



MARINE RESOURCES ADVISORY COUNCIL

Meeting Summary

July 8, 2014, 10 a.m. to 3:30 p.m.
Norman Worthington Conference Center
St. Martin's University
Lacey, WA

Meeting documents are available on the Washington Department of Ecology Ocean Acidification webpage:

<http://www.ecy.wa.gov/water/marine/oceanacidification.html>

Meeting Attendance and Objectives

The Washington Marine Resources Advisory Council (MRAC) held its fourth meeting on July 8, 2014. The meeting was open to the public and facilitated by Angie Thomson of EnviroIssues and Martha Kongsgaard, MRAC Chair.

Members in attendance: Martha Kongsgaard (Chair), Ron Schultz (Washington State Conservation Commission alternate for James Peters), Dick Sheldon, Mike Cassinelli, Megan Duffy (Department of Natural Resources alternate for Peter Goldmark), Tom Davis, Bill Dewey, Phil Anderson, Ginny Broadhurst (Northwest Straits Commission alternate for Christine Woodward), Kelly Wood, Garrett Dalan, Hedia Adelsman (Department of Ecology alternate for Maia Bellon), Steve Hollenhorst, Tom Eaton (EPA Region 10 alternate for Dennis McLerran), Greg Arnold (Makah Tribal Council alternate for T.J. Greene), Libby Jewett (via conference call).

MRAC members not in attendance:

Paul Dye, Terry Williams, Tony Floor, Brian Allison, Senator Kevin Ranker, Representative Dave Hayes, Senator Steve Litzow, Representative Larry Seaquist, Norm Dicks, Lisa Graumlich, Phil Rockefeller

Meeting objectives:

- Review draft proposals developed by ad hoc committees
- Learn about the importance of aragonite and how it is impacted by CO2 emissions
- Develop a basic understanding of how the MRAC can be effective as part of the legislative process

Materials distributed:

- April 28 MRAC Meeting Summary
- Ad Hoc Committee Proposal Packages

Welcome, recent and upcoming happenings

Chair Martha Kongsgaard opened the meeting by commending the council for the astonishing amount of work that has been completed since March in digesting the recommendations of the Blue Ribbon Panel. Without the MRAC, she noted that those recommendations would largely be

left unimplemented. She then invited council members to share updates on recent happenings related to ocean acidification. Topics discussed included:

- On June 16 and 17, U.S. Secretary of State John Kerry held an international conference in Washington, D.C. called “Our Ocean,” at which ocean acidification was one of three main topics. Bill Dewey (Taylor Shellfish) sat on the ocean acidification panel, and noted that Secretary Kerry was very engaged. The Secretary announced that the conference had stimulated \$1.4 billion of global investment to address the three identified ocean issues. The conference underscored that ocean acidification is being explored at local, national, and international scales in a collaborative and interconnected way.
- Bill Dewey also attended a stakeholder discussion on the reauthorization of the FOARAM Act in Woods Hole, MA. The group was optimistic about expanded funding to federal agencies for ocean acidification efforts in the reauthorization.
- On June 20, Washington Governor Inslee kicked off several tours across the state to engage stakeholders on his climate agenda. Governor Inslee visited the Taylor Shellfish hatchery to learn more about ocean acidification and its impacts to Washington’s shellfish industry. His visit included a round table discussion with several shellfish growers, who shared current efforts in adaptation and monitoring.
- On June 30, Taylor Shellfish also hosted a hatchery tour for the Washington State House Environment Committee.
- The Pacific Coast Collaborative (PCC) is planning a meeting in November to convene high-level officials from the United States and Canada to discuss funding and partnership on ocean acidification. Martha suggested that the MRAC be involved in the meeting.
- A panel of ocean acidification and hypoxia researchers from Oregon, Washington, and California recently published a series of 18 facts about ocean acidification in the Pacific Northwest. It was distributed at the meeting, and Richard Feely (NOAA PMEL) suggested it be one of the products of the MRAC as well.
- U.S. Environmental Protection Agency is reviewing water quality standards in Washington State. The agency will use findings from expert panels convened by the California and New England regional offices, expected to be released this fall. It will use those findings to determine next steps and share them with the MRAC.
- The Washington State Conservation Commission has awarded \$4.5 million to 14 counties for shellfish projects, prioritizing funded projects that are grouped geographically to allow for monitoring upstream and downstream. At a future meeting, the Commission would like to present on its prioritization approach.
- In partnership with the Washington Department of Fish and Wildlife (WDFW), the U.S. Army Corps of Engineers has invested \$20 million over the last 10 years on ecological restoration projects, comprising 83 percent of all near shore habitat restoration work in the state. After a general investigation is completed within the next year, WDFW will seek additional restoration funding.

Science update: Aragonite, pteropods, and ocean acidification

Andy Suhrbier (Pacific Shellfish Institute), Jan Newton (Washington Ocean Acidification Center), and Richard Feely (NOAA PMEL) presented on aragonite and ocean acidification trends – defining what aragonite saturation is and why it is relevant to shellfish growers, its connection to the food web, and what is currently known about its future status and impacts.

Jan explained that calcium carbonate exists as two common biominerals used by organisms: calcite and aragonite. With ocean acidification, carbonate ions are fewer and calcium carbonate is more likely to dissolve. A saturation state indicates whether formation or dissolution of shells is favored. The pH value doesn't vary linearly with aragonite saturation, however the saturation value is roughly 1 when pH is 7.7.

Andy explained that the Pacific Shellfish Institute (PSI) and Pacific Coast Shellfish Growers Association (PCSGA) are working in partnership to research water quality in Willapa Bay. Hatchery and wild production of shellfish demand good water quality, including safe aragonite saturation levels; shellfish mortality has been observed as a result of low aragonite levels, and juveniles are particularly vulnerable. These partners are working with the Washington Ocean Acidification Center to fine tune aragonite monitoring, and several field sites across Washington (including many in Willapa Bay) are currently monitoring aragonite as well as other water quality parameters. Monitoring data and real-time pH levels at each of these field sites is available on the NANOOS website. This data informs shellfish growers on when they should fill their tanks with the highest quality water to support hatchery operations. Andy added that with this monitoring program, some shellfish hatcheries perform water treatments to help shell-building in young larvae by injecting sodium carbonate.

Richard presented recent research on the impacts of ocean acidification on pteropods. He explained that when pH drops over the coming decades, carbonate levels will also drop. This will affect pteropods, which are particularly sensitive to ocean acidification and provide a primary food source for many species throughout marine ecosystems. Nina Bednarsek (NOAA PMEL) has been studying pteropod shell dissolution, ability to calcify, respiration, fitness and survival, etc. Her research shows that 53 percent of pteropods in the region already show signs of dissolution. As a sensitive indicator species, pteropods can be used to predict how ocean acidification will impact other species over short time scales.

Richard explained that monitoring efforts are being used to refine modeling in both short- and long-term time scales to inform management decisions. He also underscored the urgent need to address carbon dioxide, noting that under high emissions scenarios, Washington's coastal waters will experience corrosive conditions during more than half the year in the coming decades.

In conclusion, Jan emphasized how monitoring, models, and experiments are interdependent and that many entities represented on the MRAC are working collaboratively on complementary tools.

MRAC Legislative Coordination

Representing the Governor's office, Hedia Adelsman (Department of Ecology) discussed the Governor's agenda to address climate change presented in an Executive Order announced this April. She noted that this is the most comprehensive climate-related Executive Order Washington has seen to date. The agenda has seven key action items, including the establishment of a carbon market, increased energy efficiency, and a transition out of coal-heavy energy production. A formal legislative proposal will be released in November. The Department of Ecology will review current science to evaluate whether statutory emissions limits should be revised.

Hedia relayed a message from Governor Inslee that the MRAC can raise the profile of carbon dioxide and how it impacts the state, and can play a role in advocating and endorsing the initiatives in the Executive Order as a means to address ocean acidification. She also reminded the group that, in parallel with Governor's climate agenda, the Blue Ribbon Panel expressed an interest in reducing greenhouse gas emissions.

Linda Steinmann (Office of Financial Management), responsible for budget analysis for the Department of Ecology, Puget Sound Partnership, and other natural resource agencies, talked about the 2015-2017 budget process. She shared that the Office of Financial Management (OFM) is asking all state agencies to propose 15 percent reductions to general functions. Agencies can add funding requests back in for prioritized items, however they are discouraged from looking for increases in new spending. Increased competition for capital and general funds are in part a result of the State Supreme Court's 2012 *McCleary v. Washington* decision, ordering the Washington state to fully fund K-12 public schools.

Linda also shared timelines for budget processes. While many agencies have already begun their budget processes, requests are not due to OFM until September 12 and 19 for smaller and larger agencies, respectively. The Governor's budget will be released on or before December 20 and then sent to the legislature. If the MRAC is looking to use funding from dedicated sources, she recommended communicating and collaborating budgetary needs now. In response to a question about getting items added back in to agencies' prioritized lists, she noted specifically that the MRAC should know its priorities and consult with state agency representatives and budget personnel. Several agency representatives noted that their budgets were already close to being finalized.

MRAC Proposal Process

Angie Thomson (EnviroIssues) explained the proposal development process. The MRAC's four ad hoc committees (Monitoring and Investigation, Education and Outreach, Adaptation and Remediation, and Local-Land Based Contributions) worked diligently after the April council meeting to review current activities and gaps towards meeting the Blue Ribbon Panel's recommendations. The committees then spent time prioritizing a subset of actions for next steps and developing draft proposals. These draft proposals each identify an issue or gap, describe an implementation plan to address that issue or gap, suggest agency leads, list funding requests, identify evaluation metrics, and note the relevant Blue Ribbon Panel recommendations. She encouraged the MRAC's feedback to revise and refine these proposals.

MRAC Proposal Discussion

Chairs and members of the four ad hoc committees presented each of their proposals, to which the MRAC discussed revisions. Comments and clarifications, when stated, are included below.

1. Monitoring and Investigation Ad Hoc Committee proposals

The committee presented proposals on the following topics:

- Ocean acidification monitoring
- Biological experiments
- Ocean acidification forecast modeling
- Local source attributions modeling
- Ecological impacts modeling

Ocean acidification monitoring: Sustain and expand the existing ocean acidification monitoring network.

Several clarifications about this proposal were made:

- Some programs not listed have current funding that the MRAC may want maintained. The budget request needs to be refined.
- The vast majority of this funding request is to pay for staff, and funding for technical assistance is also included. The funding request assumes that agencies are maintaining their current funding contributions to these activities and programs.
- This action was also identified as a priority by the Adaptation and Remediation Ad Hoc Committee; that priority is covered by this proposal.

Biological experiments: Continue laboratory studies to determine biological response to ocean acidification alone and in combination with other stressors such as low dissolved oxygen and increased temperature. Build on work to date to more fully address affects on local species of economic and ecological importance, including fish species.

Ocean acidification forecast modeling: Sustain and improve the Ocean Acidification Forecast Model established by the Washington Ocean Acidification Center.

Local source attribution modeling: Support and extend currently funded work to create a local source impacts model.

Clarifications about this proposal were made:

- These modeling efforts are currently funded through June 2016, and it is anticipated that additional funding will not be needed.
- The proposal is included to flag it as a critical component for monitoring and investigation efforts.

Ecological impacts modeling: Extend current modeling efforts by developing an ocean acidification ecological impacts model.

The council made several general comments about the Monitoring and Investigation proposals:

- As a continuation of current efforts, these proposals seem reasonable and important. All are complimentary to each other and can help tell the story of how acidification is attributable to anthropogenic behavior.
- There needs to be an additional proposal for funding the Washington Ocean Acidification Center. The Center plays an important role in generating and interpreting data and research for resource managers.

2. Education and Outreach Ad Hoc Committee proposals

The committee presented proposals on the following topics:

- Ocean acidification website
- Targeted audience outreach
- Ocean Acidification Conference and Salish Sea Ecosystem Conference sponsorship
- Ocean acidification literacy assessment and public polling
- Washington state ocean acidification college
- Ocean acidification education: K-12
- Ocean acidification education: Higher education

Ocean acidification website: Create and maintain a freestanding, welcoming, all-inclusive website on ocean acidification to engage multiple audiences and age groups through art, film, story, science, food, business and place.

Targeted audience outreach: Focused outreach to specific groups who will be affected by ocean acidification or who can help to identify and implement solutions through the use of customized materials and public forums.

Ocean Acidification Conference and Salish Sea Ecosystem Conference sponsorship: Host a biannual Ocean Acidification Conference and sponsor the Salish Sea Ecosystem Conference in order to organize symposia focused on ocean acidification and advance the science, policy and engagement strategies for addressing water quality problems.

Ocean acidification literacy assessment and public polling: Develop a scale for assessing ocean acidification literacy in K-12 students and adults. Conduct public polls to measure comprehension of ocean acidification concepts by using the literacy scale.

Washington State Ocean Acidification College: Establish an online Washington State Ocean Acidification College to educate a variety of audiences and professionals via a multidisciplinary curriculum of online courses.

Ocean acidification education: K-12: Ensure that Washington State K-12 educators have access to, and are trained in the use of, high-quality ocean acidification learning materials and field experiences that are engaging, accessible to all socioeconomic populations and aligned with Washington State's content learning standards.

A comment was made about this proposal:

- It might be possible to build funding for this proposal through existing K-12 programs funded through the *McCleary v. Washington* decision.

Ocean acidification education: Higher education: Increase the incorporation of ocean acidification in higher education curriculum across various disciplines of study and support opportunities for students to complete research and experiential learning focused on ocean acidification.

The council made several general comments about the Education and Outreach proposals:

- The Ad Hoc Committee made an effort to see which projects are shovel ready and which could be funded from private sources. There may be other proposals that could also be brought to private sources for funding.
- These proposals don't seem to be in the council's purview. These are long term strategies, but they do not address immediate solutions which are more attractive to legislators.
 - In response, Martha noted that the Blue Ribbon Panel made recommendations directly related to education and outreach.
- The budget requests in these proposals are ambitious.
- These proposals should include support for teacher pre-service and masters programs. It is a good time to leverage the turnover in the teacher population.

3. Adaptation and Remediation Ad Hoc Committee proposals

The committee presented proposals on the following topics:

- Seaweed cultivation and harvest
- Ocean acidification refuges
- Native oyster restoration
- Genetic adaptation

Seaweed cultivation and harvest: Build on current work to assess the effectiveness of seaweed cultivation and harvest as an ocean acidification mitigation strategy.

A few comments and clarifications were made about this proposal:

- This proposal is currently being reviewed for funding by Paul Allen Foundation, and is part of a larger proposal to the foundation to assess seaweed cultivation and collection at shellfish farms could mitigate. If the proposal is not funded by the foundation, it will drop off the MRAC's proposal package.
- The budget request includes funds for the Department of Fish and Wildlife to conduct fish habitat monitoring and for carbon chemistry and biological monitoring where seaweed is harvested.

Ocean acidification refuges: Apply multiple remediation strategies within three specific bays and inlets and assess their effectiveness in order to proactively develop ocean acidification refuges.

A few comments and clarifications were made about this proposal:

- This proposal sets the stage for future funding.
- This proposal links to a near-term action item of the Conservation Commission. The MRAC should partner with them on this item.

- Refuge is a politicized and misleading term, as it implies that no action will be done in the area referred to, though the opposite is true. A substitute term could be ‘experimental marine zone.’
- This proposal connects with the Department of Natural Resources’ existing Aquatic Reserves Program. The agency is working to establish a preserve in Dabob Bay, which could be informative from an ocean acidification perspective.

Native oyster restoration: Provide funding to re-establish native oyster breeding populations in 19 priority areas and to investigate the capacity of native oyster beds to increase ocean acidification resilience.

Several comments and clarifications were made about this proposal:

- The Blue Ribbon Panel speculates that dense native populations increase the resilience of oysters; this proposal provides the opportunity to test that theory scientifically. We should first focus on investigating that theory, and postpone further restoration efforts until we have a better understanding of the benefits of native oysters.
- Cultured oysters are more productive at water filtration than native oysters. This proposal should not be funded.
- This biennium’s funding for biological experiments through the Washington Ocean Acidification Center is devoted to oyster research. Research on this subject will be released.
- The ad hoc committee will discuss whether it should hold off on this proposal until that data is available.

Genetic adaptation: Research the capacity for genetic adaption to ocean acidification in keystone and commercially important species within Washington waters.

A few comments and clarifications were made about this proposal:

- This proposal has not yet been fully vetted by the committee.
- This proposal seeks to ensure better coordination between institutions in this space.
- The coordination role could be assigned to the Washington Ocean Acidification Center.

The council made several general comments about the Adaptation and Remediation proposals:

- In the last biennium, the Department of Natural Resources funded adaptation and monitoring programs broadly that were applied to ocean acidification efforts.
- These proposals need to acknowledge current efforts, for example the Northwest Straits Commission’s data mapping. There is a lot of work in adaptation and remediation that is not necessarily captured.

4. Local Land-Based Contributions Ad Hoc Committee proposals

The committee presented proposals on the following topics:

- Nutrient and carbon pollution control programs
- TMDL implementation
- Voluntary Stewardship Program
- Failing septic systems

Nutrient and carbon pollution control programs: Support the existing nutrient and organic carbon reduction programs by maintain their current funding, assessing their effectiveness on a local scale, and ensuring adequate field capacity to support programs

A few comments and clarifications were made about this proposal:

- Maintaining existing funding may be ambitious this year, however this budget request is based on existing funding. No additional funding beyond existing levels is needed.
- The MRAC could evaluate the effectiveness of funds for these programs.
- It is misguided to show \$415 million as the budget request. The proposals should only indicate additional funding requests. We can capture the importance of maintaining existing funding in a letter to agencies.

TMDL implementation: Implement Total Maximum Daily Loads (TMDLs) to reduce pollutants contributing to ocean acidification.

The following comment was made about this proposal:

- The Department of Natural Resources, Sea Grant, and several other entities have programmatic work that is not captured in this proposal. These efforts need to be acknowledged.

Voluntary Stewardship Program: Provide additional funding for counties through the Volunteer Stewardship Program.

The following comment was made about this proposal:

- There hasn't been any push back from agricultural groups on this proposal. They have traditionally pushed back on the link between nutrient loading and ocean acidification and advocated for that link to be demonstrated through research.

Failing septic systems: Identify and implement solutions to address failing septic systems.

A few comments and clarifications were made about this proposal:

- The first step is to convene stakeholders to understand current tools. A future budget request could cover the costs of pilot site testing.
- This proposal was placed in the Governor's Office as there are many levels of jurisdiction in play. The Department of Health is another entity in which this could be housed.
- There is a lot of effort in this space already. This proposal seems redundant.
- This proposal has socioeconomic repercussions, as it will subsidize development in rural areas. That is not what the MRAC is trying to accomplish.

General proposal comments

Several council members provided general comments to the proposal approach throughout the discussion, including:

- Martha suggested the formation of a new **Budget Ad Hoc Committee** to provide insight on proposal drafting and budget timelines.
- The proposals need to be consistent with how they identify and portray funding needs. The budget committee could determine how best to be consistent. For example, perhaps

the proposals should differentiate between maintained funding levels for an existing program, increased funding for an existing program, and new funding for a new program.

- It should not be assumed that the current levels of state funding will be maintained in the next biennium. That needs to be captured in the proposals.
- It may be too late to find funding through agencies, but maybe the Governor's budget is the best target for budget requests.
- There may be an increase in federal dollars dedicated to ocean acidification initiatives. This could be a source for funding for programs and projects in Washington State.
- It is important to secure ongoing – not just one-time – funding.
- Proposals should be limited to actions that are directly related to ocean acidification activities; there needs to be a clear linkage. The line seems blurred right now.

Public Comment

One member of the public made the following comment:

- Having observed both MRAC and WCMAC meetings, there is a lot of crossover in your work. There needs to be increased collaboration between these two groups to leverage limited funds.

Next Steps

- Angie will share the MRAC's feedback with the ad hoc committees and work with them to revise and finalize all proposals by July 25. Angie will send updates to keep councilmembers engaged in proposal revisions.
- Angie and Martha will convene a new Budget Ad Hoc Committee within 10 days of the meeting to discuss the budget request process for MRAC priority recommendations.