COLLEGE OF THE ENVIRONMENT / UNIVERSITY *of* WASHINGTON

OCEAN ACIDIFICATION

Ocean acidification is a growing environmental concern that can affect marine ecosystems and economies worldwide. Scientists from the College of the Environment and their partners operate at the leading edge of this burgeoning field, engaging in core research to better understand the fundamentals of ocean acidification and help guide actions to minimize its impacts on ecosystems and society.

UNDERSTANDING OCEAN ACIDIFICATION

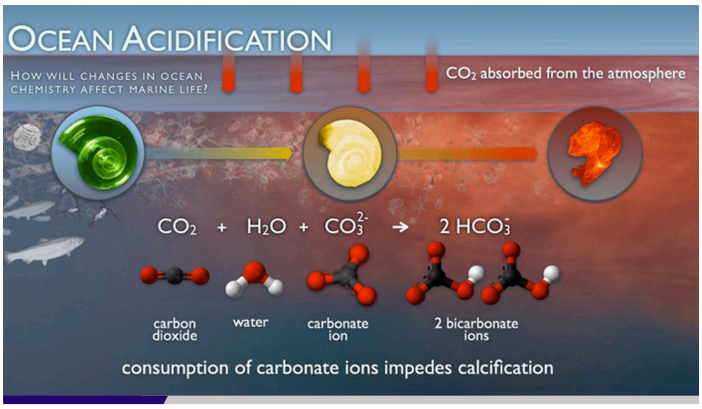
Signatures of human activity are surfacing in environments and ecosystems the world over. These include the global oceans where a measurable decline in seawater pH—from about 8.2 to 8.1—over the past 200 years has been recorded. It doesn't sound like much, but because the pH scale is logarithmic—like the earthquake-measuring Richter scale—this change represents a nearly 30% increase in the acidity of ocean water. Driving this change is the fact that the oceans absorb about one-quarter of the CO_2 produced by human activities every year, causing chemical reactions that lead to lower pH in seawater. As a result, the availability of calcium carbonate—a key component of shells and skeletons—is reduced. And for animals like corals and shellfish, this really matters.

ADDRESSING OCEAN ACIDIFICATION

Key to the College's leadership and success is training students and young scientists in ocean acidification research while continuing to build its broad network of collaborators and partners across academic, government, industry, tribal, and NGO entities, all of which are focused on better understanding the cause and consequences of ocean acidification.

ADVANCING THE SCIENCE

Central to testing any scientific theory is the ability to perform experiments in the field and laboratory. Multiple laboratories on campus are doing just that, whether it's studying the effects of corrosive waters on shellfish development or better understanding how ocean acidification manifests in different parts of the global ocean. The Friday Harbor Laboratories now operate the Ocean Acidification Environmental Laboratory, which has far-ranging capabilities including a chemistry lab, an indoor lab to manipulate ocean conditions, and a field-based lab to run experiments closer to a real-world setting. These facilities and others on campus provide a setting for scientists from around the globe to collaborate and compare results from other ocean basins, adding to the network of knowledge that supports our understanding of changing oceans.



The chemistry behind ocean acidification.
(Diagram: PMEL Carbon Group, www.pmel.noaa.gov/co2/)

CONNECTING WORLD-CLASS KNOWLEDGE TO SOLVE LOCAL CHALLENGES

Washington's Puget Sound is particularly susceptible to the effects of ocean acidification. As recommended by the Washington Sea Grant led Blue Ribbon Task Force, the Washington Ocean Acidification Center was established under direction from the State Legislature and Governor Inslee. The Center brings together scientists, industry representatives, state, local, federal, and tribal policy makers, and others to address five priority actions focused on mitigating and adapting to ocean acidification. The Center is led by the College of the Environment and is modeled after the Climate Impacts Group, a leader in developing and delivering decision-relevant science.

FOSTERING NEW LEADERS

Integrative Graduate Education and Research Traineeship (IGERT) Award

Faculty in the College's School of Marine and Environmental Affairs successfully competed for a prestigious National Science Foundation Integrative Award, which provides $3 million over the course of five years to examine how our oceans are changing. Cornerstone to the program is training the next generation of scientists to elucidate those changes—from climate change and ocean acidification to warming waters and the spread of invasive species—and what we can do to safeguard ecosystems and the resources we depend on from the sea.

Ocean Acidification Courses

Addressing this important emerging issue, College of the Environment faculty now offer courses in which students study ocean acidification from diverse perspectives. A new graduate field course in ocean acidification research was offered in Summer 2011 at the Friday Harbor Laboratories—this was the first offering of its sort anywhere in the U.S., and students came from across the country to participate.

BUILDING STRONG PARTNERSHIPS

Beyond the new Washington Ocean Acidification Center, researchers at the College strengthen their work—both in terms of scientific rigor and application to real-world scenarios—through rich collaborations and partnerships with government, industry, tribes, and others. There are many emerging and established partnerships at the College, including:

Government: Residing within the College of the Environment is the Joint Institute for the Study of the Atmosphere and Ocean, fostering collaboration between partners at the National Oceanic and Atmospheric Administration (NOAA) Pacific Marine Environmental Lab, Fisheries Science Center, and UW. Scientists focus on the physical and chemical aspects of ocean acidification and how these in turn affect the well-being of various marine species.

Industry: The shellfish industry—worth more than $270 million annually in just Washington alone—continues to work with UW scientists and other partners to promote best practices to safeguard shellfish from the corrosive effects of ocean acidification.

Tribes: Scientists from the College partner with Puget Sound Indian tribes to assess the impact of ocean acidification on marine resources, and also team up with students and faculty—like at the Northwest Indian College, for example—for field-based research and learning.

Corals, shell-bearing animals and other calcifiers may be adversely affected by ocean acidification. (Photos: J. Meyer)

For more information, please contact the College of the Environment at: 206.685.5410 or coenv@uw.edu