

Greenhouse gases aren't just warming the planet. They're also acidifying our oceans

By James B. McClintock, Sep 06, 2018 | 4:15 AM



Carbon dioxide bubbles off Papua New Guinea on Jan. 13, 2013. The waters here offer a glimpse of how acidification is likely to transform the seas (Steve Ringman / MCT)

As the new acting chief of the Environmental Protection Agency, Andrew Wheeler, [pushes ahead](#) with the Trump administration's plan to weaken fuel economy standards to levels that give even the auto industry pause, Americans should consider the ramifications of the rollback.

Most of us are aware that auto emissions contribute significantly to the pool of atmospheric greenhouse gases. Scientific studies show that nearly [one-fifth](#) of the atmospheric carbon dioxide gas generated in the United States each year comes from the combustion of fossil fuels by cars and trucks. Many citizens also know that the product of this combustion process is primarily carbon dioxide, a colorless gas that traps heat within the atmosphere, contributing to the ongoing warming of Earth.

Much less common, however, is an understanding that the emissions spewing from our tailpipes are also acidifying the world's oceans. Since the first coal-burning fires of the Industrial Age, [about 30%](#) of the atmospheric carbon dioxide produced by humans has been absorbed by our surging seas.

Oceanic absorption of carbon dioxide varies somewhat with latitude. The colder the water, the more readily carbon dioxide will dissolve in it. The Southern Ocean, which surrounds Antarctica, absorbs [about 10%](#) more carbon dioxide than other seas.

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When carbon dioxide combines with seawater, it undergoes a series of chemical reactions that increase the acidity of the water. The same chemical reactions also reduce the availability of calcite and aragonite, two carbonate minerals that are needed for the shell-building process.

Marine life is reacting to the acidification of our oceans, and not in a good way. In some coastal regions, oysters, clams and snails are struggling to produce and maintain their shells. The tiny offspring of these animals are particularly vulnerable.

Coral reef ecosystems are also at risk. Half of the coral in the Great Barrier Reef [has died since 2016](#) in a catastrophic bleaching event exacerbated by acidification.

Marine biologists and chemists have established that ocean acidification influences not only the ability of marine organisms to make and maintain a shell, but their capacity to grow, reproduce and navigate.

Researchers at the University of Tasmania, led by Dr. So Kawaguchi, [found that](#) the tiny eggs of krill are less likely to hatch when exposed to ocean acidification. The shrimp-like crustaceans provide sustenance for the majority of fish, seals, penguins and baleen whales that dominate Antarctic food webs.

A scientist at the University of Oregon, Dr. Julie Schram, [determined](#) that some species of Antarctic amphipods — small, insect-like

crustaceans — die after prolonged exposure to ocean acidification, perhaps because they have trouble shedding their exoskeletons.

And a team of scientists at the Australian Research Council Center of Excellence for Coral Reef Studies, led by Dr. Philip Munday, [observed](#) that in acidifying conditions, juvenile clownfish lose the ability to relocate their natal reef, a process required for their reproduction.

Even sharks are affected. Dr. Danielle Dixson at the Georgia Institute of Technology [discovered](#) that sharks are less likely to smell their food when exposed to elevated acidification.

Ocean acidification could cause a substantial loss of biodiversity within some of the most diverse ecosystems on the planet. Complex marine ecosystems, including the seafloor communities surrounding Antarctica and tropical coral reefs, provide habitat and nutrients for a rich array of bacteria, invertebrates and fish. As ocean acidification begins to eliminate the most vulnerable species, their loss risks disrupting these interdependent communities. Not to mention that some of these ecosystems may provide cures to a variety of human diseases.

While the Trump administration works to freeze car pollution rules, Americans need to weigh the full costs of such a move. We have collectively made the connection between fossil fuels and the atmosphere. We need to understand what fossil fuels are doing to our oceans before it's too late.

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