CAN-078-CO2 threatens coral & oysters

Join us to save coral reefs

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Rising Carbon Dioxide Levels Threaten Corals and Oysters

By HEATHER GOLDSTONE · APR 4, 2016
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Oysters have a harder time forming shells when ocean water is more acidic.

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Tiny, thin-shelled oysters; crumbling coral reefs; fish unable to make sense of odors; decimated plankton populations. Those are some of the nightmare scenarios conjured by the prospect of a rapidly acidifying ocean caused by unchecked carbon dioxide emissions from fossil fuel burning.

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Ocean acidification

Here's the chemistry: when carbon dioxide and water mix, they form a weak acid, called carbonic acid. Add enough carbon dioxide, and the pH, or acidity, of the water will start to change. Of course, the ocean is a big place with a lot of water, and it naturally contains other chemicals that can help stabilize the pH.

On the other hand, the ocean has absorbed more than a quarter of all human-produced carbon dioxide since the industrial revolution. The result: globally, the pH of the ocean has dropped by an average of 0.1 pH units. That may not sound like much but, since the pH scale is logarithmic, it translates to a 25 to 30 percent increase in acidity. And, as ocean water becomes more acidic, the carbonate that many animals use to build their calcium skeletons and shells becomes scarcer.

While the theory of ocean acidification has been well understood for decades, it wasn't until ten or fifteen years ago that scientists realized just how much of a challenge ocean life could be facing. Researchers now know that rising carbon dioxide levels are impeding growth of corals and oysters in some areas of the world. Laboratory studies have shown that baby clams and scallops build smaller, thinner shells and are more prone to mortality. And, perhaps most bizarrely, multiple studies have found that fish living in more acidic waters are less able to interpret chemical cues - in essence, underwater odors - that indicate the suitability of a habitat, or the presence of a predator.

The impacts of ocean acidification could have major economic ramifications, and not just in island nations where coral reefs are the source of tourism and fishery revenues. Oyster growers in the Pacific Northwest have been sounding the alarm for several years, and concern is growing here in New England.

A recent assessment by the National Oceanic and Atmospheric Administration concluded that rising water temperatures and increasing acidity are the two biggest threats to New England's fisheries. Bay scallops, quahogs, and oysters were found to be some of the most vulnerable species. Another study released last year ranked southern New England among the most economically vulnerable regions in the country, because of reliance on scallops and other shellfish.

Legislators around the country have started taking notice of the problem. Washington and Maine, both states where shellfish provide hundreds of thousands of dollars in revenue each year, have have been precedent-setting. Several other states are now following their lead. Massachusetts is in the early stages, with legislators currently considering a bill that would establish a task force or special commission to study the current and potential future effects of ocean acidification, identify knowledge gaps, and explore possible responses.

Of course, no state acting alone can solve the global ocean acidification problem. However, communities can take action to reduce nutrient pollution, which can locally contribute to acidity. State-enacted limitations on greenhouse gas emissions also contribute to global reductions in atmospheric carbon dioxide levels. And reducing carbon dioxide is the only way to address the ocean acidification problem at its root.