

Alaska fisheries and communities at risk from ocean acidification

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Fishermen from Homer, Alaska haul in tanner crabs, one of the fisheries that research is showing may be affected by ocean acidification. Credit: Mathis/NOAA

Ocean acidification is driving changes in waters vital to Alaska's valuable commercial fisheries and subsistence way of life, according to

new NOAA-led research that will be published online in *Progress in Oceanography*.

Many of Alaska's nutritionally and economically valuable marine fisheries are located in waters that are already experiencing ocean acidification, and will see more in the near future, the study shows. Communities in southeast and southwest Alaska face the highest risk from ocean acidification because they rely heavily on fisheries that are expected to be most affected by ocean acidification, and have underlying factors that make those communities more vulnerable, such as lower incomes and fewer employment opportunities.

The term "ocean acidification" describes the process of ocean water becoming more acidic as a result of absorbing nearly a third of the [carbon dioxide](#) released into the atmosphere from human sources. This change in ocean chemistry is affecting marine life, particularly the ability of shellfish, corals and small creatures in the early stages of the food chain to build skeletons or shells.

Studies show that red king crab and tanner crab, two important Alaskan fisheries, grow more slowly and don't survive as well in more acidic waters. Alaska's coastal waters are particularly vulnerable to ocean acidification because of cold water that can absorb more carbon dioxide, and unique ocean circulation patterns which bring naturally acidic deep ocean waters to the surface.

"We went beyond the traditional approach of looking at dollars lost or species impacted; we know these fisheries are lifelines for native communities and what we've learned will help them adapt to a changing ocean environment," said Jeremy Mathis, Ph.D., co-lead author of the study, an oceanographer at NOAA's Pacific Marine Environmental Laboratory in Seattle, and the director of the University of Alaska Fairbanks School of Fisheries and Ocean Sciences Ocean Acidification

Research Center.

The research presented in the new study examines the potential effects on a state where the fishing industry supports over 100,000 jobs and generates more than \$5 billion in annual revenue and helps maintain the U.S. balance of trade in the global economy. Additionally, approximately 120,000 people or roughly 17 percent of Alaskans rely on subsistence fisheries for most, if not all of their dietary protein. Fishery-related tourism also brings in \$300 million annually.

"Ocean acidification is not just an ecological problem—it's an economic problem," said Steve Colt, Ph.D., co-author of the study and an economist at the University of Alaska Anchorage. "The people of coastal Alaska, who have always looked to the sea for sustenance and prosperity, will be most affected. But all Alaskans need to understand how and where ocean acidification threatens our marine resources so that we can work together to address the challenges and maintain healthy and productive coastal communities."

The study recommends that residents and stakeholders in vulnerable regions prepare for this environmental challenge and develop response strategies that incorporate community values and needs. "This research allows planners to think creatively about ways to help coastal communities withstand environmental change," said Sarah Cooley, Ph.D., co-lead author who was at the Woods Hole Oceanographic Institution while doing the research and is now science outreach manager at Ocean Conservancy, in Washington, D.C. "Adaptations can be tailored to address specific social and environmental weak points that exist in a community."

While acknowledging that the most important way to address [ocean acidification](#) is by reducing carbon dioxide emissions globally, the research shows that by examining all the factors that contribute to risk,

more opportunities can be found to prevent harm to human communities at a local level. Decision-makers can address socioeconomic factors that lower the ability of people and communities to adapt to environmental change, such as low incomes, poor nutrition, lack of educational attainment and lack of diverse employment opportunities. NOAA's Ocean Acidification Program and the state of Alaska are also developing tools to help industry adapt to increasing acidity.

Provided by NOAA Headquarters

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