

# Scientists: Global warming has already changed oceans

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In Washington state, oysters in some areas haven't reproduced for four years, and preliminary evidence suggests that the increasing acidity of the ocean could be the cause. In the Gulf of Mexico, falling oxygen levels in the water have forced shrimp to migrate elsewhere.

Though two marine-derived drugs, one for treating cancer and the other for pain control, are on the market and 25 others are under development, the fungus growing on seaweed, bacteria in deep sea mud and sea fans that could produce life-saving medicines are under assault from changing [ocean](#) conditions.

Researchers, scientists and Jacques Cousteau's granddaughter painted a bleak picture Tuesday of the future of oceans and the "blue economy" of the nation's coastal states.

The hearing before the oceans subcommittee of the Senate Commerce Committee was expected to focus on how the degradation of the oceans was affecting marine businesses and coastal communities. Instead, much of the testimony focused on how the waters that cover 70 percent of the planet are already changing because of global warming.

Ocean acidification or diseases that thrive in acidified, oxygen-depleted seawater could be responsible for oysters not reproducing in Washington state, said Brad Warren, who oversees the ocean health and acidification program of the Sustainable Fisheries Partnership in Seattle. A federal study found that two-thirds of larval blue crabs died when exposed to

acidity levels like those currently measured off the West Coast, he said.

Federal studies also found acidity levels in the North Pacific and off Alaska are unusually high compared to other ocean regions. The high acidity is already taking a toll of such tiny species as pteropods, which are an important food for salmon and other fish.

As greenhouse gas emissions increase, billions of tons of carbon dioxide from smokestacks and vehicle tailpipes are absorbed by the oceans. The result is carbonic acid, which dilutes the "rich soup" of [calcium carbonate](#) in the seawater that many species, especially on the low end of the food chain, thrive in, Warren said.

"If we lose it, it is gone forever," Warren said of the oceans' delicate chemical balance.

In the Gulf of Mexico, Alexandra Cousteau said, the runoff down the Mississippi River from farms in the Midwest has created a dead zone the size of New Jersey where few species can survive. Wetlands in Louisiana are disappearing at the rate of 33 football fields a day as hurricanes grow in strength and frequency because of climate change, she said.

"We must start to realize that there can be no standalone policies, especially as they relate to our water resources," Cousteau said. "Energy, transportation, climate change, infrastructure, agriculture, urban development: this is where our ocean policy must begin. It is all interconnected."

Others testified that the economic toll eventually could be enormous for fishing and other ocean-related industries and for the nation's coastal communities. Taken together, the ocean and coastal economies, including the Great Lakes, provide more than 50 million jobs and make up nearly 60 percent of the nation's economy.

"Significant environmental changes, such as sea level and sea temperature rise, oxygen depletion and ocean acidification, will dramatically change the landscape, restructuring an array of natural and physical assets as well as cultural and economic," said Judith Kidlow of the National Ocean Economics Program. "Over the next 30 years, the nation will see the most significant changes in the ocean and coastal economies since the arrival of industrialization and urbanization."

The subcommittee's chairman, Sen. Maria Cantwell, D-Wash., suggested a doubling of the National Oceanic and Atmospheric Administration budget, which is now about \$4 billion, and giving the agency additional responsibilities.

Cantwell, however, said the key has to be passing comprehensive [climate change](#) legislation to reduce carbon emissions.

"Protecting our oceans is an environmental and economic imperative," Cantwell said.

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## ON THE WEB

Information on oceans from NOAA: [www.noaa.gov/ocean.html](http://www.noaa.gov/ocean.html)

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