MARINE RESOURCES ADVISORY COUNCIL

Meeting summary
March 27, 2024
9:00 a.m. to 12:00 p.m.
Virtual meeting

Meeting attendance and objectives
The Washington Marine Resources Advisory Council (MRAC) held its 29th meeting online and by conference call on March 27, 2024. The meeting was facilitated by Martha Kongsgaard, MRAC Chair, Angie Thomson, Thomson Strategic Consulting, and Cory Archer, True Wind Collaborative.

Members in attendance: Martha Kongsgaard (Chair), Cynthia Catton (Department of Natural Resources), Meg Chadsey (WA Sea Grant), Bill Dewey (Taylor Shellfish Farms), Aaron Dufault (Washington Department of Fish and Wildlife, alternate), Rod Fleck (Washington Coast Marine Advisory Committee), Jennifer Hennessey (Washington State Department of Ecology, alternate), Erika McPhee-Shaw (Western Washington University), Marilyn Sheldon (Coastal Shellfish Grower)

MRAC members not in attendance: Brian Allison (Puget Sound Commercial Crab Association), Mike Cassinelli (Recreational Fishing), Tom Davis (Washington State Farm Bureau), Norm Dicks (Van Ness Feldman LLP), Representative Joe Fitzgibbon (Washington State House of Representatives), Tony Floor (Northwest Marine Trade Association), Lucas Hart (Puget Sound Partnership), Dennis McLerran (Puget Sound Partnership), Mindy Roberts (Washington Environmental Council), Senator Jesse Salomon (Washington State Senate), Douglas Steding (Association of Washington Business), Senator Keith Wagoner (Washington State Senate), Laura Watson (Washington State Department of Ecology)

Other participants: Simone Alin (National Oceanic and Atmospheric Association), Cory Archer (True Wind Collaborative, MRAC facilitation team), Shallin Busch (National Oceanic and Atmospheric Association), Brian Cochrane (WA State Conservation Commission), Jessica Cross (Pacific Northwest National Laboratory), Richard Feely (National Oceanic and Atmospheric Association), Micah Horwith (Washington Department of Ecology), Terrie Klinger (Washington Ocean Acidification Center), Tommy Moore (Northwest Indians Fisheries Commission), Talia Neiman (True Wind Collaborative, MRAC facilitation team), Jan Newton (Washington Ocean Acidification Center), Betsy Peabody (Puget Sound Restoration Fund), Candace Penn (Squaxin Tribe), Liz Perotti (National Oceanic and Atmospheric Association), Angie Thomson (Thomson Strategic Consulting, MRAC facilitation team), Jessie Turner (Ocean Acidification Alliance), Brad Warren (Global Ocean Health)

Meeting objectives:

- Share updates on recent ocean acidification efforts.
- Review the 2024 MRAC Work Plan.
- Hear an update on recent ocean acidification science findings.
- Review the state's Climate Resilience Plan.
- Discuss initial planning and ideas for MRAC budget requests for the 2025-2027 biennium.

Welcome and introductions
Martha Kongsgaard, MRAC Chair, welcomed participants and reviewed the meeting agenda.

Recent ocean acidification happenings
Participants shared recent ocean acidification activities. Highlights included:

- Martha Kongsgaard provided the group with the following updates:
    - Martha congratulated the Pacific Marine Environmental Laboratory (PMEL) team for their work on Dungeness crab, ocean acidification, and marine carbon dioxide removal (mCDR). This work provides the Committee with a foundation for understanding mCDR and how MRAC can offer support.
    - The Fiscal Year 2025 President's Budget proposed a 34% reduction in funding for the Integrated Ocean Observing System (IOOS) Regional Observations. If enacted, funding at this level would cripple the IOOS system, and regional associations like NANOOS would be unable to maintain observing infrastructure, including equipment in the water, data management, and data services to users. Partners, supporters, and user communities are being asked to send a strong message to Congress by April 10, 2024. Please reach out to Jan Newton, Washington Ocean Acidification Center (WOAC), for more information and ways to show support.
    - Betsy Peabody, Puget Sound Restoration Fund, is stepping down from MRAC as she transitions into a new role with PSRF. Martha thanked Betsy for her valuable contributions to the group and announced that Jodie Toft will be taking over Betsy's role on the Committee.

- Angie Thomson, MRAC facilitation team, updated the group on the work of the MRAC mCDR committee. The committee has been focused on identifying key questions and considerations for MRAC to review and discuss, specifically related to ocean acidification in Washington and permitting restrictions and requirements. Once these are finalized, the mCDR committee will bring them to the MRAC for review and discussion. Angie reminded the Committee that it is an open group and invited anyone interested in joining to reach out to her directly.

- Meg Chadsey, Washington Sea Grant, shared the following updates:
    - The Pacific Northwest mCDR Node is meeting in Seattle, WA, on April 17, by invitation only. This gathering will collaborate on regional-specific mCDR issues regarding removing carbon from the marine environment. If you're interested in the meeting, contact Meg Chadsey to discuss participation at this or future meetings.
    - The U.S. Department of Agriculture (USDA) has funded a five-year project led by the University of Washington and Washington Sea Grant to remove carbon from marine environments, specifically offshore shellfish growing areas and shellfish farms.

- Terrie Klinger, Washington Ocean Acidification Center, noted that WOAC is working on two new projects focusing on crab larvae exposed to different ocean acidification treatments.

- Jan Newton, Washington Ocean Acidification Center, shared the following updates:
    - mCDR and alkalinization were discussed during Monaco Ocean Week. The panels brought perspectives covering all sides of mCDR. Jan shared two articles from Ocean Week that the MRAC mCDR committee may be interested in: https://www.sciencedirect.com/science/article/pii/S0959378024000104 and https://www.frontiersin.org/articles/10.3389/fclim.2020.575716/full.
    - As part of the UN Ocean Decade, the Ocean Acidification Research for Sustainability (OARS) program is looking for people to post commitments regarding their current work in the PNW. Commitments can be posted here: http://www.goa-on.org/oars/commitments.php.
    - The OARS program is also working on an outcome to advance ocean acidification data and evidence for global and local mitigation and adaptation needs.

- The UN Decade of Ocean Science in-person meeting is scheduled for April 11th, more information can be found here: https://estuaries.org/event/blue-carbon-national-working-group-in-person-meeting/.
- Richard Feely, National Oceanic and Atmospheric Association, shared the California Ocean Acidification Network is hosting an mCDR webinar on April 4. The focus will be on monitoring, reporting, and verification (MRV) for ocean alkalinity enhancement (OAE). Experts will discuss the importance of rigorous MRV, entities potentially responsible for funding and conducting MRV, existing ocean observing infrastructure and modeling capabilities, and implementation readiness. This will be an opportunity to understand the overall impacts of mCDR in the region and what is required for monitoring and reporting. You can register for the webinar here: https://bit.ly/3wYi07d.

- Rod Fleck, Washington Coast Marine Advisory Council (WCMAC), updated the group with the following:
    - WCMAC had a meeting in February on mCDR and a summary of 2023 accomplishments will be shared with the group.
    - The governor's office is working to engage with various stakeholders and organizations to identify the concerns, future processes, and loan proposals for Washington offshore winds. The report will be open for review in May and will be finalized in mid-June. Anyone interested in this report can participate and provide input.

- Micah Horwith, Washington Department of Ecology, shared three updates:
    - Micah attended the Affiliated Tribes of Northwest Indians meeting, which brought together 57 Tribal governments from the greater northwest. Micah presented to their natural resources committee about ocean acidification and the history of what is happening in Washington. Micah will continue to attend these meetings for updates and presentations.
    - The Washington Sea Grant Conference for Shellfish Growers met to discuss and build connections between shellfish growers and environmental monitoring and science programs. This first meeting was mainly a listening session to understand what people saw on their farms in 2023 and connect the data to various

monitoring programs. This will help identify the connections between what farmers have observed and what was seen during the monitoring periods.
    - The Olympic Coast Ocean Acidification Sentinel Site (OASeS) symposium will be held May 14th-16th in Forks, WA. If you would like to attend, you can register now until April 19th at https://docs.google.com/forms/d/e/1FAIpQLSd-7UdiF4Xgd3rUCdtLqeTokVaFsIWWUAw-kc21CDY2B_Zfgg/viewform. This symposium will focus on discussion and participation by members of Coastal Treaty Tribes.

- Shallin Busch, National Oceanic and Atmospheric Association, noted the Affiliated Tribes of Northwest Indians are coming to the Northwest Fisheries Science Center to tour the Ocean Acidification experimental facilities.

- Cynthia Catton, Department of Natural Resources, shared the Puget Sound Partnership Habitat Strategic Initiative (HSI) lead has two new funding opportunities: Increase capacity and workforce development to meet Puget Sound habitat recovery goals and new science, synthesis, and analysis for improved protection and restoration of kelp and eelgrass in Puget Sound. More information can be found here: https://pugetsoundestuary.wa.gov/2024/03/26/habitat-funding-opportunities/.

- Jessie Turner, Ocean Acidification Alliance, shared the following updates:
    - Exploring our Changing Ocean Impacts in Response to Ocean Acidification in the US is a collaboration to create story maps to introduce aquaria visitors to ocean acidification, the work that is happening in different regions, and calls to action. More can be found here: https://storymaps.arcgis.com/collections/304a83b174c347b0bb86872d6e385fdd?item=3.
    - The OARs program is also working to advance ocean acidification data, and evidence for global and local mitigation and adaptation needs.
    - The UN Decade of Ocean Science meeting is happening on April 11th; OARS will be working on some projects, and the MRAC is invited to follow along virtually.
    - The United States Ocean Acidification (OA) Action Plan is out. The goal is to encourage others to create an OA action plan and present at least 10 new National OA action plans at the UN Ocean Conference next June 2025.

2024 MRAC work plan

Participants reviewed the 2024 MRAC work plan. Highlights include:

- The Committee is working to finalize the one-pagers; additional discussion is scheduled for later today.

- The group will begin discussing budget request planning and needs, which are due in September of this year. The Committee aims to confirm MRAC budget requests by the June meeting, and working sessions will be scheduled between July and August. Below is the MRAC budget process and schedule:
    - Spring:
        - Identify MRAC funding priorities.
        - Coordinate with agency priorities where overlap exists.

    - Summer:
        - Identify funding gaps and fill them with MRAC-specific budget requests.
        - Draft decision packages.
    - Early fall:
        - Submit decision packages directly to the Governor's Office (Office of Financial Management).
        - Promote agency OA-related budget requests.

- The October 2024 MRAC meeting will be an all-day, in-person meeting as this time of the year works for most to meet.

Science update
Participants heard an update about recent ocean acidification science. Highlights include:

- Simone Alin, National Oceanic and Atmospheric Association, reviewed Richard Feely's presentation on the combined effects of anthropogenic carbon dioxide uptake and respiration on habitat sustainability for marine calcifiers along the Washington coast. This was presented to the MRAC during the October 2023 meeting. The review included:
    - Surface anthropogenic carbon dioxide concentrations generally increase along the coast from north to south, with the lowest values occurring in the strong upwelling region near the coast in northern California.
    - Anthropogenic carbon dioxide is the major cause of decreased pH and aragonite saturation in surface waters, whereas respiration processes (seasonal change) and anthropogenic carbon dioxide (decadal change) are the major cause of decreased pH and aragonite saturation state in subsurface waters.
    - Seasonal decreases in pH and aragonite saturation in late summer and fall in subsurface waters drop below critical thresholds for many calcifying species, causing decreased calcification and increasing dissolution.

- Simone Alin then focused on the 2017 Puget Sound carbon dioxide storm, highlighting oceanographic conditions in the Main Basin. These findings include:
    - September had exceptionally high levels of fCO_2 and low aragonite saturation state and pH at surface and depth. Some fresher salinities were observed across depth, with slightly warmer conditions at the surface.
    - July recorded anomalous summer conditions, with slightly warmer surface conditions and lower salinity across depths.
    - April recorded much fresher salinity, high O_2, and pH at the surface, with somewhat lower fCO_2 values. Nothing of note was identified at depth.
    - These are consistent with weather, hydrological, and circulation driver anomalies observed in 2017.

- Simone Alin then reviewed the role of rivers in the regional carbon cycle:
    - Rivers bring nutrients, organic carbon, and freshwater to coastal oceans.
    - Freshwater can change circulation and stratification.
    - Nutrients can stimulate primary productivity, increasing oxygen in surface waters and carbon dioxide at depth.
    - Organic carbon can enhance respiration.

- There are various processes that influence the size and timing of river inputs to coastal systems, including anomalies in atmospheric temperature, precipitation, wildfire, sediment transport, snowpack, and rain- versus snow-dominated runoff.

- Closing thoughts included:
    - Many resources are spent studying warming, acidification, and hypoxia.
    - More attention is likely needed to the changing hydrological cycle for multi-stressor conditions and impacts.

- Betsy Peabody raised concerns about the potential impact of increased upwelling winds due to climate change and questioned whether this factor would be incorporated into future modeling as these winds can greatly impact shellfish growers.
    - Simone Alin confirmed that there are scientific observations supporting an increase in upwelling winds.
    - Richard Feely confirmed that the Northern California region is experiencing this phenomenon the most, and the Washinton coastal region will likely not experience it as intensely. These upwelling events bring corrosive and non-oxygenated waters to the surface from deeper depths.

Climate resilience plan
The group heard an update on the state's Climate Resilience Plan. Highlights include:

- Jennifer Hennessey, Department of Ecology, is working to update the state's climate resiliency strategy and better address the impacts of climate change in the future. The goal is to bring together the work across state agencies in a cohesive and coordinated strategy, as well as identify any gaps that may exist. The Department of Ecology is working to deliver more climate-resilient communities, infrastructure, and natural systems, specifically focusing on the disproportionate impacts on Tribes and their cultural resources, communities of color, and others who have not had the invested resources previously.

- Ten agency teams are responsible for strategy development: Agriculture, Commerce, Ecology, Emergency Management, Fish and Wildlife, Health, Natural Resources, State Conservation Commission, Puget Sound Partnership, and Transportation. Additional outside engagement is also included in this work.

- This project kicked off in the fall of 2023 and included identifying goals and metrics, summarizing existing work, and drafting an engagement plan. The team is currently identifying gaps, needs, actions, funding, and governance structure. By the summer of 2024, the goal is to finalize the strategies and actions and establish costs. The Department of Ecology is aiming to publish the final strategy by September 2024. Jennifer Hennessey will keep MRAC updated on work and any support needed by organizations or members.

OA priorities and budget discussion
The group engaged in discussion to provide feedback on the five one-pagers: Ocean Acidification in Washington, What we Know About Ocean Acidification in Washington, Species at Risk, Adapting to Ocean Acidification Conditions and Building Resilience, and Ocean

Acidification Monitoring in Marine Washington Waters. The feedback received will be incorporated into the documents and final one-pagers will be shared with the group.

The Committee concluded the discussion by reviewing the MRAC funding requests and discussing initial planning and ideas for the 2025-2027 biennium. This review included the identified needs, which requests are ongoing or will need resubmission, and identifying potential new requests. It also emphasized the success observed by these organizations because of the funding they received from MRAC.

- Marilyn Sheldon suggested annual check-ins across the organization to understand the current state of funding, what data and events are being seen, and what needs to change moving forward. This could be included in the MRAC communication plan that is currently being discussed.

Next steps

1. Implement the edits received during today's session.
2. Schedule kickoff meetings to discuss the MRAC budget request needed for the 2025-2027 biennium.