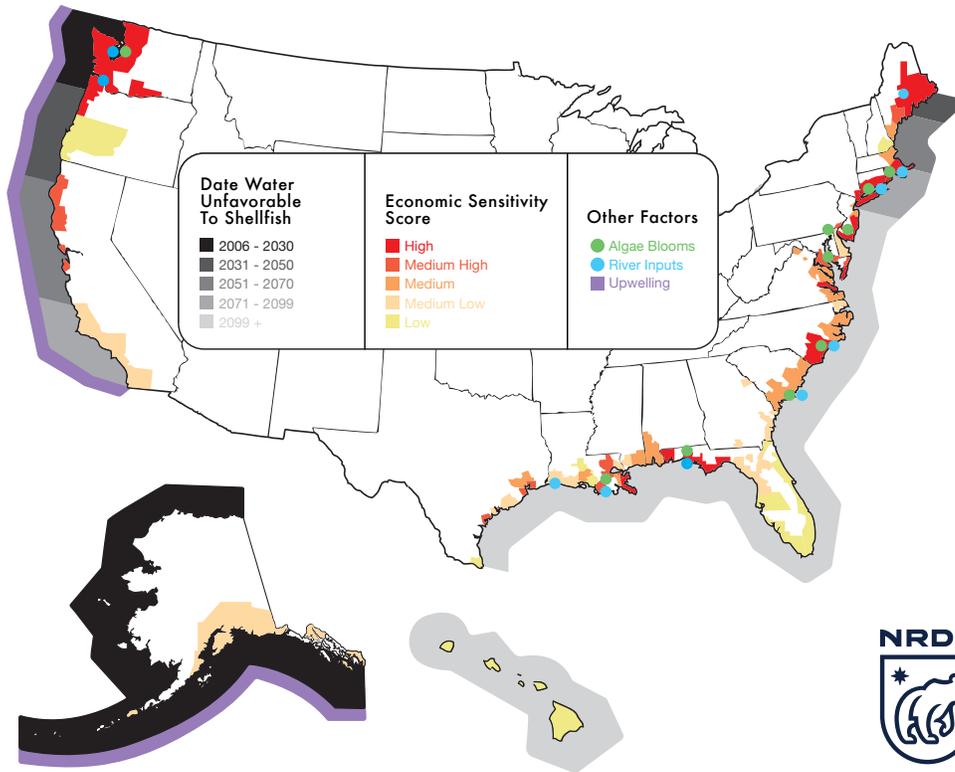


CONNECTICUT IS AT HIGH RISK FOR ECONOMIC HARM DUE TO OCEAN ACIDIFICATION ACCORDING TO NEW STUDY



According to a new assessment of the U.S. communities most vulnerable to ocean acidification, Connecticut is at high risk of economic harm. Communities and governments can still take action, researchers say.

MAP LEFT: The long-term economic impacts of ocean acidification are expected to be most severe in regions where ocean areas are acidifying soonest (black) and where the residents rely most on local shellfish for their livelihood (red). Coastal features such as algae blooms from nutrient pollution, local upwelling currents, and poorly buffered rivers (green, purple, blue) can amplify acidification locally.



adapted by NRDC from Ekstrom *et al.*, 2015

WHY IS CONNECTICUT A HOTSPOT?

ECONOMIC DEPENDENCE



CASH CROP. Connecticut ranks fifth in economic dependence on shelled mollusks in the United States; shellfish harvests

have brought in an average of \$17.3 million annually over the past ten years. However, the economic benefits extend well beyond the value of the harvest.

MOLLUSKS ARE PARAMOUNT in commercial fishing in Connecticut—comprising an average of 70 percent of all fisheries revenues in the state. Sea scallops, quahogs, and oysters are the top earning shellfish species in the state.

OCEAN VULNERABILITY



RIVERS MATTER. Poorly buffered rivers with relatively acidic fresh water—such as the Connecticut River—

further reduce the pH level and availability of carbonate minerals for shellfish to build their shells. (see sidebar)

POLLUTION HELPS SOUR THE WATERS. In some areas farms, lawns, and leaky sewage systems pour excess nutrients such as nitrogen into waterways, which spurs excess algae growth. When the uneaten algae die, they decompose; releasing additional carbon dioxide and raising the acidity even higher. Long Island Sound has had a long-term problem with nutrient pollution.



PHOTO: Bren Smith owner of Thimble Island Oyster in Branford, CT.
PHOTO CREDIT: Ron Gautreau

WHAT CAN WE DO?



Alaska fishermen send urgent message to save the oceans from ocean acidification. | PHOTO: Lou Dematteis/Spectral Q

THE MOST EFFECTIVE STEP toward healthier oceans is to stop pumping carbon dioxide into the sea from cars, factories, and power plants. Connecticut policymakers—and residents—don't need to wait for global coordination, researchers say. They can make a difference now:

REDUCE the amount of pollution from nutrients such as nitrogen that flows into waterways through smarter farming and development techniques and by installing upgraded sewage treatment.

INVEST in shellfish aquaculture techniques to help protect mollusks from corrosive waters during their sensitive larval phase.

HELP NATURE CULTIVATE ocean acidification-resistant bivalves by selecting and breeding strains that are naturally more resistant to the ocean changes. Armed with National Marine Fisheries Service's Milford Laboratory, Connecticut is in a good position to invest in aquaculture methodologies and the development of ocean acidification-resistant strains.

INCREASE FUNDING for targeted research and monitoring programs that help protect the shellfish industry, such as the National Oceanic and Atmospheric Administration's Sea Grant program and the Federal Ocean Acidification Research and Monitoring program.

ESTABLISH AN OCEAN ACIDIFICATION TASK FORCE. States such as Maine, Maryland, and Washington have taken an important step toward reducing their vulnerability to ocean acidification by assembling an expert commission to evaluate economic and ecological risks and to identify measures to mitigate them.

ABOUT THE STUDY

THE FINDINGS ABOUT CONNECTICUT ARE part of "Vulnerability and Adaptation of U.S. Shellfisheries to Ocean Acidification," published today in *Nature Climate Change*. The groundbreaking study identifies coastal communities most likely to be harmed by ocean acidification, revealing a national mosaic of vulnerability.

Coastal communities in 15 states are at high economic risk from ocean acidification due to their dependence on U.S. shelled mollusk fisheries, which bring in \$1 billion annually. The researchers urge policymakers to take action now to protect these regions.

Researchers examined several key factors to reach these conclusions. They studied harvests from shelled mollusks such as oysters, clams,

and scallops because these fisheries are likely to be the first harmed by ocean acidification in the United States. They mapped ocean locations experiencing the most rapid changes from rising carbon dioxide in the atmosphere. They identified places where local factors such as algae blooms exacerbate acidification, and mapped coastal communities most vulnerable to declining harvests. Finally, they identified where all these variables overlapped. This work was supported by the National Socio-Environmental Synthesis Center through funding received from the National Science Foundation DBI-1052875.

WHAT IS OCEAN ACIDIFICATION?

THE OCEANS NATURALLY absorb carbon dioxide from our atmosphere. Now, however, we've tinkered with that equation, dramatically increasing the amount of carbon dioxide entering the ocean through more than a century of burning fossil fuels.

When carbon dioxide dissolves into the ocean, it triggers chemical reactions that reduce the pH (increasing its acidity) while also reducing the availability of compounds such as carbonate. Carbonate is crucial because many shellfish and corals need it to build their skeletons and shells. With less of it, organisms expend more energy on shell-building and less on eating and basic survival. This can harm the organism and reduce populations.

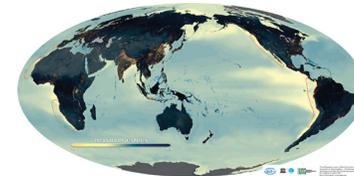
As ocean acidification accelerates, it now poses a serious threat to the web of life underwater.

RAPID DECLINE IN: OCEAN pH

OCEAN pH IN
1860



PROJECTED OCEAN pH IN
2100



pH
7.1 7.7 8.3

INFOGRAPHIC: This infographic is part of the *Ocean Acidification Summary for Policy Makers - Third Symposium in an Ocean in a High CO₂ World* sponsored by IGBP, IOC-UNESCO, and SCOR for more information www.igbp.net.