OCB-OA: Fisheries

On this page:

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Why are people so concerned about larval organisms?

Will oysters, clams, and mussels that we eat for food no longer be available in future oceans?

Basic: Some organisms may adapt or find refuges where they can survive. We don't know yet how common those responses will be. But it's possible that if some food species decline, at some point we may no longer be able to fish for them.

Intermediate: It's not likely that all of these will be gone completely. We know that larval and juvenile stages are most susceptible, and that areas with favorable conditions will shrink because of the way that carbonate chemistry varies in the coastal oceans (see Gruber and Hauri modeling papers on California Current). There will probably always be some refuges where these organisms find favorable conditions. But we don't know how long the conditions will last, and whether those refuges will become so small that it becomes economically unfeasible to rely on bivalves as a food item. We also do not know how quickly some of these species may be able to adapt to lower pH conditions. There is some evidence sub-populations may be differentially sensitive, so it may be that genetic traits already exist to allow species to adapt. However, we do not know if any of those adaptations come at an expense of sensitivity to other stressors. At some point there will be limits to physiological compensation in species. —G. Waldbusser, M. Green, J. Salisbury

Why are people so concerned about larval organisms?

Basic: Larvae and juveniles are most important to creating healthy adult populations. Even without environmental changes, many young marine organisms don't survive to adulthood.

Changes like ocean acidification may reduce this number even further.

Intermediate: We are concerned with the larvae (and juveniles) because these are the life stages most critical to ultimately contributing to adult populations, and we know this is where the bottleneck in natural populations exists. In most natural bivalve species, as well as other benthic species, there is considerable mortality in these early stages, with only a fraction of the individuals surviving to larger sizes that generally allow them to escape predation and be more resilient to environmental parameters. In fact, year to year in some species there may be wide variability in how many individuals succeed, with some years showing no new individuals to the population. We therefore focus most efforts on understanding how the early life-history stages are impacted because that is often the bottleneck of population growth in bivalves. —G. Waldbusser, M. Green, J. Salisbury

Last updated: September 19, 2012

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Mail: Woods Hole Oceanographic Institution, 266 Woods Hole Road, Woods Hole, MA 02543, USA.
E-Contact: info@whoi.edu; press relations: media@whoi.edu, tel. (508) 457-2000
Problems or questions about the site, please contact webdev@whoi.edu