



Maine's Shellfish Co-Management System

Analysis of Strengths and Recommendations for Improvement

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Overview

- I. Shellfishing values and issues
- II. Co-management and adaptation
- III. Research design
- IV. Strengths of the existing program
- V. Recommendations for improvement
- VI. Conclusions and next steps



Shellfishing Values and Issues



Ecological

Economic

Social

Ecological Threats



Invasive green crabs & increased predation



Water temperature and quality
Phytoplankton blooms



Land use

Economic Uncertainty



Decline in state license sales



Younger generations & limited entry



Price fluctuations



Reduction in shellfish
dealers & market power

Social & Cultural Issues



- Inequality and disrespect
- Physical pain and injury
- Drug and alcohol addiction
- Education and access to technology
- Loss of access to local food
- Decline of local knowledge and cultural traditions

Co-management and adaptation



Working together to study, predict, and respond to issues to strengthen and grow the shellfish industry: ***Resilience approach***

Fisheries co-management can improve how fishermen, agencies, and citizens work together to support the industry and promote adaptation.



What is co-management?

- Sharing power and decision making
- Cooperative
- Networked
- Mutual responsibility

Co-management successes

Used in >130 fisheries in 44 countries

- ✓ ME lobster
- ✓ Scotia-Fundy small-boat fixed-gear groundfish
- ✓ Columbia River Tribal Fisheries (salmon, lamprey, and sturgeon)

Support improved governance outcomes by increasing buy-in by fishermen, utilize local ecological knowledge, and allow leaders to advocate for long-term views that support sustainability.

Academic and Practitioner Resources:
Ecology & Society , Resilience Alliance



Shellfish co-management factors in Maine



- ✓ Sedentary resource & well defined boundaries
- ✓ Group cohesiveness (culture)
- ✓ Institutional framework for user participation
Fishermen are often the first to be aware of emerging problems and can expedite actions to address them when enabling institutions are present
- ✓ Stewardship requirement- conservation hours
- ✓ Combine science and local ecological knowledge

In sum: Co-managed clam fisheries may be better prepared to identify threats and more quickly respond and adapt to environmental and social change.

Research questions and methods

What are the factors that shape communication and adaptation within shellfish co-management?

What are strategies to strengthen connections between science and management?

Communication: Meetings and decision making, access to and use of science, organizational communication

Methods: Data Collection

Shellfish Committee Meeting Observations

Phase I (Place-based): approx. 30 meetings in Bar Harbor, 7 Town,
& Gouldsboro (2014-2016)

Phase II (Coastwide): 19 meetings (2016)

Interviews

Purposive and key informant sampling: 41 interviews w/ 39 individuals

Shellfish Committee Meeting Minutes

236 sets from 2013-2016:

Annual report database

Interview Participants

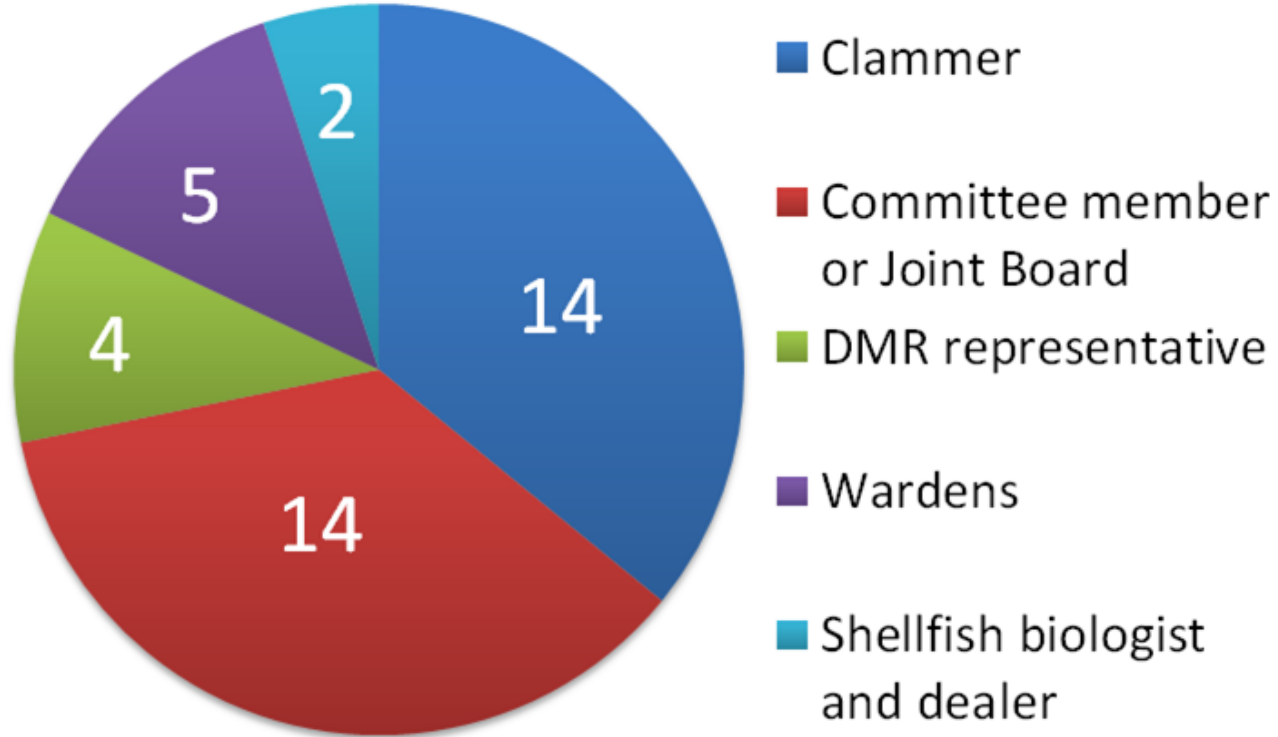
Key informants

Average # years
working in fishery:

27 years

Coastwide: 14

Place-based: 25



How well is the shellfish management program working?

What is success? Varies and is context dependent

Economic

- Dock and landings value
- Number of licenses
- Town investment

Ecological

- Stable and growing resource
- Use science in management
- Monitoring linked to management
- Water quality improvements

Social

- Meeting frequency and organization
- Town participation
- Warden
- Community value
- Adaptive capacities: Leadership, innovation



Co-management strengths: DMR role



- Area Biologists: Ambassadors to towns
- Relationships based on mutual respect
- Science communication strategies: listening, adapt to audience, building relationships, going out on the mud
- DMR provides science and regulatory information; can expand advisory role

How well is the co-management system working?

Scale of 1 (best) to 10 (worst)

5

Median and Mode

Mean: 4.6

SD: 2.3

Range: 1 to 10

“Somewhere in the middle. I think it’s definitely workable. It definitely can survive...Let's do the extra to find out if it is going work when we do it. Monitor it, check it, find the data, get the data, record it, compare it, use it as a tool for future situations, share it with other committees, network. Whatever it takes, but I mean, if we're going go through the moves, why not make them count?”

Recommendations to Support Co-management

1. Conduct yearly needs assessment with towns to identify problems, needs, and partnership preferences.
2. Build municipal partnerships and infrastructure.
3. Increase information sharing and strengthen collaborations across sectors.
4. Improve and leverage focus on shellfishing at the annual Maine Fishermen's Forum.
5. Explore organizational restructuring to prioritize shellfish science and resource monitoring within DMR.

1. Conduct yearly needs assessment with towns

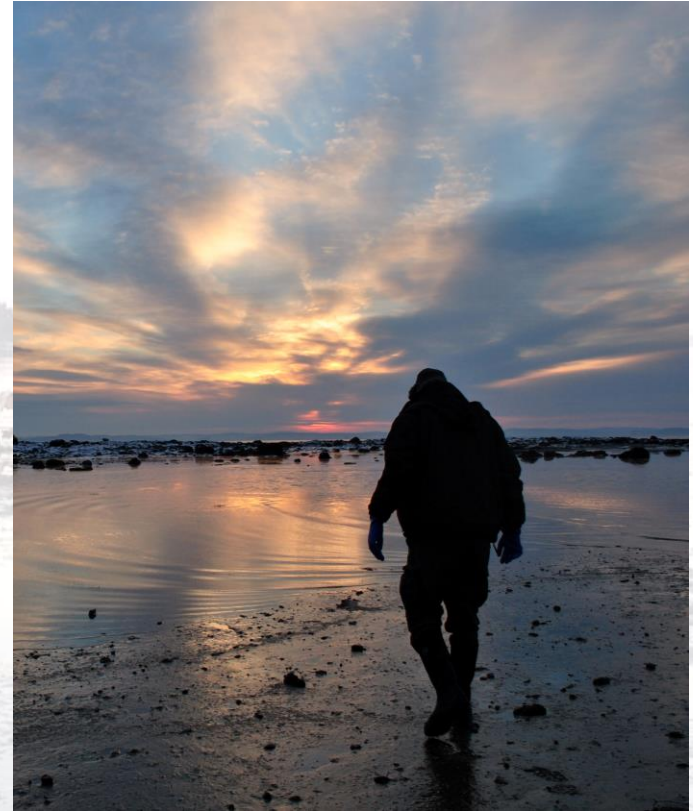


- One-size-fits all doesn't work
- Regional diversity and home rule
- Programs are continually changing
- System for evaluating

Annual survey to towns:

“What do you want? What do you think [DMR] should be working on? What are your interests? What do you want to work on? What do you need help with that [DMR] can do?”

“Are we doing surveys where we should be doing surveys? Are we giving proper information to X, Y, Z?”



Example: DMR Committee meeting attendance

- Presence of at least one DMR staff person at 29% of Shellfish Committee meetings (68/233 meetings) and 44% (8/18) for 2016 meeting attendance.
- **Adequate?** Need a way to evaluate the needs, tailor attendance, and make outreach more efficient and sustainable.
- Needs assessment = more proactive and tailored approach that could eventually reduce paperwork and administrative burden.

Needs assessment focus

- Problem ID, information needs, partnership preferences
- Online surveys using Google forms and/or Survey Monkey
- Connect with Annual Report and/or Fishermen's Forum



2. Build municipal partnerships and infrastructure



- Town participation and role
- Organization and record keeping
- Diverse and effective leadership

Town participation and role

Presence of at least one town staff person (Warden, Clerk, Manager) @ 81% of meetings (190/233 meetings).

Regional variation:

Region 1	82%
Region 2	65%
Region 3	83%

Adequate? Evaluate role and quality of the participation.



P. J. Presnell (left) and Gouldsboro Shellfish Warden Michael Pinkham sit behind the town's clambers are having made to capture invasive green crabs. PHOTO BY JACQUELINE WEAVER

Photo from the *Ellsworth American*

Organization and record keeping: Meeting minutes

- Access to info (Senecah, 2004)
- Entry point for involvement
- Demonstrates town standing
- Source of information for DMR to tailor partnership strategies

Minutes available online

Total	27% (16/60 programs)
Region 1	30% (7/23 programs)
Region 2	29% (5/17 programs)
Region 3	20% (4/20 programs)

Diverse and effective leadership



- Leadership essential to adaptation
- Programs are innovating-show multiple forms of leadership from within the town and clamming community
- Types of leadership: Visionary, Problem solvers, Science, Connectors
- Warden as leader in the program

3. Increase information sharing and collaboration across sectors

- Regular (monthly, quarterly) conference call-in with DMR
- Shellfish Science and Leadership Summits (yearly)
- Build on the power of partnerships w/ clammers



The power of partnerships w/ clamming community



- Medomak Water Quality Project
- Freeport Clam Field Experiments
- Maine Coastal Observing Alliance
- Bar Harbor Resource Monitoring
- Frenchman Bay Partners
- Increase networks, types of leadership, access to resources, potential for innovation and policy development (McGreavy et al., 2016)

4. Improve and leverage Fishermen's Forum



- One of most important ME yearly events for learning and building relationships
- Active evaluation to make strategic decisions about design and content—UMaine collaboration
- Integrate Shellfish Focus Day
- Expand ShAC role in organizing

Countering social bias and raising the profile of clamming in the state

“I'd like to see the whole harvesting or clam digging profession be considered a legitimate occupation, not just ‘Oh, he's a clam digger.’ You know?”

How many people can stand up and say, ‘Well, what's your occupation?’ ‘I'm a clam digger.’”



5. Explore organizational restructuring to expand shellfish science and monitoring



- Recent changes are making a difference in staff capacity and ability to do management science.
 - Hiring area biologists and administrative staff for shellfish program = improvement

5. Explore organizational restructuring to expand shellfish science and monitoring

- Area biologists still have substantial administrative duties that may limit ability to do field science
- Alignment between mission and funding priorities of public health and shellfish science/management?
- Ways to improve access to resources for shellfish science?
- Strawman recommendation to start conversation

Take home summary

Fortunate to have co-management in the State and to work with experienced managers and regulators who start with listening and work tirelessly to meet the diverse needs for science and regulatory information and administrative support.

As with any complex organization, there is room for improvement. Our recommendations intend to serve as “informed agitation” for promoting incremental change over time.

Our recommendations related to needs assessment; partnership, infrastructure, and leadership development, learning networks across committees; leveraging Fishermen’s Forum; and organizational restructuring may help improve the role of science in decision making and enhance the ecological, economic and social sustainability of shellfishing.

V. Conclusions, next steps, discussion

1. Seek funding for municipal training, regional learning, and collaboration efforts
2. Explore opportunities for citizen science for shellfish resource monitoring
3. Learn more about options for DMR's public health and science organization
4. Finish analysis
5. Present and publish findings
 - Fishermen's Forum
 - Maine Water and Sustainability Conference
 - Technical report and Shellfish Management Handbook
 - Journals: Marine Policy, Ocean & Coastal Management, Global Environmental Change, and Science Communication