

# Acid oceans: the 'evil twin' of climate change

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In this photo taken Oct. 30, 2009, Research Director for the Monterey Bay National Marine Sanctuary Andrew DeVogelaere paddles his kayak at the sanctuary in Monterey, Calif. Far from Copenhagen's turbulent climate talks, the sea lions, harbor seals and sea otters reposing along the shoreline and kelp forests of this protected marine area stand to gain from any global deal to cut greenhouse gases. (AP Photo/John Helprin)

(AP) -- Far from Copenhagen's turbulent climate talks, the sea lions, harbor seals and sea otters reposing along the shoreline and kelp forests of this protected marine area stand to gain from any global deal to cut greenhouse gases.

These foragers of the sanctuary's frigid waters, flipping in and out of sight of California's coastal kayakers, may not seem like obvious beneficiaries of a [climate treaty](#) crafted in the Danish capital. But reducing [carbon emissions](#) worldwide also would help mend a lesser-

known environmental problem: ocean acidification.

"We're having a change in water chemistry, so 20 years from now the system we're looking at could be affected dramatically but we're not really sure how. So we see a train wreck coming," said Andrew DeVogelaere, the sanctuary's research director, while out kayaking this fall with a reporter in the cold waters.

Nothing in the treaty negotiations specifically addresses the effects of carbon absorption in the oceans on marine life, which studies show is damaging key creatures' hard shells or skeletons.

Oceans absorb about 25 percent of the world's greenhouse gases pumped into the atmosphere from human activities each year, says a new U.N. report released at the Copenhagen talks this week. That helps slow global warming in the atmosphere, the focus of the Copenhagen talks.

But carbon dissolving in oceans also forms carbonic acid, raising waters' acidity that damages all manner of hard-shelled creatures, and setting off a chain reaction that threatens the food chain supporting marine life, including the lumbering sea mammals along the 276-mile coast of the California sanctuary and the rest of the U.S. West Coast.

By 2100, the report said, some 70 percent of cold water corals - a key refuge and feeding ground for commercially popular fish that also are food for the seals and otters - will be exposed to the harmful effects.

Ocean acidity could increase 150 percent just by mid-century, according to the report by the Secretariat of the U.N. Convention on Biological Diversity.

"This dramatic increase is 100 times faster than any change in acidity experienced in the marine environment over the last 20 million years,

giving little time for evolutionary adaptation within biological systems," it said.

The average acidity of oceans' surface water is estimated to increase measurably by the end of the century and will affect marine life, according to Peter Brewer, a senior scientist at the Monterey Bay Aquarium Research Institute.

"The total quantity of carbon dioxide that we've put into the oceans today is around 530 billion tons," Brewer told journalists on a fall fellowship program with the Honolulu-based East-West Center. "Now, it's going up at about 1 million tons an hour. You can't keep doing that without it having some impact."

And Brewer, a member of the Nobel Peace Prize-winning U.N. scientific panel on climate change, said that's only part of the story.

"The trouble is, there's more than one thing going on," he said, citing other effects of climate change that bring, for example, "milder winters, so the deep ocean is getting less oxygen down there."

Given the importance of marine life - some 1 billion people depend on fish as their primary source of protein - climate experts and researchers at the treaty talks have sought to draw more attention to the problem. They call it a particularly important - but largely overlooked - reason for nations to agree on a new climate accord.

In Copenhagen, Jane Lubchenco, head of the National Oceanic and Atmospheric Administration, which manages the sanctuary, said global cuts in greenhouse gases are needed to limit the "blue" carbon absorbed by oceans.

She said the Copenhagen talks have focused on other types of carbon -

the "brown" variety from industrial warming gases released by fossil fuel burning, the "green" carbon from burning and chopping down tropical rainforests - but there has been little focus on helping the oceans.

"It's important to recognize that carbon dioxide in the atmosphere is also being absorbed by oceans, and that makes oceans more acidic," Lubchenco told AP.

"I call this ocean acidification climate change's equally evil twin, if you will," she said. "And part of the need to reduce carbon emissions is to both slow down the rate of climate change but also to start repairing the damage that is being done to oceans."

Lubchenco pointed to the harmful effects of carbon absorption in the oceans as decreasing the amount of calcium carbonate that can be used by marine creatures to construct shells or skeletons.

"As the oceans become more acidic, it's harder for corals, oysters, clams, crabs, mussels, lobsters to make their shells or their hard parts, and they dissolve faster," she said.

"So ocean acidification, which is a relatively unappreciated problem, is as important as climate change. It's one that most people haven't heard of. Another way to think of ocean acidification is as osteoporosis of the seas."

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