University of Alaska Fairbanks Ocean Acidification Research Center

Assessing the Impacts of Ocean Acidification on Alaska's Fisheries

- Ocean Acidification (OA) begins when a portion of CO_2 released into the air is absorbed by the sea. Increased CO_2 in the seawater increases the acidity and reduces the availability of calcium carbonate minerals, which are the building blocks of shells and skeletons for many marine organisms, like the pteropod, a major food source for salmon.

Photo by Russ Hopcroft

Pteropod

- Marine waters around Alaska are quickly becoming dangerous to shell building organisms, such as crabs, clams and oysters due to OA. This process could have profound and lasting consequences in the coastal oceans of Alaska, which are uniquely sensitive and susceptible to further reductions in ocean pH.

- The $2.7M requested in the UA FY13 capital budget request will be combined with $750k from external awards to expand the number of OA buoys in Alaska. The data from these buoys will provide an early warning system for Alaska's fisheries and will be combined with other environmental data and fish stock assessments. This will make it possible for the first time ever, to develop an economic model to quantify the costs of OA to Alaska now and in the future.

- The coupled ocean acidification-economic model will combine new data from environmental, economic, and social science sources to fully constrain the financial, as well as the societal impacts of OA in Alaska.

- For the sake of our state's economy, and future generations of fishermen, we need to aggressively pursue a full understanding of OA so that through technological innovations, management, and sound decisions we can keep our fishing grounds productive and our oceans secure.

OA buoy - Resurrection Bay.
Photo by Jeremy Mathis

For more information contact Dr. Jeremy Mathis (http://www.sfos.uaf.edu/oarc/)

Ocean Acification

While NSF has started to make investments in Ocean Acidification (OA) research, very little of this funding is directed toward work in Alaska and none of it addresses the issues that UA has identified in the FY13 capital budget request.

NSF-sponsored research will improve Alaska's understanding of ocean acidification in general, but it will not be particularly useful for managing the fisheries in the state.NSF research is directed towards understanding the global processes (i.e. fundamental science questions) that are causing ocean acidification.

In 2011, NSF committed ~$21M to ocean acidification research around the globe. Only about 5% of that was directed towards research in Alaska. As federal funding for scientific research is reduced in the next few years it is likely that even less money will be spent on ocean acidification issues in Alaska.

UA's request is specifically designed to do the things that NSF will never do, but are absolutely critical to sustaining the fisheries in Alaska.Ocean acidification could disrupt several fisheries in Alaska both directly and indirectly.For many commercial species (i.e. crabs, clams, oysters) that form carbonate shells the impacts of ocean acidification will include a reduction in their ability to form and maintain healthy shells. This could cause a reduction in size, and could even lead to increase mortality, particularly at early life stages.

In addition, other non-calcifying species such as salmon may be impacted by a loss of prey. Salmon and many other commercial species of fish feed on microscopic organisms that form carbonate shells.If ocean acidification begins to diminish these prey populations, then there will be a cascading effect in the food web, with a reduction or possible collapse of certain commercial fisheries.Other states, particularly along the west coast (Washington and Oregon), where ocean acidification is already disrupting certain fisheries (i.e. oyster hatcheries) have already begun building a network of coastal observing systems that can provide real-time data to their stakeholders.

Right now, Alaska doesn't even know if the fisheries around Alaska are being impacted by OA due to a lack of data.NSF is never going to pay for monitoring efforts around the state and NOAA's budget cuts are going to make it impossible for them to provide these resources.An investment from the state is the only means of establishing the baseline ocean acidification data that is necessary to predict the economic impacts of ocean acidification as well as establish a monitoring program that will serve as an early warning system for the fisheries in the state.

The longer Alaska waits to establish these monitoring efforts the greater the risk is that Alaska will miss a fundamental shift in water chemistry that could drive declines incertain fisheries stocks.NSF funding will answer hypothesis-driven science questions, but without an investment from the state Alaska will never obtain the data needed to develop practical solutions to the ocean acidification problem.