

# Seattle Post-Intelligencer

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## Corrosive ocean water moving inland

### Increased acidity wasn't expected for 100 years

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**By LISA STIFFLER**  
P-I REPORTER

The ocean is getting more corrosive closer to shore decades earlier than anyone expected, in large part because of the carbon dioxide being pumped into the air by human activities, new research shows.

The increasingly acidic water threatens the survival of a wide range of organisms, including certain microscopic plants and animals called plankton found at the base of the food chain; shellfish such as oysters, mussels and clams; juvenile forms of different marine animals; and coral. The acidity can dissolve the shells and skeletons of these creatures.

Carbon dioxide -- made infamous for fueling global warming -- partially is absorbed by the world's oceans, but it changes the pH or acidity of the seawater. Scientists collecting water samples from Canada to Mexico last summer found surprisingly acidic conditions near the coasts.

"This is what we might expect the surface water pH to be 100 years from now," said Richard Feely, an oceanographer with NOAA Pacific Marine Environmental Laboratory in Seattle. He's the lead author of a paper released Thursday in the online version of the journal *Science*.

About one-third of the carbon dioxide produced when fossil fuels are burned sinks into the ocean. Windy conditions found from early spring to late summer cause an upwelling of deeper, more acidic water to near the surface along the West Coast.

Earlier work by Feely and colleagues documented more corrosive water in the open ocean at deeper depths; the new study marks the first time researchers looked at the shallower coastal shelf where more marine plants and animals could be at risk. The study documented corrosive water as close as four miles from the northern California coast.

"This is a startling result," said Edward Miles, a professor with the University of Washington's Climate Impacts Group and School of Marine Affairs. He was not part of the study.

"It means the global community needs to pay much more attention to documenting what is going on in the global coastal ocean as well," he said.

Sen. Maria Cantwell will host a field hearing Tuesday in Seattle on the effects of climate change and ocean acidification on this region. Last year, she sponsored a bill to create a national program researching and monitoring acidification.

While small, shelled organisms are most obviously at risk from the harmful effects of high levels of carbon dioxide, these creatures are the prey of larger marine life, including salmon and ultimately orcas.

Climate change "could really dramatically affect the oceans and Puget Sound," said Ciaran Clayton, a Cantwell spokeswoman. "Worst-case scenario, it's a complete collapse of food chains."

Terrie Klinger from the UW School of Marine Affairs will be among those testifying next week. She's not sure what to expect in coming decades -- the research is still nascent. The trouble is that a variety of changes -- warmer water temperatures, less oxygen, increased ultraviolet radiation -- can add up in unpredictable ways.

"Research is tending to focus on negative responses because those are of concern to economic and social systems," she said. "But there is evidence of potential for positive responses."

Some sea grasses do better with higher temperatures and acidity, and certain plankton seem to thrive in more corrosive conditions.

"My own opinion is the ocean won't be empty," Klinger said. "But 100 years from now it could look very different."

Brett Bishop, owner of Little Skookum Shellfish Growers in Shelton, who also will testify, is anxious all the same.

"Increased acid in seawater might dissolve the shells of our shellfish crops," he said after learning about the new research. "Very scary stuff."

The research was part of the North American Carbon Program West Coast Cruise with support from the National Science Foundation and Oregon State University. Other researchers working with Feely were NOAA's Christopher Sabine and scientists from OSU, the University of Baja California and Fisheries and Oceans Canada. More testing is planned for next year.

"This is a really more widespread problem than just the areas we've been able to study so far," Feely said.

"We need to look at these areas really carefully."

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