

Coastal States Respond to Ocean Acidification

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Ocean acidification is warming up policy discussions about marine resources. In fact, state agencies and legislatures in the Pacific Northwest and Northeast are considering new laws and regulations to mitigate the effects of climate change on shellfish harvesters and other marine industries.

In August, California and Oregon established the West Coast Ocean Acidification and Hypoxia Science Panel. This panel was tasked with developing new research and policy proposals to respond to risks from ocean acidification. Those states' action built on a November 2012 report by the Washington State Blue Ribbon Commission on Ocean Acidification (Commission) that resulted in the creation of a new state panel in Washington to analyze policies to mitigate ocean acidification.¹

On the East Coast, Maine's State Legislature passed a joint resolution in March recognizing ocean acidification as a direct threat to Maine's economy, particularly to clams, mussels, and lobsters. It called for "research and monitoring in order to better understand ocean acidification in the Gulf of Maine and Maine's coastal waters, to anticipate its potential impacts on Maine's residents, businesses, communities and marine environment and to develop ways of mitigating and adapting."² A bill to fund further study of ocean acidification was submitted to the legislature in October, although it now appears this bill will be postponed until Maine's January session.

What Is Ocean Acidification?

Ocean acidification refers to the reduction in pH level (measure of the acidity or basicity of a water-based solution) of the ocean. Increasingly acidic ocean water can damage marine life, such as shellfish and coral, by corroding their shells or coral skeletons. The lower pH level also reduces the supply of carbonate ions, which slows the pace at which shellfish can develop shells (and rebuild them after corrosion).

For many years, marine biologists thought the ocean could store nearly unlimited amounts of carbon dioxide emissions. They believed that oceans acted as a buffer to mitigate the atmospheric effects of carbon dioxide emissions by storing about 25% of global emissions. The tide has turned. Now, many recent reports describe harmful effects of carbon dioxide absorption on ocean chemistry.

On the Pacific Coast, a process known as upwelling makes local shellfish especially vulnerable to ocean acidification. Upwelling is caused by seasonal strong winds along the Pacific Coast that push surface water away from the coast and pull in deep offshore water that is comparatively rich in nutrients and high in carbon dioxide. The deep offshore water is especially corrosive to shellfish and slashes harvesting yields unless buffering techniques are used (often at significant cost to local aquaculture). The unique effects of upwelling on shellfish, documented extensively over the last 10 years in Oregon and Washington, helped spur calls for action in California, Oregon, and Washington.

Regulating Ocean Chemistry: The Effects of Local Coastal Regulations

The success of state regulations in combatting ocean acidification is complicated by the many global factors affecting ocean waters that are outside of local and even federal control. Nonetheless, more states are considering regional and local coastal regulations to mitigate environmental consequences of changing ocean chemistry on aquaculture.

The governor of Washington issued an Executive Order requesting that the Department of Ecology implement policies to reduce local nutrients released into water supplies that impact ocean chemistry in response to the Commission report linking shellfish mortality to ocean acidification. In addition, Washington became one of the first states to fund research into ocean acidification and propose policy solutions.³

An appendix to the Commission Report (prepared with Stanford University) outlines policy options to mitigate local causes of ocean acidification. These options provide a preview for what industries might face as states like California, Oregon, and Washington implement new ocean mitigation policies. Here are two policy proposals that could have immediate impacts on industry:

More Stringent Water Quality Standards. Coastal policymakers increasingly view agriculture and aquaculture as competing policy choices, and many proposals protect the oceans by subjecting farming operations to stricter water quality standards. Such proposals limit nutrient release from crop and dairy farming, as well as from wastewater treatment facilities, to improve water quality in local sources that flow into the ocean. Regulatory options often either mandate reducing nutrient use or provide incentives to do so.

As a mandate, regulators might impose state standards that protect water quality by limiting effluent nutrient levels. The federal Clean Water Act (CWA) sets a technology-based standard to maintain water quality from point sources such as wastewater treatment plants or Concentrated Animal Feeding Operations. But this federal standard is only a floor, and states can impose more strict performance-based effluent limits. Such stricter standards could require wastewater treatment plants to invest in better infrastructure (or better technology to clean and denitrify effluent). States could also require dairy and crop farmers to develop strict nutrient management plans, either through state environmental laws or through market mechanisms such as trading permits.⁴

As an alternative method of setting stricter limits, states could list ocean areas as “impaired waters” under the CWA § 303(d). This alternative would require states to develop total maximum daily load (TMDL) standards to protect impaired waters. Setting a TMDL caps permissible contaminant levels and allocates a reduced level of

contaminants between farmers and wastewater treatment facilities. But states are unlikely to enforce hard limits. In a time of budget austerity, caps require too much spending to monitor effluent levels. A less costly option that the Commission discussed would require stricter nutrient management plans; farmers and wastewater treatment would have to comply procedurally, but there would be minimal monitoring of actual results.

Voluntary measures such as Washington state's current program to reduce nutrient runoff provide incentive-based alternatives. Washington now provides funding to farmers or wastewater treatment facilities to improve land use or reduce nutrient runoff. Funding incentives encourage investment in local water-quality improvement projects instead of imposing new mandates.

Additionally, the Commission recommended providing insurance for farmers who follow best practices with regards to chemical use. If a farmer agrees to reduce the use of certain chemicals in farming operations, the state would insure losses from severe drought in a particular year. Voluntary reduction policies appeal to regulators because they require less start-up funding than enforcement of stricter water quality limits, although regulators express concern that they undervalue the future harm from ocean acidification.

Product and Chemical Regulations for Certain Fertilizers. Some states have proposed limitations on the use of certain chemicals in fertilizers. These regulations would manage the use of some chemical agents in fertilizers or limit fertilizer use by residential or agricultural users. Washington is one of at least 11 states that currently ban the use of phosphorous in fertilizers. California and Oregon do not have similar bans, but industry should anticipate that the upcoming ocean acidification report from these states will undoubtedly discuss the effect of fertilizer runoffs on coastal water quality and provide additional support to lawmakers who seek to ban or limit the use of nitrogen or phosphorous in fertilizers.

A broader version of this type of proposal, to focus on limiting certain chemicals, might threaten industries already facing potential obligations from Green Chemistry Initiatives. Current research on ocean acidification has suggested that ocean acidification is worsened by the release of legacy chemicals, such as heavy metals, as well as emerging chemicals, including plastics and pharmaceutical compounds. To the extent that policy proposals focus on limiting specific chemicals of concern, a much broader range of manufacturing industries might want to track developments.

What's Next?

On the federal level, the Interagency Working Group on Ocean Acidification continues to research effects of ocean acidification. But EPA has refrained from requiring states to list ocean waters as "impaired waters" under the CWA.⁵ Despite continuing lawsuits, there are few signs of imminent action by EPA or Congress. While it is possible that significant state momentum might cause Congress to respond, federal action is not likely to immediately impact crop or dairy farmers.

By contrast, there is momentum on the international level. The International Programme on the State of the Ocean (IPSO), in a major October report, recommended more international policymaking focused on less and cleaner oil and gas extraction from the high seas.⁶ At a recent panel on the report, one contributor to the

IPSO report commented that many international policymakers are beginning to view agriculture less as a solution to global food security and more as a threat to aquaculture.⁷

And international regulators are already using ocean acidification research to inform the discussion as the UN prepares to issue its first licenses for deep-sea mining as early as 2016. Industries should expect state and international regulation to continue to develop at a rapid pace in the months ahead.

¹See Memorandum of Understanding Between the California Natural Resources Agency and the Oregon Governor's Natural Resources Office to Establish the West Coast Ocean Acidification and Hypoxia Panel).

²J.R. 2166, 126th Leg., (Me. 2012).

³See S.B. 5603, 63d Leg., 2013 Sess. § 4 (Wash. 2013).

⁴Center for Ocean Solutions, Washington State's Legal and Policy Options for Combating Ocean Acidification in State Waters: A Report to the Washington State Blue Ribbon Panel on Ocean Acidification 12, 23 (2012). For another survey of policy options states might consider, see Ryan P. Kelly & Margaret R. Caldwell, *Ten Ways States Can Combat Ocean Acidification (and Why They Should)*, 37 Harv. Envtl. L. Rev. 57, 72-99 (2013).

⁵Center for Ocean Solutions, Washington State's Legal and Policy Options for Combating Ocean Acidification in State Waters: A Report to the Washington State Blue Ribbon Panel on Ocean Acidification 12, 23 (2012). For another survey of policy options states might consider, see Ryan P. Kelly & Margaret R. Caldwell, *Ten Ways States Can Combat Ocean Acidification (and Why They Should)*, 37 Harv. Envtl. L. Rev. 57, 72-99 (2013).

⁶Kristina M. Gjerde et al., *Ocean in Peril: Reforming the Management of Global Ocean Living Resources in Areas Beyond National Jurisdiction*, 74 Marine Pollution Bull. 546, 548(2013).

⁷Wilson Center Panel: The State of the Oceans (Nov. 13, 2013).