Shellfish Affected by Ocean pH

UC Davis' Bodega Marine Laboratory studies changes in ocean chemistry that may threaten coastal shellfish in California.

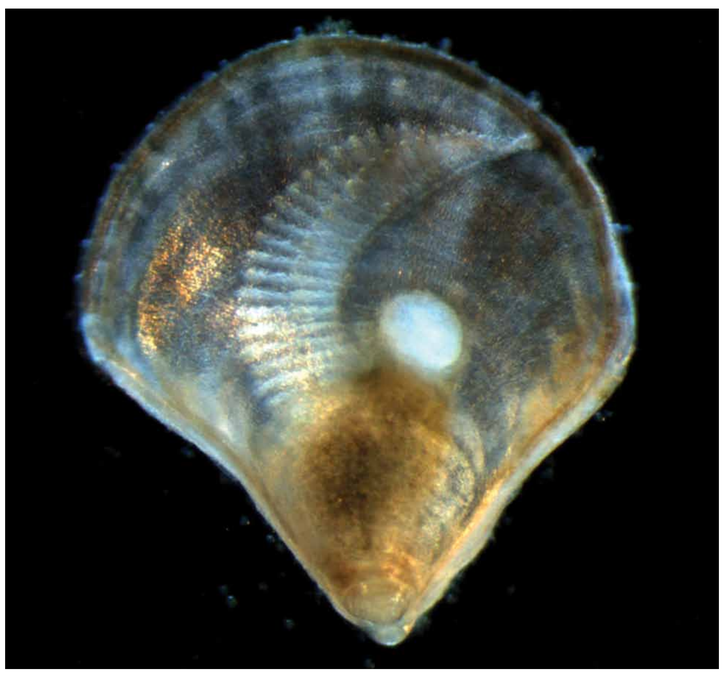
We conducted experiments (above) at Bodega Marine Laboratory to test the impacts of ocean acidification on the growth and survival of native oysters (*Ostrea lurida*). We raised the early life stages of oysters under current atmospheric concentrations (380 ppm) and those predicted by the year 2100 (540–970 ppm). Larval oysters raised in high-CO_2 seawater are smaller (14%) and grow more slowly (38%) as juvenile oysters than oysters raised under today's atmospheric conditions. We are currently investigating whether smaller juvenile oysters experience greater mortality in their natural habitats—an effect that could lead to declines in coastal oyster populations. (Photo: K. Sato)

AS ANTHROPOGENIC CARBON DIOXIDE is added to the atmosphere, roughly 40% is absorbed by the ocean, leading to a decline in ocean pH. Despite evidence that ocean pH has decreased since the Industrial Revolution, the potential consequences of "ocean acidification" have only recently received attention.

Decreasing ocean pH causes chemical hurdles for shell-forming organisms such as abalone, mussels, and oysters. Shelled organisms living in increasingly acidic water may grow more slowly, have weaker shells, and may be less able to survive to maturity. These impacts could have devastating repercussions for coastal oyster populations, including valuable commercial fisheries. Studying these effects is the focus of a major research program at UC Davis' Bodega Marine Laboratory.

We use instruments on moorings and the R/V *Mussel Point* (above) to monitor ocean chemistry offshore Bodega Marine Laboratory and in Tomales Bay, an important habitat for oyster populations. We have found that coastal ocean pH is influenced by natural and anthropogenic processes, including freshwater runoff from land and changing ocean currents. (Photo: BML)

Ocean chemistry varies within and among different estuaries, suggesting that oysters and other shellfish may grow better in some locations than others. Managing marine resources in the face of declining ocean pH must include identifying and preserving those habitats that promote the growth and survival of oysters and other key marine organisms. (Photo: A. Hettinger)



A juvenile native Olympia oyster. (Photo: E. Sanford)

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