



# Sounding the Alarm on Ocean Acidification

*A Bay Paper from Friends of Casco Bay*



Friends of Casco Bay  
Casco BAYKEEPER

## ***Did you know that acidic mud could wipe out clam harvesting in Casco Bay?***

**Why?** Sea water is becoming more acidic, which weakens or simply dissolves the shells of small clams, oysters, and other shellfish.

### **Carbon dioxide is the culprit.**

Coastal waters like Casco Bay suffer a double whammy because of:

**Ocean acidification:** The burning of fossil fuels pumps carbon dioxide into the atmosphere. About a third of that carbon dioxide, scientists estimate, is absorbed by the ocean. It's a global problem.

**Coastal acidification:** Closer to home, the problem is runoff from shore. Stormwater pours excess nitrogen into the sea, where it fertilizes blooms of phytoplankton, tiny floating plants. As these algae blooms die and decay, they release carbon dioxide.

**What does this mean for Casco Bay?** Increased acidity can mean dissolution and death for young clams and other shellfish.

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### ***Background: Ocean Acidification***

Friends of Casco Bay is measuring acidity levels at clamflats to see if there is a link between clam population vitality and the acidity of the mud into which clams burrow.

Friends of Casco Bay is informing the community, including clam harvesters, about coastal acidification and nitrogen pollution.

Scientists estimate that the ocean absorbs a third of the carbon dioxide released by the burning of fossil fuels. When water and carbon dioxide mix, they form carbonic acid, which makes seawater more acidic. Ocean acidification is negatively affecting oceans around the world.

Nitrogen pollution is making matters worse nearshore, such as on clamflats and in bays. Runoff from city streets and fertilized lawns, emissions from smokestacks and tail pipes, raw sewage overflows, and treated sewage all send excess nitrogen into coastal waters. This nitrogen bonanza fertilizes algae blooms; when the plants die and decay, carbon dioxide is released into the water and the mud.

Ocean scientists are finding that as seawater becomes more acidic, the shells of clams, corals, and tiny creatures at the base of the marine food web can weaken and actually dissolve. Ocean acidification impairs the ability of sea creatures, from fish and squid to sea urchins and copepods, to grow, reproduce, and fight off disease.



*Interns Coutney Payne and Kalley Hansel worked with our Research Associate Mike Doan on our cutting-edge research on coastal acidification.*

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The speed at which ocean acidification is escalating has surprised and alarmed scientists. The acidity of the ocean has increased by 30% since the beginning of the Industrial Revolution. Casco Baykeeper Joe Payne worries that the impact of excess carbon dioxide will be evident in Casco Bay within the next decade, as harvesters see a decline in populations of clams, oysters, and other fisheries.

Friends of Casco Bay is working with Dr. Mark Green, a national authority on ocean acidification. He has found that juvenile clams placed in sediments taken from mudflats in Casco Bay have a hard time building their shells; larval clams, called spat, often simply dissolve. Dr. Green, based at Saint Joseph's College in Standish, Maine, calls this "death by dissolution." He blames the acidity of the mud on the effects of excess nitrogen.



Green is experimenting with adding calcium carbonate, the component material in clam shells, to mudflats. Dr. Green, Friends of Casco Bay, and clammers are looking at "buffering the mudflats" as a way to preserve the health of clamflats.

Clammers have long known that returning empty clam shells to the mudflats fosters new generations of shellfish. One reason is that the shells help neutralize the acidity of the mud, creating more favorable conditions for tiny clams to grow.

## ***What is Friends of Casco Bay doing about it?***

Friends of Casco Bay is working to reduce nitrogen pollution through its BayScaping campaign to discourage homeowners' use of fertilizers.

Friends of Casco Bay fosters legislation to set nitrogen limits on discharges into coastal waters.

Friends of Casco Bay monitors pH and nitrogen levels throughout Casco Bay and works to limit nitrogen pollution through legislative action and community education.

Friends of Casco Bay has 20 years of data that shows that our coastal waters are becoming more acidic.

Friends of Casco Bay has upgraded our sampling equipment so that we can more precisely measure changes in the acidity of the sea water.

Friends of Casco Bay documents nitrogen pollution along the coast of Maine.

Friends of Casco Bay is a community-based nonprofit organization founded in 1989, to improve and protect the environmental health of Casco Bay. Home to the Casco **BAYKEEPER**<sup>®</sup>, we are a founding member of the international **WATERKEEPER**<sup>®</sup> ALLIANCE.

## ***What can I do about it?***

- Tell your neighbors about the threat of increased acidification in Casco Bay—and in the rest of the ocean.
- Help stop nitrogen pollution by reducing your input of harmful fertilizers into the ecosystem.
- Create buffer strips using shrubs and trees to hold back soil and stormwater runoff.
- Capture stormwater runoff from roofs and lawns with rain barrels and rain gardens.
- Drive fuel-efficient cars, walk or ride when possible, and burn less oil, wood, and coal.
- Reduce nitrogen pollution by picking up pet waste.

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