

# **Scientists Tackle a Dual Threat -- More Acid, Less Oxygen in the Ocean**

**Mallory Pickett, KQED (San Francisco television), 2-28-15**

Every summer for the past decade, fishermen and beachgoers along the Oregon coast have noticed dead crabs scattered along the shore, sometimes washed up in bunches. No one knows for sure why it's happening, but scientists think "dead zones" formed by low oxygen levels in coastal waters could be the culprit.

The oceans absorb about a third of the carbon dioxide we pump into Earth's atmosphere, which means that as we increase carbon dioxide in the air, we increase it in the ocean as well. The carbon dioxide reacts with water to create an acid, so that, over time, scientists with the National Oceanic and Atmospheric Administration say, ocean acidity has risen by about 30 percent and oxygen levels have dropped.

Scientists say the combined impacts of decreasing oxygen and increasing acidity could be disastrous for marine ecosystems and the humans who depend on them, not only in California and along the West Coast, but on the East and Gulf Coasts as well.

Mollusks such as oysters and clams depend on minerals in the ocean to form their shells — specifically, calcium carbonate minerals. Increasingly acidic waters deplete the storehouse of calcium carbonate minerals, threatening the ability of shellfish to grow the structures in which they live.

Shellfish, and most other marine organisms, also need oxygen in the water to survive. When oxygen levels get to too low — a condition called hypoxia — it can kill them, which is what scientists think happened to the crabs on Oregon's beaches. Canadian scientists in 2007 found that oxygen levels off the West Coast have already declined by 20 percent over the past 50 years.

## **A Threat to Food and Fishing Economies**

A study published this week in *Nature Climate Change* found that oyster, clam, crab and other fisheries in the Pacific Northwest, Mid-Atlantic, New England and the Gulf of Mexico are among the most vulnerable in the U.S. to the impacts of ocean acidification.

A 2012 assessment conducted by the state of Washington estimated that ocean acidification has already cost the oyster industry in the Pacific Northwest more than \$100 million.

"It's a big problem and we need people to work together to think integratively," says Tessa Hill, an oceanographer at U.C. Davis.

That's why Hill and marine scientists from Canada, Washington, Oregon and California formed The West Coast Ocean Acidification and Hypoxia Panel last year. Working under the auspices of the California Ocean Science Trust, the group aims to help governments plan for the future of a rapidly changing ocean.

The group released its first report this month, outlining how scientific research can help policymakers craft smarter strategies for dealing with more acidic ocean waters.

## **How Can Science Help?**

Scientists need to know more about how the multiple effects of ocean acidification, warming waters, and other stressors affect marine life. The report recommends developing studies that use real-life time scales and large environments, outside the lab, to help make predictive modeling more accurate. For example, scientists are partnering with shellfish farmers to gather data on how shellfish are affected by the chemistry of the water they're exposed to.

The report also recommends adding chemical and biological sensors to existing ocean buoys. That would cut the cost of installing the sensors and allow the network of ocean observers to share data more easily.

Another key idea is to share data between researchers and government to help policymakers evaluate programs already in place: marine protected areas, or water quality monitoring networks. Using feedback on how conservation programs are working, political leaders could, in theory, change policies as needed to be more effective.

Scientists agree the long-term answer to ocean acidification is to decrease our fossil fuel emissions. Meanwhile, they hope to be able to foster resilience in marine ecosystems along West Coast.

"There are lots of groups coming together to try and address the problem in an innovative way," Hill says.