

# HARPSWELL ANCHOR™

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INDEPENDENCE

## Ocean Acidification Findings: Maine Lobster

BY LISA JOY

Lobster abundance and harvests are at an all-time high in the Gulf of Maine. Nonetheless, scientists and citizen scientists continue to monitor water temperature, nursery populations, primary food supply, and, most recently, ocean acidification (OA). Gathering data and studying trends is a proactive hedge against potential negative impacts in a dynamic environment.

Several scientists presented findings in their respective areas of expertise at the June 12 meeting of the Maine Ocean and Coastal Acidification (MOCA) partnership at Bowdoin College.

“In Maine alone the lobster harvest has gone from 20 million pounds a year in the 1980s and before to over 120 million pounds,” said Richard “Rick” Wahle, Ph.D., Research Professor at the University of Maine’s Darling Marine Center in Walpole.

“This amazing phenomenon is in part a credit to our harvesting and conservation measures with in-

dustry playing an important, proactive role,” he said, “helped a lot by climate changes and the depletion of predatory groundfish stocks.”

In 1989 Wahle founded a US-Canadian monitoring collaborative that developed the American Lobster Settlement Index. For the past 30 years, scuba divers have gathered data from over 100 nursery grounds in the Northeast and Atlantic Canada using a device that allows them to get in between the ocean bottom cobbles.

“What’s really interesting is that now, at a time when we should be seeing some of the highest settlement levels, we’ve been seeing them fall off, so our concern is what that might bode for the fishery’s future. It is a current debate as to whether those larvae are dying or just settling somewhere else due to changes in temperature and the quality of habitat in the Gulf of Maine,” Wahle said.

His lab is testing both the effects of rising temperature and acidity on larvae.

“The conclusion we’ve come to

so far is that the response of larvae to ... temperature conditions a couple degrees warmer than today is far greater than the response to elevated acidity. The impact of acidity on crustaceans is not as severe as it is on mollusks,” Wahle said.

While debate continues over the origins of excess carbon dioxide in the air, very few disagree that the absorption of this gas by the world’s oceans is causing increased acidity. It’s “simple chemistry” that when water combines with carbon dioxide, carbonic acid results.

MOCA is a volunteer partnership formed in 2016 by: Friends of Casco Bay, the Island Institute and University of Maine/Maine Sea Grant. It aims to implement recommendations in the Ocean and Coastal Acidification Study Commission’s 2015 report and coordinate the work of stakeholders who study and help reduce and/or adapt to related impacts. Members of Maine’s Department of Marine Fisheries (DMR) and Department of Environmental Protection

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**Marine Life** Mike Doan, Friends of Casco Bay Research Associate, hauls up the Cage of Science—electronic equipment housed in a converted lobster trap that records hour-by-hour data on the bay’s temperature, carbon dioxide, oxygen, pH, salinity and chlorophyll. (KEVIN MORRIS PHOTO)

## Harpswell Guidebook Inspires a Sense of Place

On a windy afternoon near the end of the school year about 40 third graders have gathered on the sloping lawn at Harpswell Community School. They sit in a lopsided circle, speaking in turns as attention moves counter-clockwise around.

“My favorite preserve was the snowy one,” announces student Morgandy Crawford.

“Everyone remembers that!” shouts a boy nearby, cueing several kids to talk at once.

They’re here to celebrate the end of a year-long experiment the third grade conducted with the Harpswell Heritage Land Trust (HHLT) using a recently published Junior Ranger Activity Guide as the centerpiece of a



**Hometown Adventure** Harpswell day campers enjoy a scenic walk along Devil’s Back Trail on Orr’s Island. (HHLT PHOTO)

series of local outdoor field trips, nine in total. As the school year draws to a close, they reflect on what they learned on their visits to the HHLT and town-managed preserves and trails. A few comment about tide pools, others inch worms, one about animal adaptations.

Emma Levy, who grew up in Harpswell, is here at the celebration. Levy is currently a sophomore at Williams College. Two years ago as a senior at Mt. Ararat High School, she created the Junior Ranger Activity Guide for her capstone project, a graduation requirement for which students demonstrate skills as self-directed, lifelong learners by working with advisors and community volun-

teers to complete a project of personal interest to them.

Levy had spent time helping HHLT Outreach Coordinator Julia McLeod run the organization’s Nature Day Camp during the summer months, an experience that inspired the creation of the guide. “I really discovered the preserves when I helped at Nature Day Camp,” Levy reflects.

The guide, loosely modeled after a similar book Levy used when visiting national parks with her family, encourages kids to be observers of the natural world. How they ended up being the basis of a field trip series happened serendipitously.

“We had received a grant from  
See **GUIDEBOOK** p. 12

# Acidification

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(DEP) have been participating in MOCA's efforts.

"The volunteer approach is fantastic in this particular [political] climate – and to have DEP and DMR participating," said Rep Michael "Mick" Devin (D-Newcastle), lead sponsor of the 2014 legislation that resulted in the Commission.

"We need to elevate OA policy within the state and get its backing. I'll be working with MOCA to do that as best we can," he said.

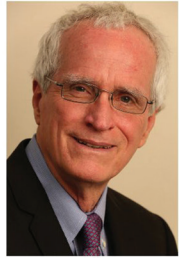
Rep. Joyce "Jay" McCreight (D-Harpswell) is aiming for her third term in November, and has "done my best to stay as connected as possible" to coastal community

conversations in her second term after serving on the marine resources committee in her first.

"I see the importance of this science, and putting it together with the expertise of the [lobster] industry to preserve that industry, which is our heritage and the livelihood for so many people," she said.

Joyce and Devin were among roughly 60 attendees at the MOCA meeting, including a fellow state representative from York, as well as staff from Sen. Susan Collins and Sen. Angus King offices. Rep. Chellie Pingree addressed the group via video (<https://youtu.be/oz6e7Pq3BR0>):

"...[T]wo stunning statistics have been on my mind. The first is that warming waters are projected to push the lobster population 200 miles northward in the next 30 years. The second is that 2017 was



*"Brunswick Area Student Aid Fund, along with a lot of hard work, allowed me to go to the University of Maine which then led to a legal career, ten years as Maine Attorney General and a position now as a teacher at both Columbia and Harvard Law Schools. BASAF changed my life and it will change the life of others."*

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## Friends of Casco Bay Monthly Mean Water Temperature, 2007-2016



**Degrees** Casco Bay water temperature averages fluctuate year to year, while straight black lines depict warming water trend. (COURTESY OF FRIENDS OF CASCO BAY)

the smallest Maine clam harvest in almost 90 years – a combination of invasive green crabs, algae blooms and ocean acidification," Pingree said.

In May she introduced the Coastal Communities Ocean Acidification Act of 2017 (H.R. 2719), which asks that the National Oceanic and Atmospheric Administration conduct vulnerability assessments related to OA.

Lobster may be less affected by acidification than other species, but the ocean is an ecosystem and those that study its parts acknowledge the importance of understanding the whole.

"We become fixated on looking at the direct and interactive effect on a single species, but it's going to be an understanding of an ecosystem that's required," said David Fields, Ph.D., Senior Research Scientist at Bigelow Laboratory for Ocean Scientists in East Boothbay.

Fields and his colleagues study the physiological and environmental influences on the regional and global scale distribution of zooplankton, which includes larval lobsters and copepods, the primary food of larval fish, jellyfish and whales – in Fields' words, "a very pronounced link in the food chain."

He is looking for early indicators of change in the Gulf of Maine's copepod population by observing  
**Continued on next page**

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Continued from previous page their energy reserves, specifically breathing reserves and fat content.

“That will tell you how long they have to survive when swimming in the water column,” Fields said.

“If history means anything, we’re in ‘something’s coming’ because an increase in metabolic rates and gene expression rates are the first sign that an organism is stressed. What we’re seeing are clear signs of increased stress in both copepods and lobsters caused primarily by temperature and exacerbated by increased acidification,” he said.

Brad Warren, Director of Seattle-based Global Ocean Health, a program of National Fisheries Conservation Center, was also in the audience. Working with a tribal

and industry partner in 2011, Warren helped initiate the nation’s first Blue Ribbon panel in Washington State to study and make recommendations on countering OA’s impacts. Initially in response to the shellfish industry’s dire need – particularly oyster farmers – today’s research, monitoring, adaptation and pollution reduction has the support of some of the Pacific Northwest’s crabbers and salmon fishermen as well.

In 2010, Warren “on-boarded” two Maine oyster farmers and is building other relationships with policy makers and area fisheries.

“My main takeaways from the MOCA meeting are that research on the impact of OA on juvenile and adult lobsters is ongoing. The

long-term data set with scientific conclusions shows that warming temperatures are the biggest factor on lobster populations, and that your copepods are getting skinnier,” Warren said.

He sees the biggest next step for the Northeast as extending its Regional Greenhouse Gas Initiative with the northern mid-Atlantic states to transportation fields. He’ll be looking to see how Maine participates in the dual-region Transportation and Climate Initiative.

“Our piece in that conversation is to get fishermen, growers and the working waterfront to say what they need to see, so that a piece of the price of fuel comes back to them, and they can keep their energy costs under control,” Waller said. ☺

## Free Summer Meals for All Children—No Questions Asked!

Mid Coast Hunger Prevention Program is participating in the Summer Food Service Program. Meals will be provided to all children without charge and are the same for all children regardless of race, color, national origin, sex, and age or disability, and there will be no discrimination in the course of the meal service. Meals will be provided, on a first come, first serve basis, at the sites and times as follows:

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**Curtis Memorial Library** (23 Pleasant St., Brunswick): Lunch — 12:00 - 1:00 pm from 6/25 - 8/24, Monday - Friday

**Harpswell Town Office** (263 Mountain Road, Harpswell): Lunch — 12:30 - 1:00 pm from 6/25 - 8/24, Monday, Friday

### About MCHPP

Mid Coast Hunger Prevention Program is a nonprofit organization based in Brunswick and dedicated to the mission of providing hungry people with access to healthy food, working to improve the quality of their lives by partnering with others, and serving them in a manner that recognizes their dignity. For more information about MCHPP’s services, hours, and volunteer opportunities, or to make a donation, please visit [mchpp.org](http://mchpp.org). ☺

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