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Volunteer Crews to Test Recycled Oyster Shell to Reduce Acidification

South Portland, ME – A field experiment starting this week will study methods for reducing the impact of coastal acidification on Maine shellfish. The experiment, being conducted by the Downeast Institute, with funding through Casco Bay Estuary Partnership and EPA's Climate Ready Estuaries Program, will test whether oyster shell recycled from Portland-area restaurants can be used to reduce acidity of tidal flats, and thus benefit shellfish, including softshell clams.

Ocean and coastal acidification refer to changes in water chemistry caused by elevated levels of dissolved carbon dioxide. The surface ocean absorbs huge amounts of carbon dioxide (CO₂) each year due to increases in atmospheric CO₂. Acidification in coastal areas reflects those global processes, but also local stressors, such as water quality, river flow, and temperature. Clams and other shellfish are especially vulnerable to the chemical changes caused by acidification because it affects their ability to build shells. Studies by Friends of Casco Bay have shown that mud in local tidal flats can sometimes erode shells of softshell clams. Researchers from St Joseph's College have also demonstrated that acidified muds discourage settlement of shellfish larvae, and a previous effort by the Downeast Institute using crushed softshell clam shells to ameliorate acidified mud suggested that predation was another important factor regulating populations of juvenile clams. Clams from Maine tidal flats support significant commercial fisheries (softshell clams alone were worth \$15.6 million in 2020). Healthy shellfish also benefit water quality. Clams and mussels are filter feeders, and thus can improve water clarity and reduce risks of excess algae.

The study will establish more than 100 experimental plots on an intertidal mudflat in Mill Creek in South Portland. "We selected the site in South Portland because the experiment will not disrupt commercial harvests," says Theresa Torrent, Senior Planner at Maine Coastal Program of the Maine Department of Marine Resources. "While clams do grow there, they are not legal to harvest. The flat is closed as a precaution to protect public health because of potential sources of pollution nearby."

Crews will be working to install the experimental plots on April 23 and 24. Plots will be treated with crushed oyster shell, collected from participating restaurants in Portland in 2019. The shell has been stored on land for more than a year to ensure that pathogens or invasive marine species aren't introduced into Maine waters. Some plots will be left alone as controls. Others will be covered with netting to exclude shellfish predators, like green crabs. Scientists will measure both the chemistry of the mud, and abundance of juvenile clams in the experimental plots. The goal is to develop methods that Maine towns could implement to reduce the effects of acidification. "The methods we are testing in experimental form could in future be scaled up to be applied by shellfish commissions, with the help of local clammers," says Dr. Brian Beal, Professor of Marine Ecology at the University of Maine at Machias.

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