MARINE RESOURCES ADVISORY COUNCIL

Meeting summary
November 2, 2022
1:00 p.m. to 4:00 p.m.
Virtual meeting

Meeting attendance and objectives
The Washington Marine Resources Advisory Council (MRAC) held its 25th meeting on November 02, 2022, online and by conference call. The meeting was facilitated by Martha Kongsgaard, MRAC Chair, Angie Thomson, EnviroIssues, and Cory Archer, True Wind Collaborative.

Members in attendance: Martha Kongsgaard (Chair), Bill Dewey (Taylor Shellfish Farms), Aaron Dufault (Washington Department of Fish and Wildlife, alternate), Gus Gates (Surfrider Foundation), Annette Hoffmann (Washington Department of Ecology, alternate), Libby Jewett (National Oceanic and Atmospheric Association), Senator Jesse Salomon (Washington State Senate), Marilyn Sheldon (Coastal Shellfish Grower)

Other participants: Simone Alin (National Oceanic and Atmospheric Association), Cory Archer (True Wind Collaborative, MRAC facilitation team), Shallin Busch (National Oceanic and Atmospheric Association), Meg Chadsey (WA Sea Grant), Jessica Cross (National Oceanic and Atmospheric Association, Pacific Marine Environmental Laboratory), Richard Feeley (National Oceanic and Atmospheric Association), Meg Hamele (City of Seattle, Ocean Acidification Work), Jennifer Hennessey (Washington Department of Ecology), Sasha Horst (Northwest Straits Commission), Micah Horwith (Washington Department of Ecology), Jim Kaldy (Environmental Protection Agency), Katie Keil (48 North Solutions), Terrie Klinger (Washington Ocean Acidification Center), Peter Murchie (Environmental Protection Agency), Talia Neiman (True Wind Collaborative, MRAC facilitation team), Jan Newton (Washington Ocean Acidification Center), Betsy Peabody (Puget Sound Restoration Fund), Candice Penn (Squaxin Tribe), Mike Rechner (Washington Department of Natural Resources), Liz Schotman (Surfrider Foundation), Kahreen Tebeau (City of Seattle, Ocean Acidification Work), Angie Thomson (EnviroIssues, MRAC facilitation team), Jessie Turner (Ocean Acidification Alliance), Brad Warren (Global Ocean Health), Gary Wilburn (Department of Ecology), Katie Wrubel (Olympic Coast National Marine Sanctuary),

Meeting objectives:

- Hear an update on recent MRAC budget requests for the 2023-2025 biennium.
- Hear an update on recent ocean acidification efforts.
- Hear a presentation on Carbon Dioxide Removal (CDR) strategies and potential connections to ocean acidification.
- Discuss if there is a role for MRAC in the CDR space and, if so, what that might look like in practice.

Welcome and introductions

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

Budget update

Cory Archer, True Wind Collaborative, shared an update on new MRAC budget requests for the 2023-2025 biennium for consideration in the Governor's budget. The two requests are on behalf of the University of Washington's Washington Ocean Acidification Center (WOAC). One decision package requests an increased level of ongoing funding for WOAC operations, monitoring network, and forecast modeling, to offset increased costs. This request also includes support for engagement activities to reach partners on the Washington coast. The second decision package requests support for new biological studies in four study areas: 1) the response of Dungeness crab larvae to existing ocean acidification conditions in Puget Sound, 2) the relationship between seawater chemistry and harmful algal blooms in Washington waters, 3) environmental DNA (eDNA) as a tool to monitor biological response to ocean acidification in Washington waters, and 4) existing time-series of paired biological and environmental observations. These two new requests are in addition to the continued support for ongoing, or carry-forward, requests that have been included in previous biennia.

- Candice Penn, Squaxin Tribe, asked how much of the funding would be allocated to the eDNA projects. Terrie Klinger, WOAC, offered to connect with Candice to share additional budget details.

- Jan Newton, WOAC, added that the ongoing funding WOAC receives is for observations of chemical and biological conditions, along with forecast modeling. Any projects outside of monitoring and forecasting need additional funding requests each biennium, including additional biological studies.

- Angie Thomson, EnviroIssues, and Jennifer Hennessey, Washington Department of Ecology, confirmed the initial budget will be released no later than the third week in December.

Recent ocean acidification happenings

Participants shared recent progress and updates. Highlights include:

- Jessie Turner, Ocean Acidification Alliance, shared that approximately 60 participants across British Columbia, California, Oregon, and Washington met in October. Goals of the meeting included implementing recommendations of the ocean acidification and hypoxia action plans, as well as integrating across climate and ocean coastal policies at the state or provincial level. Recommendations developed at the meeting include 1) developing a regional communication plan for the West Coast, with high level goals and a clear rationale for the work happening at a local level, 2) developing ocean acidification and ocean climate change indicators and leveraging opportunities to engage more with jurisdictions and communities, and 3) fostering collaboration across water quality practitioners along the West Coast. Additionally, there was a discussion about the importance of differentiating between coastal wetlands and submerged aquatic

vegetation, in the context of carbon sequestration and resilience goals. Discussions at the meeting will inform the Pacific Coast Collaborative (PCC) workplan for 2023
    - Betsy Peabody, Puget Sound Restoration Fund, added there was discussion around the idea of a "no regrets" strategy regarding actions that would be taken in order to mitigate or address ocean acidification. There was some tension in discussions around ideas that may be moving forward aggressively, such as Carbon Dioxide Removal (CDR). Regardless of the approach, Betsy noted the need to ensure that actions are taken with due regard to tribal sovereignty and treaty rights.

- Jessie Turner also shared about the upcoming COP27 meeting in Egypt. There is building momentum across ocean practitioners to ensure that ocean mitigation and adaptation is better reflected across the United Nations Framework Convention on Climate Change. The United States joined the Ocean Acidification (OA) Alliance in June 2022, and the State Department and the National Oceanic and Atmospheric Administration (NOAA) have been speaking on and sharing examples of ocean acidification action planning. Governor Inslee will attend COP27 and speak at one of the events at the Ocean Pavilion, alongside other ocean acidification practitioners from Chile, Egypt, Tanzania, British Columbia, and the United Kingdom. His presentation will focus on the need for a policy and management emphasis on ocean acidification and multi-stressor science work.
    - Jan Newton applauded and thanked the team for bringing Washington's local stories to a global stage.

- Micha Horwith, Department of Ecology, shared that goals for the Ocean Acidification Sentinel Site (OASeS) were discussed during the Ocean Shores symposium hosted in May 2022. He noted that the OASeS website will be launched in partnership with the Northwest Association of Networked Ocean Observing System (NANOOS). Outputs from the symposium and work going forward will be shared on the OASeS website.

- Richard Feeley, NOAA, reported that the Environmental Protection Agency (EPA) released different climate adaptation plans, which focused on ocean acidification vulnerabilities but less on actions. EPA is doing a lot of ongoing work but is still trying to understand the future impacts of the Inflation Reduction Act. The Act provides a good amount of funding for climate projects, specifically mitigation work.

- Libby Jewett, NOAA, noted that NOAA's ocean acidification legislation was reauthorized this year. One of the new requirements of the reauthorized legislation is the formation of an ocean acidification advisory board. She is confident the Pacific Northwest will be well represented in that group.

- Marth Kongsgaard mentioned the United States government is developing an Ocean Climate Action Plan and is gathering comments until November 18th. The OA Alliance has submitted some high-level comments and Martha will submit comments on behalf of MRAC. Participants are invited to review the plan and submit their own comments, which can be reviewed here.

- Richard Feely announced NOAA funded a new project to better understand how multi-stressors impact coastal marine ecosystems, particularly Dungeness crab and other species. Led by Richard Feely and Francis Chan, this project is looking at specific stressors of acidification, detoxification, warming waters, and harmful algal blooms. This four-year project started in November 2022.
    - Brad Warren, Global Ocean Health, noted a running process with Tribes to develop policy and governance ideas around multi-stressors. The process covers both ocean and onshore, helping Tribes decide if they want to participate.

- The group took a moment to remember and honor the late Professor Ken Chew who passed earlier this year. Ken greatly influenced many members and participants of the MRAC and had a deep passion for fighting ocean acidification and championing shellfish research.

- Candace Penn shared updates on the Squaxin Tribe's work on carbon and carbon offsets. The Tribe recently received funding from the Climate Commitment Act through two programs, the Tribal Carbon Offset Program and the Tribal Consultation Program.

- Angie Thomson shared there has been work on the "progress one pagers" that will be used to convey to legislators and other groups the progress MRAC has made.
    - Jennifer Hennessey noted there has been great conversation about using this set of one-pagers as a communications tool. As these documents are developed, they will be shared with the broader group for feedback, corrections, and additions.
    - Micah Horwith added their team did some brainstorming during the recent symposium in Portland about what kind of visuals to include and how to create the right scope.
    - Jessie Turner suggested creating a panel to share the one pagers and other work to both audiences inside the US and international partners.

- Micah Horwith provided updates on the Washington Department of Ecology's Water Quality Assessment. Micah also added that monitoring work continues in Grays Harbor and Willapa Bay and data will be available soon. Lastly, Ecology is working on a new set of communication products, which will include a revised webpage with videos and interactive data maps.

Carbon Dioxide Removal presentation and Q&A

Dr. Jessica Cross, NOAA, presented an overview of the state of the science regarding Carbon Dioxide Removal (CDR). Highlights from the presentation include:

- CDR is acknowledged by the Intergovernmental Panel on Climate Change (IPCC) and climate scientists. It is a combination of mitigation measures, including steep carbon dioxide emissions reductions and carbon dioxide removal that are going to be necessary to meet our current climate targets.

- Timing is critical, and the longer it takes to commit to steep carbon emissions cuts, the greater the reliance on CDR will be to achieve our climate targets.

- Conventional abatement technologies, like renewable energy and emissions reductions, are the most impactful and first actions that we can implement.

- Some emissions will be challenging to abate, such as diesel fuel for ships, so these emissions must be offset by other actions such as CDR.

- Both land and ocean-based CDR will be important, and there is a wide range of activities on both land and in the oceans that can remove carbon from the atmosphere.

- There are three broad categories of CDR: 1) photosynthesis to sequester carbon from the atmosphere and store it as organic plant matter, 2) mineralization to sequester carbon from the atmosphere and store it as rock, and 3) engineering methods that remove carbon dioxide from the atmosphere directly, liquefy it, and store it some other way, either through mineralization or storage intakes. No method is considered better than another. We need all these actions together to be able to generate the amount of carbon removal needed to meet our climate goals.

- Several papers published recently conclude that CDR will not help reverse ocean acidification. There is an opportunity in some cases where CDR could pause acidification, but it is not likely to reverse existing acidification damage. Some of these techniques might be effective at reversing local ocean acidification, but these techniques cannot then remove carbon from the atmosphere at the same time.

- To make an overall impact, it is important to act on a global scale. Local-level projects will not have enough atmospheric impact alone.

- There is an intergenerational component to CDR. We need to ensure thoughtful research is in place, so future generations have a choice of how to engage in CDR. It is important to avoid overburdening future generations, with both the cost of research as well as the cost of inaction.

- Driving CDR research outcomes is going to be difficult and expensive. It will require parallel research, nimble responses, and incentives for operating these aspects correctly. There is no recommended CDR method that should be implemented, instead methods need to be researched in parallel.

- The global CDR science community is working towards developing voluntary codes of conduct for research and implementation, especially when regulations have not been written specifically for CDR. This is also true in the United States, where these voluntary codes of conduct will help guide research quickly, safely, responsibly, and fairly.

Q&A highlights include:

- Martha Kongsgaard asked how much CDR work is likely to show up in private industry before the permitting process will be better understood?
    - Jessica Cross responded that CDR is already taking off in private industry and is expected to have extreme growth year over year. Venture capital is interested in investing in some of these companies that may be able to remove carbon from the atmosphere in order to earn carbon credits, regardless of how those credits are being applied. The main issue is ensuring high quality offsets and setting a standard of what "good quality" means. The science community is reliant on groups like MRAC to start engaging with some of these policy options and understand how to implement new regulations to keep CDR safe, sustainable, and fair.

- Richard Feely encouraged Jessica Cross to share more about the different federal agencies and what their roles are so there is more context to what MRAC can do locally and who to engage with.
    - Jessica Cross shared the potential capacity for engaging with CDR falls into four categories: 1) Observing Networks, 2) Modeling, Scaling, and Projection of CDR Pathways, 3) Environmental Impacts, and 4) Ocean Planning and Socio-Economic Considerations. These four categories are already set at a global scale and areas of opportunity lie within the local scale, while ensuring they can fit within the global system.
    - Jessica also shared work currently being done by federal agencies. NOAA focuses on observation, monitoring, and verification, the Department of Energy and the Army Corps of Engineers focus on building carbon removal infrastructures, and the Environmental Protection Agency (EPA) focuses on regulating the potential environmental impacts of CDR techniques. The United States Department of Agriculture (USDA) focuses on land-based methods such as soil, carbon, and commercial agriculture practices and implementing those in a commercial agriculture context.

- Jim Kaldy, EPA, stated permitting is a big part of EPA regulation, especially with CDR work moving into new territory. Permits from the EPA are often needed to do experimental work like this, so it is important to make sure there are discussions between MRAC and the EPA as this work continues.

- Jessie Turner asked about the distinctions for state versus national government from a regulations or policy perspective.
    - Jessica Cross responded that it depends on location. One of the key challenges with CDR right now is it is difficult to tell who has jurisdiction over different coastal areas. Additionally, decisions have not been made on how existing

legislation and regulations should apply to CDR. Ultimately, it depends on how local entities are interpreting their own mandates.

MRAC's role engaging with CDR

- Shallin Busch stated she needs to better understand CDR and is hesitant about engaging. A potential role for MRAC is to help Washington push forward the conversations around CDR and explore if it works in the marine environment. Permitting viability is still an unknown, as CDR is not likely to be permittable everywhere. Shallin questioned if CDR would be more viable in coastal areas compared to the open ocean. Washington could be a leader in the industry by convening and engaging others to have conversations.
    - Jessica Cross responded that early on, it may be easier for coastal areas to implement CDR activities (not considering permitting challenges). Open ocean solutions will likely be highly engineered and require more development to get to a large scale.

- Marilyn Sheldon, Coastal Shellfish Grower, noted there is a lot of money to be made in CDR. As a group that often advocates for funding to explore innovative solutions, we need to be aware there are always bad actors. Marilyn supported the idea of MRAC exploring CDR rather than endorsing it. She also questioned how to support the positive aspects of CDR without supporting actions that are not positive for the long haul.
    - Jim Kaldy mentioned that Oregon is experiencing some of this with respect to marine wind farms. There has been pushback on wind farm areas.

- Richard Feely noted MRAC could support and recommend pilot and research studies under controlled conditions. These could include mesocosm research experiments on land without having a negative impact on the environment.
    - Shallin Busch supported the idea of limited research at the pilot level.

- Jessica Cross suggested that the impact of CDR on ecosystems has been minimally explored. For example, if we rapidly increase pH vs. rapidly decrease pH, what are the implications for marine ecosystems?

- Martha Kongsgaard suggested forming an MRAC committee to explore MRAC's role in engaging in CDR. If MRAC chooses to move forward as a group, we will need a heavier lift from a core group of people.

- Micah Horwith recommended the group explore if MRAC would advocate for funding for CDR research, specifically things that would have an impact on the ocean but not necessarily directly related to the ocean acidification program.

- Gus Gates, Surfrider Foundation, asked what potential role CDR would play regarding habitat restoration work that has been done throughout the coastal zones and Cascadia.

    - Jessica Cross called out that we need to protect restored habitat as much as possible as they are an important carbon bank. If these ecosystems are destroyed, all the stored carbon is released back into the atmosphere. However, restored habitat grows slowly, and is not as quick to remove carbon as some other CDR techniques may be.

- Simone Alin, NOAA Pacific Marine Environmental Laboratory, noted that MRAC has some responsibility in developing best practices and standard operating procedures for new approaches. There is an opportunity to contribute in CDR to the global community.
    - Jennifer Hennessy recommended MRAC engage cautiously in CDR. MRAC could provide guardrails in terms of the types of projects and tests related to CDR, but it is important to not distract from other MRAC goals.
    - Simone added that MRAC can contribute to ensuring CDR activities happen in a safe way if others are already moving forward with CDR plans and projects.

- Shallin Busch asked who is currently exploring the CDR space. Is there another entity at the state level that is working on CDR, and if not, could MRAC have conversations about who should be doing this? Should there be an MRAC equivalent to focus on CDR, both terrestrial and marine?
    - Martha Kongsgaard suggested that MRAC's role could be to prompt conversations about the absence of CDR policy at the state level. Are there other groups nationally that are convening around CDR to help us better understand the scope of the challenge?
    - Shallin Busch also asked if the Pacific Coast Collaborative is talking about CDR, and if it would be beneficial to do this work on a regional level, for example, with Oregon and California.

- Jessie Tuner noted some potential concerns regarding communications from a policy standpoint. High-level political communications would need a thoughtful strategy to coordinate through the PCC. Jennifer Hennessey noted that carbon markets and carbon offsets are the drivers for funding for CDR companies. Currently, the companies willing to pay for carbon offsets are the major contributors to carbon into the atmosphere.

- Terrie Klinger expressed interest in continuing to explore MRAC's role in CDR. She noted the group does not seem ready to decide but is in favor of continuing the conversation. There should be caution around CDR, but there is also substantial need.
    - Richard Feely reiterated Simone's earlier note about MRAC being a group to develop best practice recommendations.

Next steps

- Convene a CDR committee of interested MRAC members.