National Caucus of Environmental Legislators

NCEL Fact Sheet: Ocean Acidification

Ocean acidification (OA) is the name for the process of the oceans becoming more acidic due to increased levels of carbon dioxide in the atmosphere. This change threatens ocean ecosystems, the food chain and the livelihood of coastal residents.

Key Points:

- The ocean absorbs 25-30 percent of carbon dioxide emissions from the atmosphere, roughly 22 million tons per day, according to NOAA.
- As the ocean absorbs carbon dioxide, it reacts with water molecules to form carbonic acid, thereby increasing the overall acidity.
- The oceans are acidifying at a rate 100 times faster than any time in the last 200,000 years, and perhaps all of Earth's history, according to a 2012 study.
- Fishermen and the aquaculture industry will lose jobs and profits due to OA. A 2009 study found that mollusk—shelled animals like oysters—sales could drop between $75 and $187 million annually due to acidic ocean conditions.
- OA puts commercially and culturally important species such as lobsters, clams and oysters at risk. More information is needed about the extent of OA in specific regions and how to best mitigate those effects.

Legislation:

- In 2012, Washington State created the Blue Ribbon Panel to review OA research and issue recommendations. The Marine Resources Advisory Council was subsequently created to establish a coordinated response to OA and engage in public outreach. More information, including bill text, is available here.
- Maine and Maryland task forces have completed reviews, and legislators in those states are now looking to implement recommendations. Massachusetts, Rhode Island, New Hampshire and Oregon have introduced similar bills to establish an OA task force.

More information:

The acidic conditions created by CO_2 emissions are harming fisheries, aquaculture farms, coastal recreation and diversity in the ocean. Animals like oysters and clams use a substance called calcium carbonate to build their shells. Acidic water erodes that calcium carbonate and makes the organisms fragile, much like osteoporosis in a human. Even worse, the acidity could completely eliminate animals like the pteropod—a type of sea snail—that serve as a key food source for small fish, which in turn feed commercial fish like salmon and tuna. Investing in long-term research will help determine specific impacts of OA and will lead to the development of effective management and mitigation tactics to preserve our economies and ecosystems.

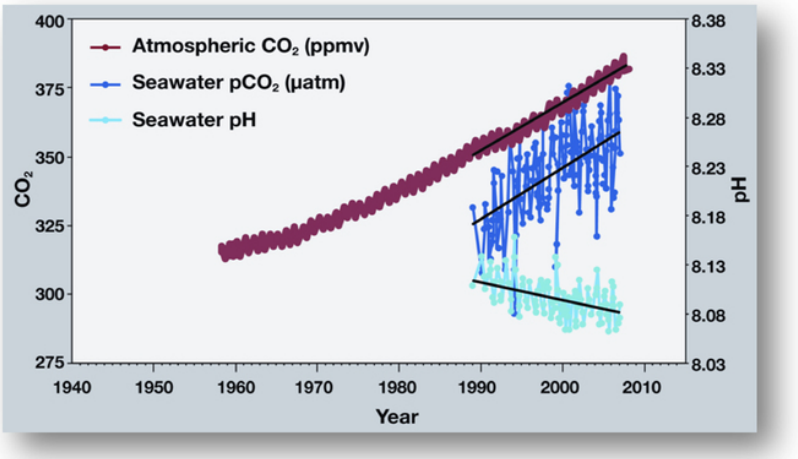
Other relevant information:

- A $500,000 OA monitoring investment in the struggling West Coast shellfish industry is expected to provide $35 million in benefits.

- The Gulf of Maine has the lowest ability to resist acidification along the entire Eastern Seaboard, according to a study by Woods Hole Oceanographic Institute.

- Washington State's staple seafood economy is at risk from OA. This industry alone is worth $1.7 billion and provides more than 42,000 jobs to the state's economy.

- By 2050, coastal waters are expected to be 70 percent more corrosive than in the pre-industrial era.



This graph shows the correlation between rising levels of carbon dioxide (CO_2) in the atmosphere at Mauna Loa with rising CO_2 levels in the nearby ocean at Station Aloha. As more CO_2 accumulates in the ocean, the pH of the ocean decreases. (Modified after R.A. Feely, Bulletin of the American Meteorological Society, July 2008)

The graph is available here: http://www.pmel.noaa.gov/co2/file/Hawaii+Carbon+Dioxide+Time-Series