Ocean Acidification in the Northeast

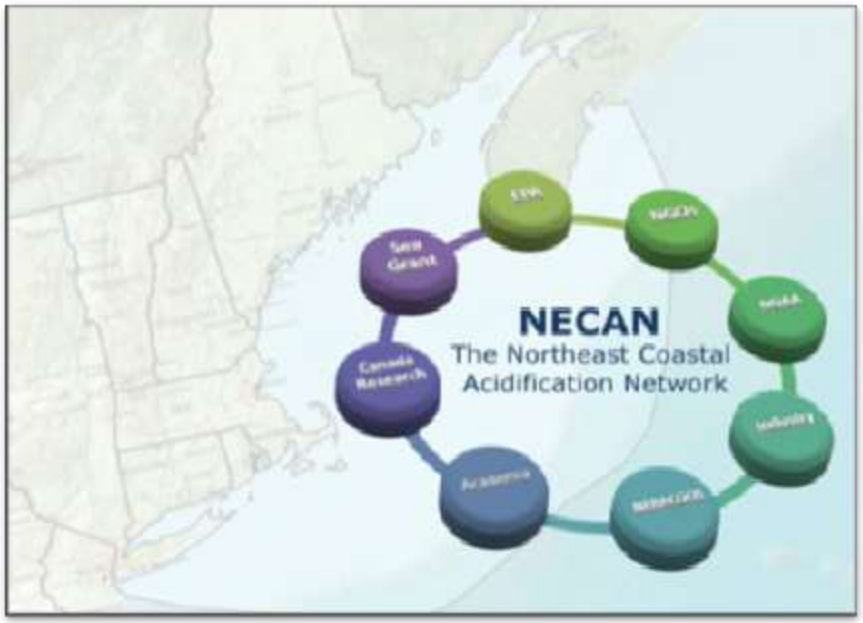
Created by O'Chang Studios

Esperanza Stancioff
NECAN and MOCA

Sustainability and Water Conference

March 30, 2017

The Northeast Coastal Acidification Network (NECAN)



Perspective

Expertise

Dedication

Diversity

NECAN Steering Committee

- Ru Morrison* (IOOS/NERACOOS)
- Jackie Ball (NERACOOS)
- **Esperanza Stancioff (UMaine Extension / ME Sea Grant)**
-Todd Capson (Independent Contractor)
- Dwight Gledhill (NOAA OAP)
- Bill Mook (Mook Sea Farm)
- Joe Salisbury (UNH)
-Elizabeth Turner (NOAA/NOS/NCCOS)
- Mel Cote (EPA)
- Helmuth Thomas (Dalhousie Univ.)
- Juliana Barrett (CT Sea Grant)

Who is NECAN?

A collaborative network of partners including:

- **Scientists,**
- **Federal and state agency reps.,**
- **Resource managers,**
- **Affected industry partners**
- **Educators**
- **Citizen Scientists**

Who are: dedicated towards coordinating and guiding regional observing, research, and modeling endeavors

NE-CAN is all of us!

NECAN's role:

- **Review and assess** the most recent scientific, technical and socio-economic information relevant to the economically important marine organisms potentially impacted by ocean and coastal acidification;
- **Communicate** state of knowledge and critical knowledge gaps identified by stakeholders to relevant state and federal agencies;
- Help to **coordinate and set regional priorities** for monitoring and research designed to further our understanding of coastal acidification;
- Understand and Respond to **user and stakeholder needs**.




Review and assess *Communicate* *Respond* *Set priorities*

Webinars → Synthesis → Translation → Stakeholder Input → Implementation Plan

Webinars

State of the Science Workshop

Summary Article

Stakeholder Engagement Workshops

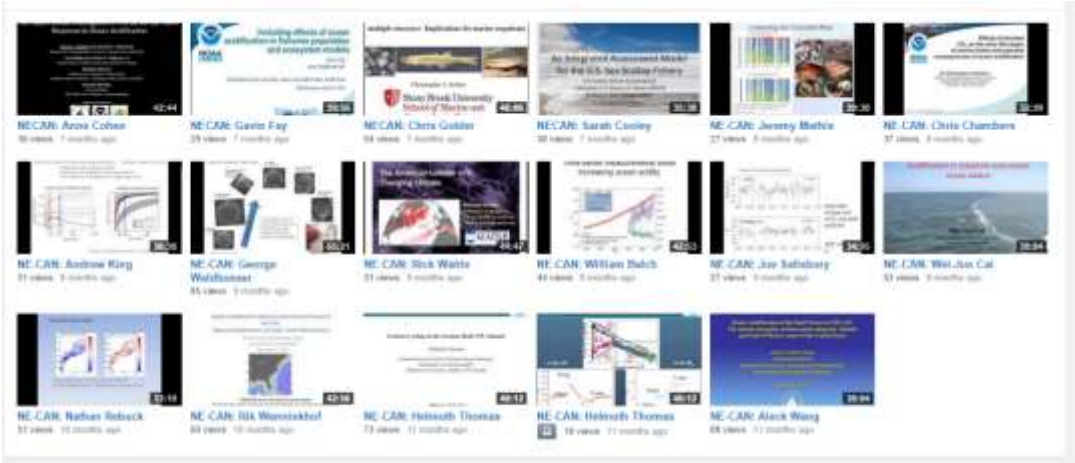
Implementation Plan

2013 → **2017**

The NECAN Strategy

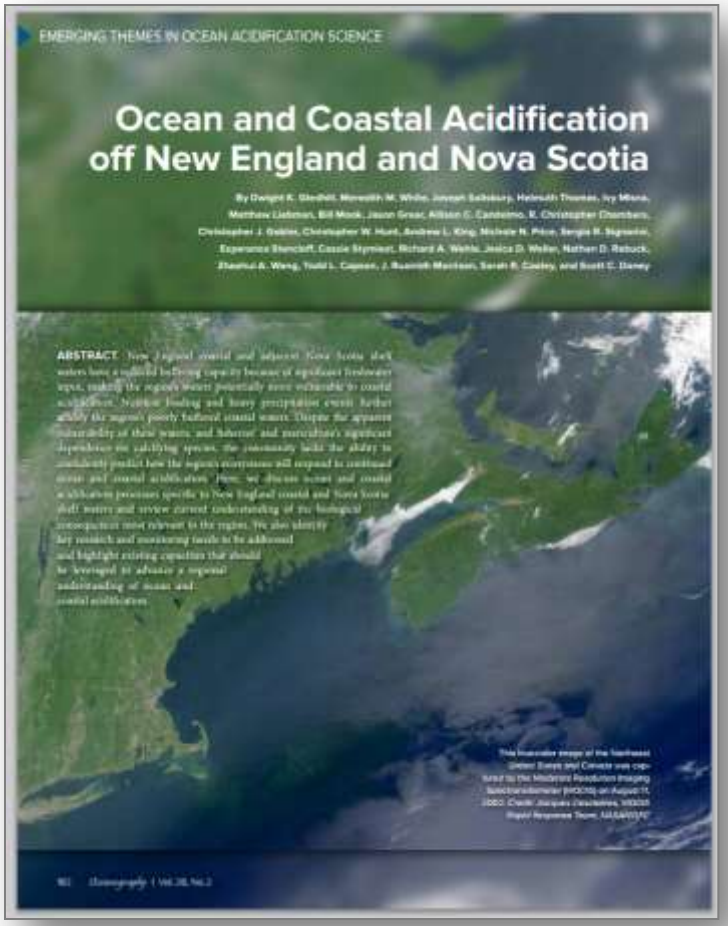
Step 1: Review and Assess

- ✓ 16 research presentations/webinars and continuing
- ✓ 1 state of the science workshop
- ✓ Article for special issue of Oceanography



State of the Science Synthesis

Oceanography
28(2):182–197

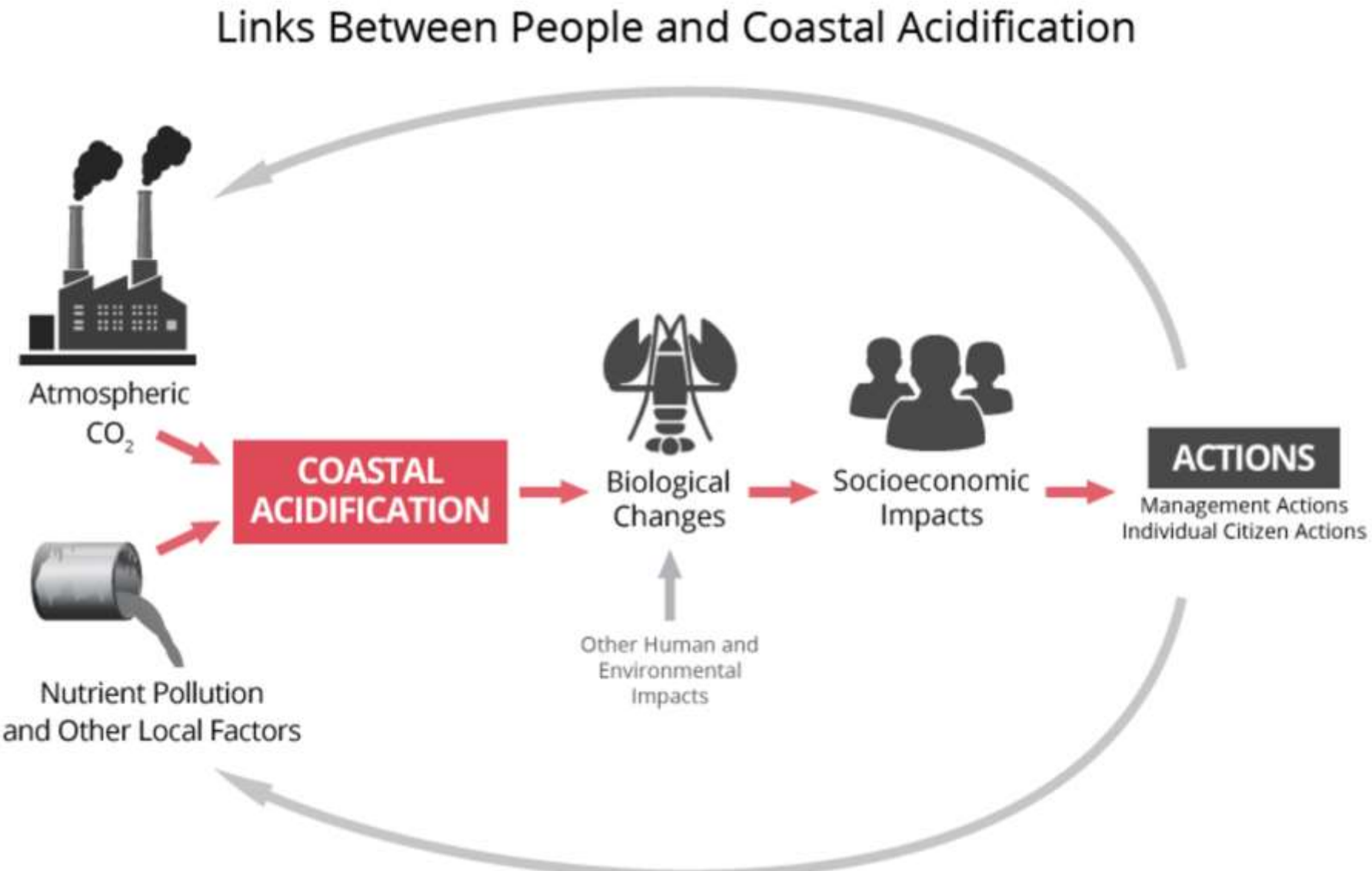


1. New England coastal and adjacent Nova Scotia shelf waters have a low buffering capacity
   - **significant freshwater input**
   - **nutrient loading and**
   - **heavy precipitation events further acidify the region's poorly buffered coastal waters.**

2. High dependence on calcifying species

1. The community currently lacks the ability to confidently predict how the region's ecosystems will respond to increasing acidification

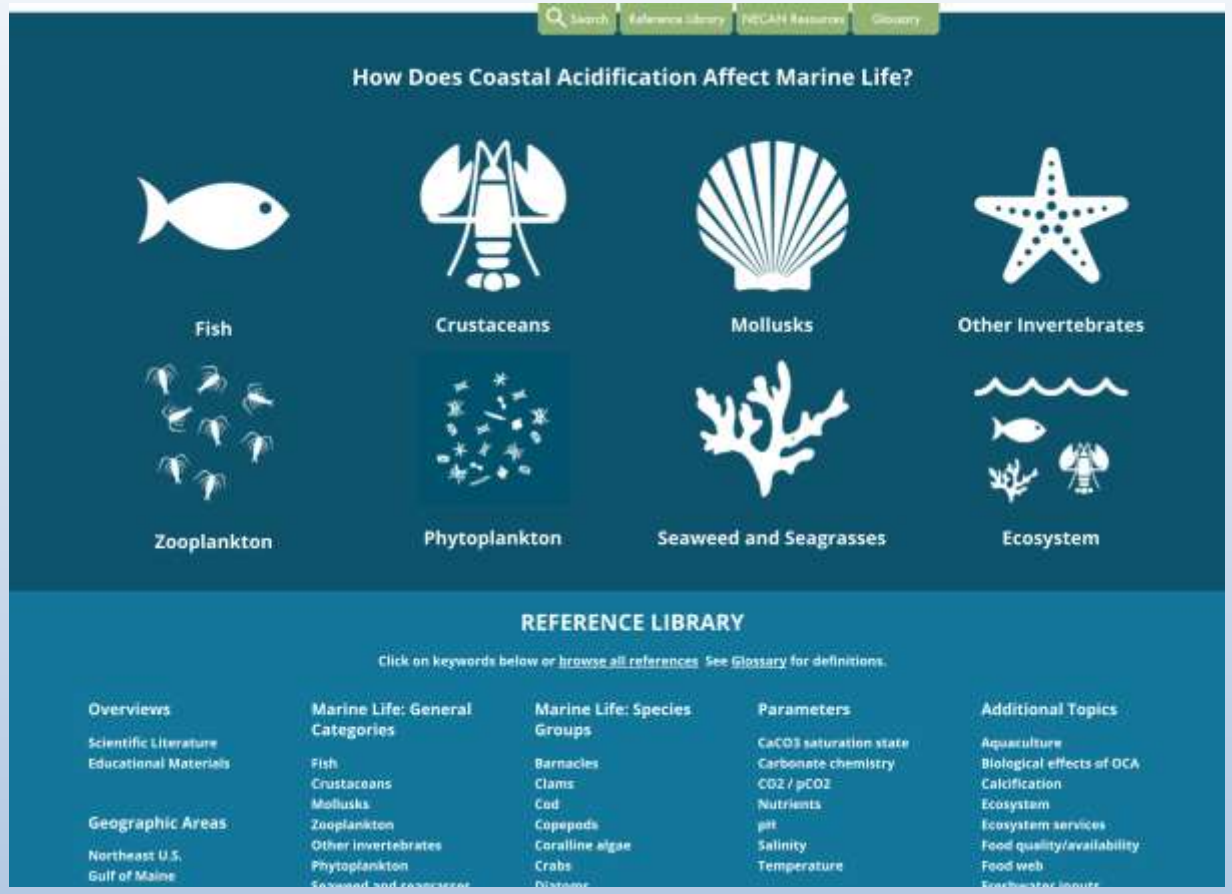
Step 2: Communicate results of synthesis



Factors that increase OCA susceptibility in the Northeast

- Freshwater inputs
- Poorly buffered waters supplied by currents
- Temperature (It's cold… and with temperature fluctuations)
- Spring bloom dynamics
- Mixing dynamics
- Nutrient loading

Website and E-Communications



Since October 2013:

- ✓ 600+ members
- ✓ 18 science webinars
- ✓ Quarterly Newsletters

- ✓ 1,000+ Youtube views
- ✓ O'Chang Video

www.necan.org

NECAN Resources

This page highlights selected informational resources on coastal acidification in the Northeast.

Webinars

Recordings from both the first and second NECAN webinar series are available below.

First NECAN Webinar Series: Information and Recordings

Second NECAN Webinar Series *(in-progress)*: Information and Recordings

Stakeholder Workshop Reports

NECAN convened six workshops in Maine, Massachusetts, Rhode Island, Connecticut, and Nova Scotia in 2015 and 2016 to inform and learn from key stakeholder groups regarding ocean and coastal acidification.

Download Workshop Reports

Other Resources

- Overview of Coastal Acidification in the Northeast Region (Four-page NECAN outreach piece)
- Ocean and Coastal Acidification off New England and Nova Scotia (*Oceanography* article)
- Big Changes Are Here: We Need to Turn on the Headlights (One-page fisheries and aquaculture outreach piece from NECAN)

NORTHEAST
COASTAL ACIDIFICATION
NETWORK

OVERVIEW | EFFECTS ON MARINE LIFE | RESEARCH PRIORITIES | REGIONAL CONDITIONS | TAKE ACTION | ABOUT US

Overview of Ocean and Coastal Acidification

Ocean Acidification Is Happening on a Global Scale

The world's ocean has historically been slightly on the basic side of the acid-base scale of pH. However, decades of scientific monitoring and research reveal that the current pH of seawater is dropping towards the acidic side of the scale, as carbon dioxide in the atmosphere increases more rapidly than perhaps ever before. When carbon dioxide (CO_2) from the air is absorbed by seawater, chemical reactions occur that form carbonic acid. They also reduce the amount of dissolved calcium carbonate minerals, which are the building blocks for the skeletons and shells of many marine species. These chemical reactions are termed ocean acidification, or OA.

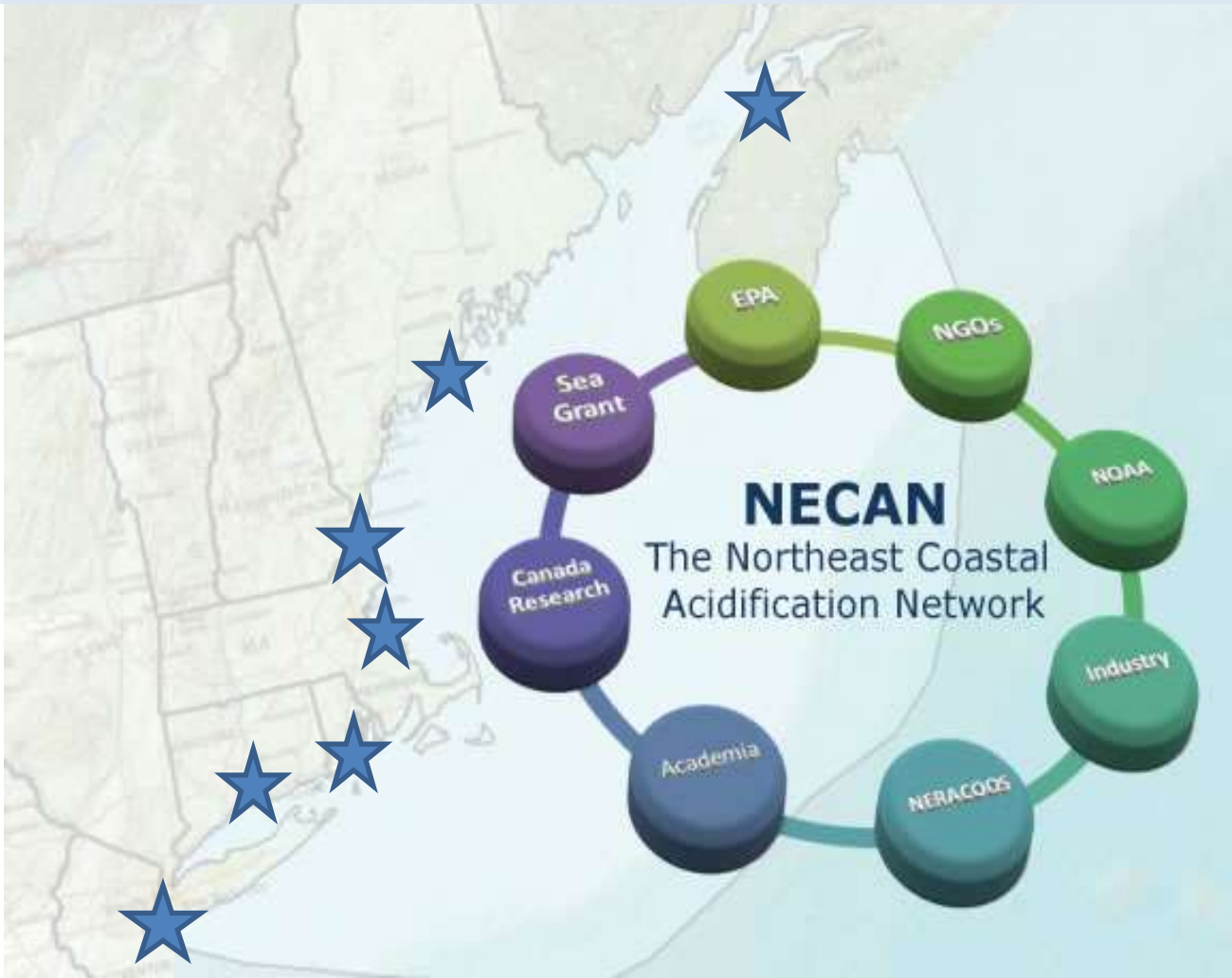
Since the beginning of the Industrial Revolution, the pH of surface ocean waters has fallen by 0.1 pH units. Because the pH scale is logarithmic, this change represents approximately a 30 percent increase in acidity. Predictions indicate that the oceans will continue to absorb carbon dioxide and edge closer to acidic. Estimates of future carbon dioxide levels, based on business-as-usual emission scenarios, indicate that by 2100 the surface waters of the ocean could be nearly 150 percent more acidic, resulting in a pH that the oceans haven't experienced for more than 20 million years.

The Chemistry of Ocean Acidification

Step 3: Stakeholder Engagement

Purpose: ***to inform and learn from fishermen, aquaculturists, and coastal water quality groups regarding OCA.***

- *Maine* (Dec.)
- *South Shore MA* (April)
- *Rhode Island* (June)
- *North Shore MA* (June)
- *NJ/DE* (not NECAN) (Aug)
- *NS Canada* (Oct.)
- *Connecticut* (Jan)



We Need to:

- *translate acidification in the context of climate change, and **multiple stressor** environment*
- ***identify risks and make recommendations** for each separate industry group*
- *improve and expand **monitoring** so we are collecting high quality (long term) data*
- ***research** targeted to regionally-important species*

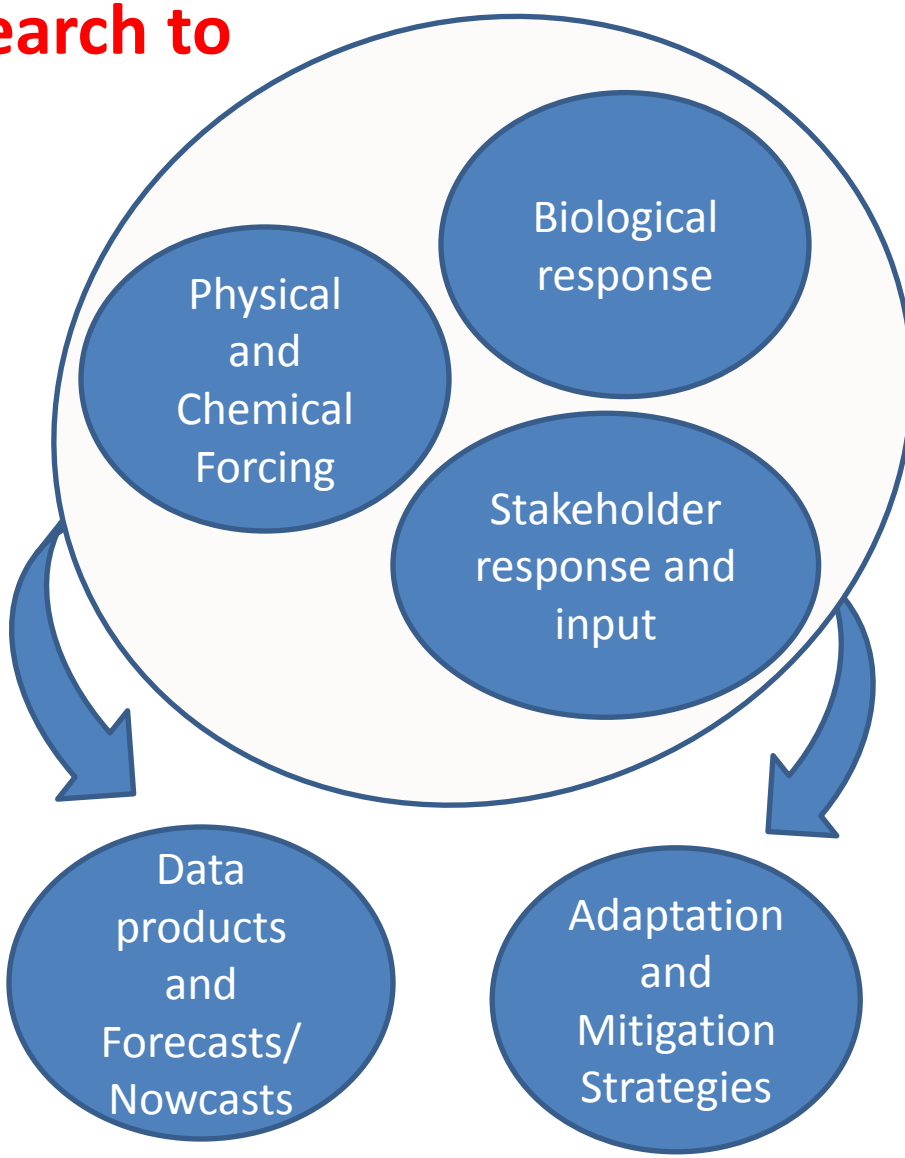
*…all of which needs to be **coordinated** and made **relevant** for stakeholders and policy makers*

* **Ocean and coastal acidification can be complex**
* **We need monitoring and research to better understand its effects and impacts on:**

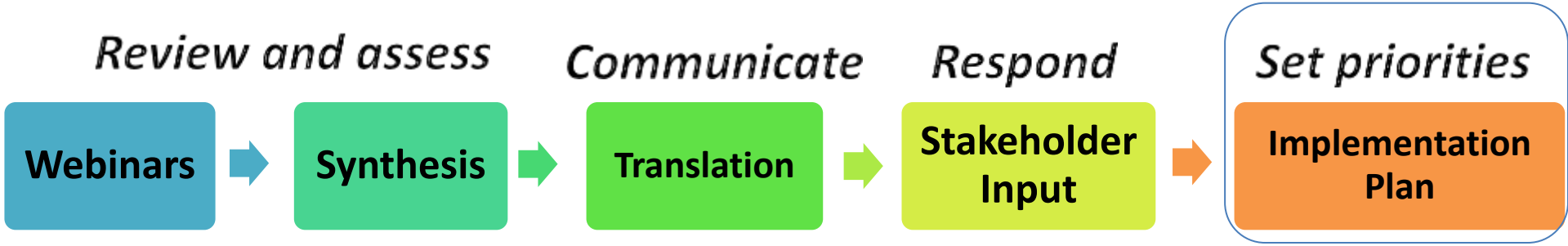
organisms:
Shellfish, lobster, finfish

different life stages:
Larvae, juveniles, adults

in different habitats:
Nearshore
Open ocean/off shore
Mixed



Step 4: Implementation Plan


Review and assess
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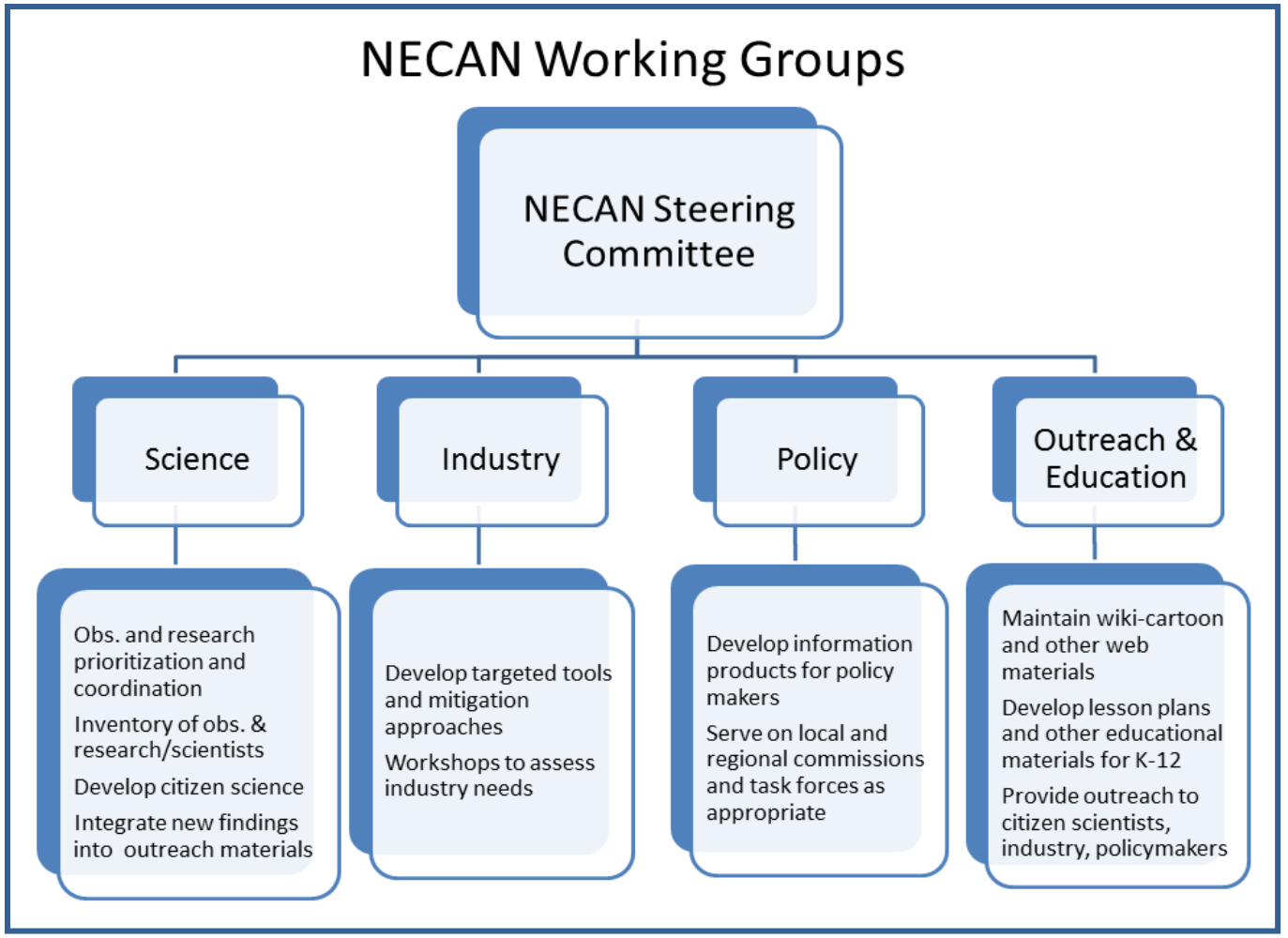
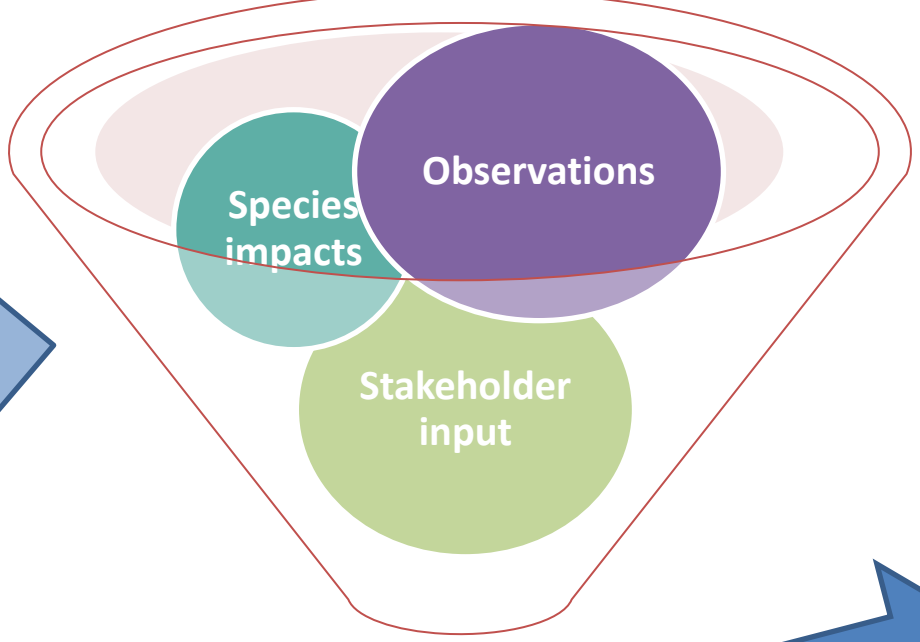

NECAN Working Groups
NECAN Steering Committee
Science
Industry
Policy
Outreach & Education
Obs. and research prioritization and coordination
Inventory of obs. & research/scientists
Develop citizen science
Integrate new findings into outreach materials
Develop targeted tools and mitigation approaches
Workshops to assess industry needs
Develop information products for policy makers
Serve on local and regional commissions and task forces as appropriate
Maintain wiki-cartoon and other web materials
Develop lesson plans and other educational materials for K-12
Provide outreach to citizen scientists, industry, policymakers

Lessons Learned

- OA is global, but coastal OA effects are local
  - Targeted outreach to specific states based on important coastal resources
- Stakeholders are concerned
  - Understand the issue and support research
- Policy follows the public
  - Once industries are concerned, policymakers and politicians will act
- Provide actions
  - Give stakeholders something to do beyond communication

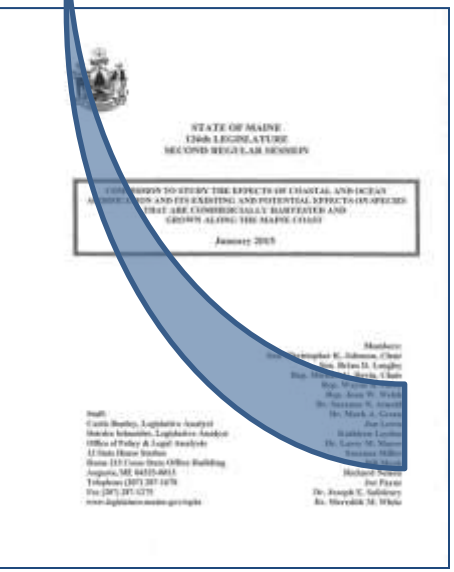


State of the Science

Rhode Island
2015-H 5320

New Jersey Commission?

Massachusetts OA
House Bill-Rep. Tim Madden


STATE OF MAINE
126th LEGISLATURE
SECOND REGULAR SESSION

January 2015

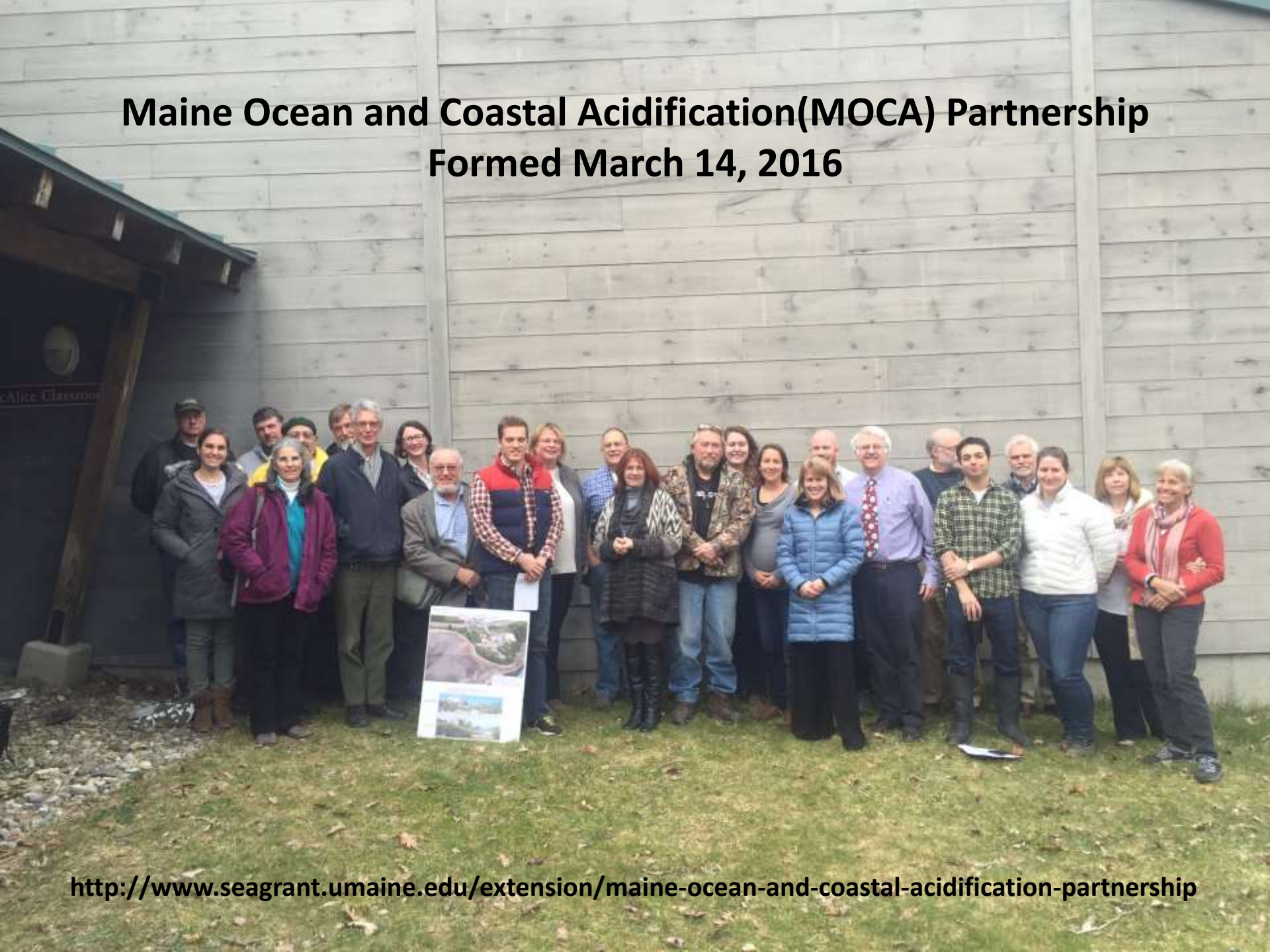
State of Maine Legislation OA Commission and Report

2014, 126th Maine Legislature – Study Commission

Effects of Coastal and Ocean Acidification and Its Existing and Potential Effects on Species That Are Commercially Harvested and Grown Along the Maine Coast

- First meeting - August 2014
- Final Commission Report with recommendations- January 2015
- **Six Goals**– and a recommendation for an OCA Council to continue the work
- Let's Get to Work!

Maine Ocean and Coastal Acidification(MOCA) Partnership
Formed March 14, 2016



http://www.seagrant.umaine.edu/extension/maine-ocean-and-coastal-acidification-partnership

Maine Events

- ME Stakeholder Ocean and Coastal Acidification Workshop– December 2014, Darling Marine Center, (NECAN)
- Ocean Acidification Vulnerability– January 2014, Maine Maritime Museum, (Island Institute)
- ME OA Commission established, 2014
- ME Fishermen's Forums, 2013, 2014, & 2016 (Maine Sea Grant)
- Casco Bay Nutrient Workshop, May 2016, (CBEP & NECAN)
- MOCA Symposiums, June 2016; November 2016

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Ocean Acidification
A Global Issue Gets Local

by Catherine Schmitt

The changing chemistry of the ocean threatens the state's most important fisheries. Yet ocean acidification seems diffuse and global, too overwhelming for any one person, or fisherman, to do much about. But, in fact, there's a lot of things people in Maine can do to address the problem, according to participants in a workshop hosted by the Northeast Coastal Acidification Network at the Darling Marine Center in December

CONTENTS

"Possibility Open" That Habitat Closures Could Impact Lobster Gear

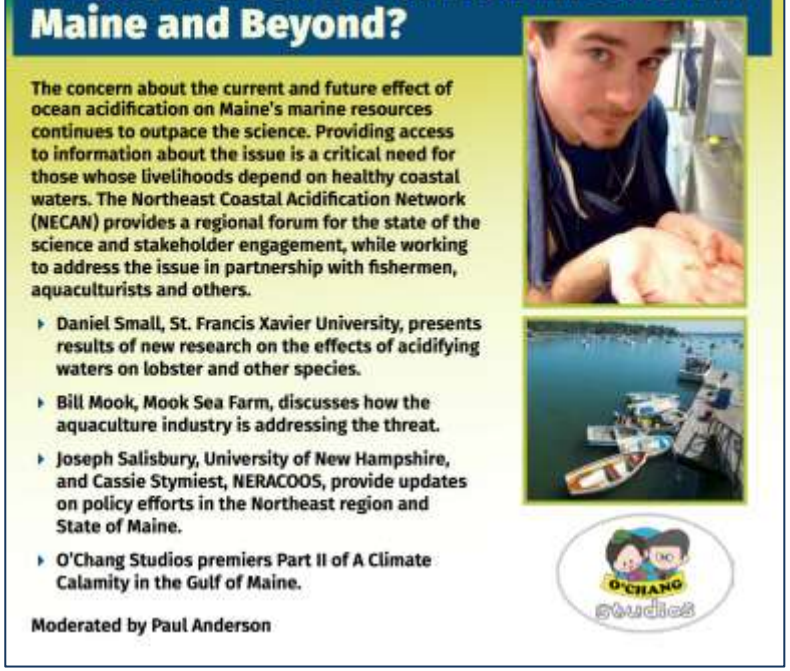
Scalp Bounties and Lovewell's War

Editorial – In These Last Hours

Maine and Massachusetts Rope Buybacks in January

Scallop Fishermen Can Harvest, But Early Season End Expected

Eastport Breakwater Collapse



What's New on Ocean Acidification in Maine and Beyond?

The concern about the current and future effect of ocean acidification on Maine's marine resources continues to outpace the science. Providing access to information about the issue is a critical need for those whose livelihoods depend on healthy coastal waters. The Northeast Coastal Acidification Network (NECAN) provides a regional forum for the state of the science and stakeholder engagement, while working to address the issue in partnership with fishermen, aquaculturists and others.

- **Daniel Small, St. Francis Xavier University, presents results of new research on the effects of acidifying waters on lobster and other species.**
- **Bill Mook, Mook Sea Farm, discusses how the aquaculture industry is addressing the threat.**
- **Joseph Salisbury, University of New Hampshire, and Cassie Stymiest, NERACOOS, provide updates on policy efforts in the Northeast region and State of Maine.**
- **O'Chang Studios premiers Part II of A Climate Calamity in the Gulf of Maine.**

Moderated by Paul Anderson

O'CHANG studios

http://www.seagrant.umaine.edu/extension/maine-ocean-and-coastal-acidification-partnership

So what can we do about it?

- Gain a better understanding through increased technology, information, and research
- Legislative and political action both globally/locally (Washington, now Maine)
- Nutrient management
- Research and Monitoring

Reduce contributions of carbon, and therefore acidification, to marine environments






Acknowledgements:

- The NECAN Steering Committee and its members
- NOAA's Ocean Acidification Program
- NOAA's North Atlantic Regional Team
- EPA
- MOCA
- Partners!

www.neracoos.org/necan

Thank You!

Photo: University of Maine