



Alaska Ocean Acidification Network

2022 Spring Discussion Series Take-aways

THEME 1: Improve communication to stakeholder audiences

1) Approach different stakeholder communities with targeted tools. Stakeholder communities are complicated networks. Define the range of decision makers and needs.

- a. Mariculture
- b. Community Samplers
- c. Subsistence Harvesters
- d. Commercial Fishing
- e. Fisheries Management
- f. Local Educators
- g. Researchers

2) Expand outreach products:

a. Maps

- i. Regional focus
- ii. Carbon chemistry layers (esp. for mariculture site selection)
- iii. Where research is being/has been done, contacts, and results

b. Infographics: with readable descriptions

c. Signature Datasets: with visuals

d. Videos: short-form / lightning talks

e. Annual product similar to ESR report: Include what we saw that year with weather, ocean chemistry conditions, shellfish health/die-offs, etc.

f. Social media posts that can be picked up by industry/community influencers

Topics important to address in outreach: Natural variability vs. OA; food chain; interactive stressors; non-lethal impacts; changes in abundance

3) Hone communication content/delivery (develop [Communication Guide](#))

- **Differentiate between natural variability and OA.** Most patterns we see are natural cycles in marine CO₂ chemistry. OA is only 2% of the signal. Explain this in an integrated way with fact-based examples.
- **Use Ecosystem Change messaging instead of just focusing on OA:** Fishermen aren't teasing temperature apart from OA, they look at it as ecosystem change. (Scientists said "Us too!")
- **Shift the nature of most conversations from harbingers to being part of the solution.** Make sure bad news includes action steps (*note: we need to work on these action steps*). Make sure bad news also comes with good news.
- **Prioritize actionable information.** This starts with identifying actionable information through conversations with a particularly stakeholder group.
- **Present local data in understandable, relevant terms.** What background info is necessary, and what can be left out to focus on what is most important?
- **Identify ways to overcome misinformation.**
- **Repeat messaging.** Marketing research shows an item needs to be presented to someone 7 times on average before they digest it. Repetition is welcome and needed.

- **Target deeply invested audiences on solutions** and develop a multi-tiered portfolio of approaches on how to transition away from activities that exacerbate OA.

THEME 2: Expand 2-way Engagement

1. **One-on-one connections with key stakeholders**
 - a. **Lunch series:** pair 1-1 conversations between researcher and stakeholder with the opportunity to explore full explanations
 - b. **Q&As:** column in local publications, Reddit AMA, podcast roundup, etc.
 - c. **Community-building informal gatherings**
2. **Ambassador program** - build OA champions
 - a. Social media influencers
 - b. Key leaders in different fishing groups
 - c. Alaska Native community
3. **Science/industry symposia**
 - a. Large annual events: in-person/virtual
 - b. Periodic stakeholder check-ins: in-person with specific groups

THEME 3: SPECIFIC NEEDS BY AUDIENCE

Community samplers:

- **Sharing data back to communities** with context, visuals, and opportunity for Q&A. Identify capacity and support needed in each region to make sure this can happen systematically.
- **More info and conversation about what’s happening in the local area**, whether we can tie it to OA or not (clam die-offs, etc.)

Mariculture

- **Focus on OA with respect to Alaska shellfish growing operations**, not the world in general. Put handouts into hard copy so growers can read them before, after, or instead of presentations
- **Include what we know about the synergistic effects of co-located seaweed and shellfish growing.** Success is site specific. Share Alaska examples if possible.
- **Provide a synthesis of current work in Southeast.** Multiple data collection efforts have focused here. Explain what they show together.
- **Get ADFG more involved.** They regulate the razor clam industry and have jurisdiction in other areas too. They should be educated and part of the conversation.

Commercial Fishing

- **Simple, certain, and focused on results.** There is concern and confusion about OA in the industry, and some stakeholders want/need more certainty than research audiences.
- **Think more about “winners” vs. “losers”** to keep things tractable.
- **Work towards integration of known OA impacts on crab (and other species when ready) into official documents or noted in assessments**, even if not used directly in models. This type of work should be part of the conversation for what is known.

Fisheries Managers

- **Management groups should have the same information as the industry and other stakeholders.** It was noted that west coast fisheries are not taking OA biological information into account in their decision making.
- **Incorporate more OA into ESR reports.** How can we expand to other chapters past Bering Sea?

Researchers

1. **Develop a list of focal people in different communities and regions:** for researchers to use as a starting point to find partners and collaborators.
2. **Develop a research proposal sharing mechanism or routine**
3. **Establish a community feedback routine for researchers:** before a project starts, identify the stakeholder communities and connect with them directly. Who should be involved in the research, how will the info be used, who is benefiting?

THEME 4: EXPAND AND ADVANCE MONITORING AND RESEARCH

Our discussion series did not focus on this enough to be comprehensive or to use the recommendations from the series alone. NOAA produced a [research plan](#) in 2020 that includes a chapter on Alaska. Applicable action items from this research plan are paired below with the needs voiced during the discussion session.

Species research across species

- **Multi-stressor impacts across life stages and trophic levels** to start understanding ecosystem impact and the vulnerability of human communities/industries.
- **Multi-generational experiments**
- **Active water manipulation** with Alaska species
- **Trophic connections** with respect to species response

Crab:

- **More research on species showing signs of distress** (snow crab, BBRKC), and how the stress factors may be related, and what scales they can be understood
 - **Action 4.3.3:** Conduct laboratory experiments on effects of OA and concurrent stressors, such as salinity and food quality/quantity, using species likely to encounter these environmental conditions, which exhibit potential vulnerabilities to such conditions, and meet qualifications listed in *Action 4.3.1* (snow crab, *Chionoecetes opilio*, and species that are important food resources for protected species).
- **Bottlenecks in life history** that are impacted by OA and other changing variables
 - **Action 3.4.1:** Conduct experiments to understand the range of life-stage responses of OA and associated environmental stressors.
 - **Action 3.7.3:** Consider OA ontogenetic effects on growth and survival of animals in order to assess tradeoffs and potential co-benefits of various management interventions that target different life-history stages and population productivity bottlenecks.
- **Confounding environmental variables**
 - **Action 3.4.4:** Expand experimental system capabilities to incorporate time-varying environmental conditions and expand capacity for multi-stressor experiments.
 - **Action 4.3.2:** Examine OA and temperature interactions in laboratory and field experiments to quantify potential synergistic responses to co-stressors.

- **Action 3.6.2:** Improve understanding of responses to OA by incorporating consideration of environmental and ecosystem variability including episodic warming, harmful algal blooms, and mass mortality events.

Groundfish:

- **Fishing vessel sampling** for environmental conditions. This means affordable, reliable technology that can be shared with the fleet.
 - **Actions 3.1.2 and 3.1.3** refer to comprehensive sampling done by research vessels (some of which were actually done this year with BASAIS fisheries surveys in the Bering), but it's a place where data collected by fishermen could also be really helpful.
- **Translating the effects of biological effects we see in the lab to possible population changes** (growth rate, swim bladders, light sensitivity) to populations
 - **Regional goal:** Assess sensitivity and resilience of critically important ecosystems and commercial species and use this knowledge to model and predict ecosystem-wide impacts of acidification.

Salmon:

- **Incorporate stressors other than climate** to see how it will impact the gene pool
 - **Action 3.4.4:** Expand experimental system capabilities to incorporate time-varying environmental conditions and expand capacity for multi-stressor experiments.
 - **Action 3.6.2:** Improve understanding of responses to OA by incorporating consideration of environmental and ecosystem variability including episodic warming, harmful algal blooms, and mass mortality events.
- **Incorporate competition from hatcheries** that can impact body size and other characteristics
 - **Action 3.5.2:** Apply phylogenetic and trait-based analyses to identify sensitive species that have broad impact on the food web.
- **Conduct more Alaska-specific studies**
 - **Action 3.4.3:** Expand research to include under-studied species including Alaska salmon and bivalves that have commercial and subsistence value.

Shellfish

- Testing for OA resistant oyster strains
 - *None of the sections on shellfish in the NOAA plan target this directly, but they do highlight shellfish research needs in general. (e.g. Actions 3.3.2, 3.4.2, 3.4.3, 3.8.1)*

Noted challenges highlighted during the series discussion:

- Communities want to be involved but don't have a strong understanding of data collection process and what the data can tell them.
- Fisherman want to expand observations on the deck but it's been difficult to find an affordable, technologically reliable approach. How do we help them do this?
- *Until we understand how policy makers will respond to OA and warming in their approach to management, it is really hard to know what to do with the OA information. If managers say we need to be more conservative, they will lower quotas and the fisheries might invest more in another fish (ie sable fish vs. cod). The fish are moving so it's already affecting how people fish.*

Noted Questions from participants

- How do we get more engagement with the outreach already in place?
- Who should be shouldering most of the communication?

- What is 'actionable information' for these different groups and how do we communicate to them if we're not there yet?
- What is sustainable fishing practice, and should we be more conservative in general given the changes we're seeing in climate and fish stocks?