Ocean Acidification and the Massachusetts Shellfish Industry

Summary of Ocean and Coastal Acidification Stakeholder Engagement Workshops held in Gloucester and Barnstable

Key Points:

Shellfish growth and reproduction are threatened by ocean and coastal acidification.

Negative impacts are already observed in both wild and farmed shellfish.

Shellfishing is a $388 million industry and employs thousands of people in Massachusetts.

Background: The coastal ocean is becoming more acidic as a result of nutrient pollution and elevated atmospheric CO_2. Acidic waters can be harmful to shellfish growth and reproduction, with negative impacts to the shellfish industry.

The shellfish industry generates over **$388 million** per year in revenue and **thousands of jobs** in Massachusetts. Shellfish are experiencing a variety of challenges and have already shown some alarming trends. Ocean and coastal acidification (OA) is one of a suite of factors affecting coastal waters in the U.S. Northeast.

The Northeast Coastal Acidification Network held workshops in Gloucester and Barnstable in April and June of 2015 with representatives from the shellfishing community, the aquaculture industry, and coastal management agencies, in order to inform and learn from these key constituencies regarding OA. This document summarizes some of their experiences and concerns.

Key issues raised by stakeholders

Alarming trends have been observed in shellfish growth and reproduction.

- Seed for oyster aquaculture is failing more often than in the past
- Wild mussel "set" has decreased, particularly on the South Shore
- Clam growth is slower and clam shells are thinner and weaker ("paper shells")
- Shellfish populations are decreasing for many species, including hard and soft clams, bay scallops, and oysters

"You used to be able to take [clam] seed and within a year and a half it would come up and have beautiful necks. Starting in 2000, this began to take two years. Now we can't use the seed anymore at all. It doesn't grow."

The shellfish industry is very economically important to Massachusetts.

Bivalves account for roughly 70% of seafood sales in Massachusetts. NOAA provided the following preliminary data (annual revenue):

- oysters: $26,000,000
- mussels: $1,511,653
- bay scallops: $2,484,765
- sea scallops: $334,552,095
- Atlantic surf clams: $18,013,677
- conch/channeled whelk: $5,605,650

Total: $388,167,840

"In 50-100 years we may pass a tipping point, and the ocean will be done; and when the ocean is done, we're done."

Recommendations

- **Establish an ocean acidification commission to study the issue and make recommendations for local and regional actions.** The states of Maine, Maryland, and Washington have convened successful blue-ribbon OA panels which have produced vital and actionable recommendations to protect their fishing and aquaculture industries that are tailored to local conditions and needs. These panels have been the key first step in charting a path forward to addressing OA in each state. Massachusetts can pursue similar efforts to protect the economy and cultural heritage of its fishing and aquaculture industries.

- **Rigorous and long term monitoring of ocean acidification is essential to finding solutions.** It is important to focus on developing long-term and continuous datasets. Priority areas for monitoring include critical and sensitive habitats, and key estuaries. Monitoring not only provides more information about where OA is likely to have the largest impacts, it also provides vital information to enable shellfishing community, aquaculture industry, and coastal management agencies to adapt practices in order minimize economic losses.

- **Raising awareness of OA in Massachusetts' coastal waters is crucial.** OA should be part of conversations on water quality, urban planning, coastal or fisheries management, and marine industries. Those conversations should involve the public, representatives of marine and coastal industries, urban planners, and water quality professionals.

For more information

Summaries, agendas, and participant lists for the workshops held in Barnstable and Gloucester can be found at the NECAN website: www.neracoos.org/necan. For additional information on OA please see the NECAN website or contact NECAN Policy Working Group coordinators, Dr. Todd Capson (capsont@gmail.com) or Dr. Elizabeth Turner (elizabeth.turner@noaa.gov).

Resources

A Climate Calamity in the Gulf of Maine Part 2: Acid in the Gulf. Video by O'Chang Studios. available at www.youtube.com/watch?v=ZimEBFw1Q7c&feature=youtu.be

Ekstrom JA et al. 2015. Vulnerability and Adaptation of US Shellfisheries to Ocean Acidification. *Nature Climate Change* 5: 207-214.

Maine Senate Paper (SP) 599. Joint Resolution Recognizing Ocean Acidification as a Threat to Maine's Coastal Economy Communities Way of Life (2013) Available at www.mainelegislature.org/legis/bills/getPDF.asp?paper=SP0599&item=1&snum=126

Maine Coastal and Ocean Acidification Report. 2015. This is an outcome of the State of Maine *Commission To Study the Effects of Coastal and Ocean Acidification and Its Existing and Potential Effects on Species That Are Commercially Harvested and Grown along the Maine Coast*. Available at www.maine.gov/legis/opla/Oceanacidificationreport.pdf