitudes Partnership
- North Slope Wildlife Dept
- Oregon State University
- Prince William Sound Science Center
- Renewable Energy Alaska Program
- Sitka Sound Science Center
- Sitka Tribe of Alaska
- University of Alaska
- United Fishermen of Alaska
- 20 communities collecting water samples
- And more!

Share ideas or feedback with the Network

AOOS
Alaska Ocean Observing System

https://aoan.aoos.org/

Kesten Bozinovic

August 2024

How and Where are We Monitoring?


UAF OARC

Fixed Moorings: OA sensors tethered to the ocean floor are located in the northern Gulf of Alaska, Bering Sea, Chukchi Sea, and Beaufort Sea. Short-term sensors have also been installed in kelp and shellfish farms.

UAF

Autonomous Gliders: Gliders can cover large geographic areas throughout the water column for weeks at a time at relatively low cost.


NOAA

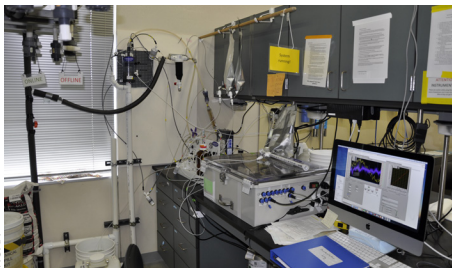
Ship-based Water Samples: Repeat water samples have been taken on a transect extending from Seward out into the Gulf of Alaska. NOAA also conducts ship-based monitoring every few years.


AMHS

Sensor-equipped Vessels: Between 2017 and 2019, the Alaska Marine Highway ferry M/V *Columbia* collected OA data during its 1,854 mile weekly roundtrip run between Bellingham, WA and Skagway, AK.


CRRC

Shoreside Sampling: Community-based sampling, primarily led by Tribes, is creating in baseline carbon chemistry data in nearly 20 communities across the state.


NOAA

Burke-o-Lators: Often co-located at hatcheries, these high-accuracy systems analyze multiple OA parameters and provide a clear picture of real-time conditions. Burke-o-Lators are located in Seward, Kodiak, and Sitka.

What Are We Learning?

- The Gulf of Alaska, the Chukchi Sea and Bering Sea are currently experiencing seasonally corrosive conditions, and the Beaufort Sea is starting to experience sustained corrosive conditions. These conditions mean there is a decreasing amount of water favorable for species like shell builders.
- Year round monitoring shows large seasonal fluctuations in carbon chemistry due to temperature, glacial runoff, phytoplankton blooms and circulation. Fall and winter tend to be more acidic than spring and summer, and bottom water tends to be more acidic than surface water.
- Studies show most Alaska crab species are sensitive to a rise in acidity, with red king crab and Tanner crab showing the strongest responses. These species consistently exhibited decreased growth and increased mortality at multiple life-history stages.
- Research on salmon is still in the early stages but also shows negative impacts. In higher acidity water, coho salmon exhibited a reduced sense of smell and were unable to distinguish the smell of a predator. A 6-week study on juvenile pink salmon showed salmon exposed to more acidic water grew more slowly, had smaller body length, increased metabolism, and elevated cortisol (meaning they were undergoing stress).
- For many fish, including salmon, ocean acidification is expected to be a multi-stressor. The impacts may be sublethal – the acidity won't kill the fish – but the added stress is likely to reduce their ability to rebound from factors such as warming.
- Long term lab studies are challenging to conduct and may not reflect natural conditions. Additionally, there is large natural variability in OA drivers in Alaska waters. A commitment to long-term monitoring and research is needed to understand trends and guide future responses.

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A program of the Alaska Ocean Observing System

https://aoan.aoos.org/