

**Transcript of the video above:**

HARI SREENIVASAN: Pacific oysters like the ones grown on Shina Wysocki's family farm near Olympia, Wash., are served in restaurants around the country.

SHINA WYSOCKI, Chelsea Farms: We think our water tastes great here, and that makes our oysters taste great.

HARI SREENIVASAN: But there's trouble in the water. The ocean's pH, which measures the level of acidity of a liquid, shows the water is becoming acidified. Most growers like the Wysockis can only farm oysters if they can buy oyster larvae, also called oyster seed, from hatcheries. But a few years ago, the larvae suddenly began dying by the billions. The culprit? The seawater pumped into the hatcheries is so corrosive that it eats away the young oyster shells before they can form.

SHINA WYSOCKI: Ocean acidification is a huge problem. And there are so many things. It's the currents, it's the carbon dioxide, it's the aragonite. And it's most of which, I understand a tiny fraction of, but what I do understand is when the nursery calls on the phone and says there's no oyster seed to ship, we don't have any.

HARI SREENIVASAN: Seed production in the Northwest plummeted by as much as 80 percent between 2005 and 2009.

RICHARD FEELY, National Oceanic and Atmospheric Administration Pacific Marine Environmental Laboratory: And what we found was just very dramatic. When the waters were highly corrosive, the organisms died within two days. The oyster larvae just simply died. When the water was high pH, they did just fine. It was just like a switch.

HARI SREENIVASAN: That switch is happening around the world as oceans take in large amounts of carbon dioxide, or CO<sub>2</sub>, says Dick Feely, a senior scientist at the National Oceanographic and Atmospheric Administration.

RICHARD FEELY: Over the last 200 years or so, we have released about two trillion tons of carbon dioxide into the atmosphere. And about a quarter of that, or 550 billion tons of carbon dioxide, have been absorbed by the oceans.

HARI SREENIVASAN: All that CO<sub>2</sub> changes the chemistry of the water by making it more acidic, 30 percent more since the start of the Industrial Revolution. Because of natural tide and wave patterns, the Pacific Northwest Coast has been hit hardest, with corrosive water being brought up from the deep ocean to the surface, where shellfish live. That's why Washington's shellfish industry, worth \$270 million a year and responsible for thousands of jobs, is the first to feel the effects of this global phenomenon, says Bill

Dewey of Taylor Shellfish, the largest producer of farmed shellfish in the country. In a single night, Taylor's growers will bring in about 50,000 oysters.

BILL DEWEY, Taylor Shellfish Farms: This is the first place these deep corrosive waters are coming to the surface. And we're an industry that relies on calcifiers, so we're the first to see the effects and to scream about it.

HARI SREENIVASAN: Ocean acidification acts a lot like osteoporosis, the condition that causes bones to become brittle in humans. For oysters, scallops and other shellfish, lower pH means less carbonate, which they rely on to build their essential shells. As acidity increases, shells become thinner, growth slows down and death rates rise.

BILL DEWEY: With oysters, the vulnerable stage that dissolves in these corrosive waters is the very, very young stage. They're using a form of calcium carbonate to build their shell that dissolves really easily.

HARI SREENIVASAN: On the East Coast, growers are starting to worry that they will be hit next. New Bedford, Mass., is America's top-producing fishing port, and sea scallops, another species vulnerable to acidification, makes up 77 percent of their production.

SARAH COOLEY, Woods Hole Oceanographic Institution: Shellfishing is really a way of life for many of those families and much of that community. And taking that away further homogenizes our country. We could see changes in the demographics of the community, as working families move away.

HARI SREENIVASAN: Sarah Cooley studies the socioeconomic impacts of altered oceans at Woods Hole Oceanographic Institution in Massachusetts. She and other researchers project acidification could reduce U.S. shellfish harvests by as much as 25 percent over the next 50 years.

SARAH COOLEY: We will look back and say, oh, things used to be like this, and I hope that's not the case. I hope we can actually preserve those pockets of individuality in the country that make it so great by finding these regional solutions that can help out different regions to preserve their ways of life. But what we are looking at is probably on the order of tens to hundreds of millions of dollars just related to the shellfish fishery in this country alone, because it's a \$740 million industry.

HARI SREENIVASAN: Oystermen have been working with scientists to find ways to adapt. Hatcheries now monitor seawater and only allow it in when acidity levels are lower. They're also adding sodium carbonate and eelgrass to help balance the pH levels. That's helped growers recover nearly 75 percent of their losses.

But Dick Feely says that strategy won't work in the future, when scientific models show corrosive waters will become more pervasive at the sea surface.

RICHARD FEELY: Because, as we continue to release more and more CO<sub>2</sub> in the atmosphere, and that will be taken up by the oceans, eventually, the oceans will be corrosive 50 percent of the time or 60 percent of the time within the next 30 or 40 years.

This would be a 100 percent to 150 percent increase of the acidity of the oceans by the end of the century. This is a very dramatic change that has not been seen in the world oceans for more than 50 million years.

BILL DEWEY: For shellfish growers, the future is now. This is a very real problem, and we hope that people pay attention to the canary in the coal mine here.

HARI SREENIVASAN: Washington state recently convened a panel of policy-makers and scientists to develop long-term strategies to the problem. And scientists are still learning more about how the impacts of acidification will ripple through the entire food web of the ocean.

But oystermen already know this is just the beginning of a long-term struggle.