

Senate Commerce testimony v2

testimony on CO2 regulation

The Future of Seafood in a High-CO2 world
Implications of ocean acidification and climate change

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Thank you for the opportunity to testify today. It's especially gratifying to be here today because the theme of this hearing, the Blue Economy, shows that many of our elected leaders today—including leaders from both parties—“get it” about the ocean. We are all here today because you understand that the ocean, which has been so generous to human beings for so long, now needs our help.

My name is Brad Warren, and I run a program on ocean acidification and global ocean health at the Sustainable Fisheries Partnership (known as SFP). SFP is a nonprofit group that works with the seafood industry to conserve fisheries and marine ecosystems around the world.

I came to this work after more than two decades in the fishing industry, where I mainly ran industry trade journals. I left the publishing business to focus on preparing the industry to confront CO₂-driven ocean acidification and climate impacts. I made this change because it was the most important work I could think of to do. The dangerous rise in world emissions of carbon dioxide has the potential to undercut every aspiration we have for fisheries and ocean ecosystems.

This isn't just one more problem for the ocean. It's the one that sets the terms for all the others. There are lots of efforts underway to conserve fisheries and protect marine habitats. But there is a very good chance that none of them will amount to much if we don't get a grip on the world's carbon dioxide emissions. It will be hard to save the fish if the ocean stops making them.

I want to thank this committee for recognizing that the ocean belongs in this discussion. If we want the ocean to keep producing the benefits we enjoy—things like fish, whales, seafood jobs for millions of people, and (thanks to photosynthesizing plankton) about half of the oxygen we breathe—then we're going to need carbon policies that preserve its capacity to deliver the goods.

To be clear, SFP is not a lobby group. Instead, we help leaders in the seafood industry to take on fundamental challenges to their future ability to produce and market fish products. Ultimately it will be up to them to speak for themselves on this issue. But I can tell you that they're listening, they're seriously concerned, and they are sorting out how they can be part of the solution. Some of the companies and fishing groups we work with are keen to learn more about carbon policy, where it's going, how it might affect them, and how it might help protect the ocean they depend on.

What's at stake? Well, In the U.S, seafood generated \$68.4 billion in retail sales in 2007, according to the National Marine Fisheries Service. Processing and wholesaling alone accounted for 67,000 jobs. Add foodservice to that, and the numbers soar. Seafood sales in New York State restaurants were estimated to support the equivalent of 70,000 full-time jobs in 1999, according to New York Sea Grant.

Worldwide, marine fisheries provide the primary source of income and food for hundreds of millions of people. FAO and other international resource agencies estimated this year that 3 billion people rely on the ocean for essential nutrition. About 400 million people in poor countries get half or more of their animal protein and minerals from seafood. Another 500 million people in developing counties earn a living from fisheries and aquaculture.

How much of this will be lost if we don't reduce emissions? There are no good answers yet. But we do know this: If we delay acting until we know

exactly what is at risk, we will make more of those losses unavoidable. Future generations will remember us for this. Whether they will forgive us is another question.

We at SFP, and some of our colleagues in other organizations, have done a lot of work to make sure leaders of the U.S. fishing industry understand what the science is telling us about ocean acidification.

The chemistry is pretty clear. The changes have been measured, not just modeled. We know that billions of tons of CO₂ from smokestacks and tailpipes are mixing into the ocean every year. The resulting carbonic acid depletes the rich soup of calcium carbonate in seawater. Many of the fish we eat depend on food species that literally build themselves out of that soup. One example: Pteropods, an important food source for salmon and many other fish, have been shown to dissolve quickly in calcium carbonate-depleted conditions resulting from elevated CO₂ concentration. Those conditions already occur in some near-surface waters along the West Coast and Alaska.

If you want to see the key scientific papers that document acidification impacts, I would be happy to provide them.

At a minimum, we expect ocean acidification and hypoxia alone will reduce productivity of fish stocks that generate food and livelihood for many millions of people. In the worst case, acidification could extinguish many fisheries. Large parts of the world's surface ocean—the top few hundred meters, where virtually all our seafood comes from—are already becoming corrosive to many of the plankton species that form the foundation of marine food webs. This is what fish eat. If fish lose their dinner table, we'll lose ours.

The consequences of thermal change—global warming—are mixed for fisheries: Small amounts of warming can and do increase the productivity of fish stocks, at least temporarily. One could make a case that some of our major fisheries have benefited from warming in the last few decades. As temperatures rise further, though, that benefit will vanish. Like Goldilocks, fish want temperatures that are “just right.”

The consequences of warming also take a toll on the oxygen content of seawater, especially in deeper waters. Several studies suggest that we're

rapidly losing deep habitat for many marine fish because warming has triggered processes that deplete the oxygen they need to survive. Some of the most compelling work on this problem comes from Canada's Department of Fisheries and Oceans.

Some fisheries, such as Washington State's oyster industry, may already be suffering grave harm from ocean acidification. Oyster growers have suffered four years of reproductive failure. There is preliminary evidence that this may be due to ocean acidification, or possibly to a disease that thrives in acidified, oxygen-depleted seawater. Larval forms of many marine species are especially vulnerable, and lab experiments show very high mortality; in a preliminary study by NOAA scientists, 67% of larval blue king crab died when exposed to levels of acidification similar to those already measured in some waters—including parts of the West Coast during summer upwelling.

Based on peer-reviewed NOAA research findings, it appears that the West Coast and the North Pacific off Alaska are especially vulnerable in the near term, because CO₂ tends to collect there. In the near-surface waters where most fish and shellfish live, CO₂ concentrations are unusually high in the North Pacific region. Alaska produces about two thirds of the U.S. fish harvest. So a lot of food is at stake.

If we lose marine fisheries, some people hope that aquaculture will take up the slack. I wouldn't count on that. The popular farmed seafood products we consume in America—shrimp, salmon, tuna, etc—are raised on feeds that include millions of tons of wild caught marine fish. Indeed, aquaculture consumes 57% of the world's annual production of fishmeal and 90% of all fish oil, according to a recent report by my colleagues at SFP.

Although we work closely with them, we don't represent the fisheries industry. There isn't yet agreement on every point or every step toward solutions. But I can say that many leaders of the industry are seriously concerned about acidification. We think they should be.

It's fair to say that seafood producers have two interests at stake in controlling CO₂ emissions.

First, they depend on the ocean to make fish. Some fishers and fishing communities are pressing for strong carbon policy in order to protect ocean productivity. We encourage that. They also want to know how CO₂

emissions are affecting fish and shellfish. Fishing and processing groups have advocated successfully for two important government research programs, one national, one regional, that will help to clarify how CO₂-driven acidification affects marine ecosystems and commercially harvested species

The second point of concern is the same one every other industry faces: fishing takes fuel. Fishers and processors want to protect the resource, and they also want to stay in business. They want emission reductions targets that are achievable. They also want emissions regulations to be fair and affordable.

Their experience is unusually relevant as the nation prepares to adopt a cap and trade system for carbon. Probably more than any other industry, fishers understand the use of transferable “rights” or “allowances” to address environmental problems. The lessons learned apply directly to carbon regulation. Dozens of transferable fishery quota systems have evolved over the last for 25 years around the world. Fishers and seafood processors have learned how these systems can solve difficult problems such as reducing bycatch; they have also learned how these cap-and-trade systems create competitive advantages and disadvantages. If a new regulatory system for carbon dioxide is going to create tools and incentives that help companies reduce emissions, improve energy efficiency, and reduce fuel costs, people in the fish business will want access to those benefits.

The fishing industry is a tiny emitter. Based on data from the U.N. Food and Agriculture Organization and U.S. Department of Energy, we’ve estimated that fishing fleets worldwide account for about 0.2% of global CO₂ emissions. Probably no U.S. seafood company (and certainly no single facility) emits 10,000-ton CO₂e, the threshold for regulation envisioned by many carbon policy proposals. But again, if a new system creates special benefits, they will want the benefits to be allocated in a fair and inclusive way—not reserved for a few big emitters, while everybody else just pays more at the pump.

There can be legitimate disagreements about how, and how much, to reduce emissions. But there is one goal everyone should hold in common: We want controls that allow the ocean to keep giving us fish to eat.

An excellent documentary film on ocean acidification has just come out. It's called *A Sea Change* (information online at www.aseachange.net). I recommend this film to everyone here.

Thank you again for holding this hearing. Good luck!