Impacts of coastal acidification on the Pacific Northwest shellfish industry and adaptation strategies implemented in response.


1Whiskey Creek Shellfish Hatchery, Tillamook, OR, USA.
2Oregon State University, Corvallis, OR, USA.
3National Oceanic and Atmospheric Administration, Pacific Marine Environmental Laboratory, Seattle, WA, USA.
4Southern California Coastal Water Research Project Authority, Costa Mesa, CA, USA.
5University of Washington, Seattle, WA, USA.
6Taylor Shellfish Hatchery, Quilcene, WA, USA.
7Oregon State University, Newport, OR, USA.
8Penn Cove Shellfish, Coupeville, WA, USA.
9Washington Sea Grant, Shelton, WA, USA.
10Pacific Shellfish Institute, Olympia, WA, USA.

ABSTRACT

In 2007, the US west coast shellfish industry began to feel the effects of unprecedented levels of larval mortality in commercial hatcheries producing the Pacific oyster Crassostrea gigas. Subsequently, researchers at Whiskey Creek Shellfish Hatchery, working with academic and government scientists, showed a high correlation between aragonite saturation state (Ωarag) of inflowing seawater and survival of larval groups, clearly linking increased CO2 to hatchery failures. This work led the Pacific Coast Shellfish Growers Association (PCSGA) to instrument shellfish hatcheries and coastal waters, establishing a monitoring network in collaboration with university researchers and the US Integrated Ocean Observing System. Analytical developments, such as the ability to monitor Ωarag in real time, have greatly improved the industry’s understanding of carbonate chemistry and its variability and informed the development of commercial-scale water treatment systems. These treatment systems have generally proven effective, resulting in billions of additional oyster larvae supplied to Pacific Northwest oyster growers. However, significant challenges remain, and a multifaceted approach, including selective breeding of oyster stocks, expansion of hatchery capacity, continued monitoring of coastal water chemistry, and improved understanding of biological responses will all be essential to the survival of the US west coast shellfish industry.

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