



Meeting summary

August 7, 2026

1:00 to 3:00 p.m.

Virtual meeting

Meeting attendance and objectives

The Washington Marine Resources Advisory Council (MRAC) held its 34th meeting on August 7, 2026, virtually via Zoom. The meeting was facilitated by Angie Thomson, Thomson Strategic Consulting and Cory Archer, True Wind Collaborative.

Members in attendance: Betsy Peabody (Chair), Shallin Busch (NOAA Northwest Fisheries Science Center), Cynthia Catton (Washington Department of Natural Resources), Meg Chadsey (WA Sea Grant), Bill Dewey (Taylor Shellfish Farms), Diani Taylor (Taylor Shellfish Farms, *membership in progress*), Aaron Dufault (Washington Department of Fish and Wildlife, alternate), Rod Fleck (Washington Coast Marine Advisory Committee), Lucas Hart (Northwest Straits Commission, alternate), Jennifer Hennessey (Washington State Department of Ecology, alternate)

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), Marilyn Sheldon (Coastal Shellfish Grower), Erika McPhee-Shaw (Western Washington University), Senator Jesse Salomon (Washington State Senate), Douglas Steding (Association of Washington Business), Laura Watson (Washington State Department of Ecology), Senator Keith Wagoner (Washington State Senate)

Other participants: Cory Archer (True Wind Collaborative, MRAC facilitation team), Candice Plendl (True Wind Collaborative, MRAC facilitation team), Angie Thomson (Thomson Strategic Consulting, MRAC facilitation team), Micah Horwith (Washington Department of Ecology), Jodie Toft (Puget Sound Restoration Fund), Jan Newton (Washington Ocean Acidification Center/NANOOS), Natalie Coleman (Washington State Department of Ecology Marine Monitoring Unit), Rein Attemann (Washington Conservation Action), Mariah Ricci (Washington Sea Grant), Katie Wrubel (Olympic Coast National Marine Sanctuary/Ocean Acidification Sentinel Site), Richard “Dick” Feely (NOAA, retired)

Meeting objectives:

- Share updates on recent ocean acidification activities, including the OASeS Symposium.
- Hear about a new tool in NANOOS.
- Discuss upcoming plans to assess progress on the Blue Ribbon Panel (BRP) Strategies.

Welcome and introductions

Betsy Peabody (Chair) provided an update on efforts to strengthen MRAC membership and representation. Diani Taylor is transitioning into the Puget Sound shellfish growers’ seat, while Marilyn Sheldon is expected to continue representing coastal shellfish growers. Recruitment is

also underway for two Tribal representatives: one representing Puget Sound Tribes and one representing coastal Tribes; as well as representatives for crab/marine fisheries and marine tourism. A new EPA representative, Diane Hennessy, is also joining MRAC.

Recent ocean acidification happenings

Participants shared recent developments across ocean acidification science, monitoring, and policy. Highlights included:

- Jodie Toft, Puget Sound Restoration Fund, shared several updates connected to recommendations from the Blue Ribbon Panel:
 - Puget Sound Restoration Fund is piloting shell recycling in Washington, working with WDFW and shellfish growers to develop methods for collecting, curing, and eventually reusing oyster shell. More than 90 percent of shell from Oyster New Year and Slurp was collected, along with approximately 2,500 pounds from Elliott's Oyster House. The shell is being stored near Nisqually and will cure for approximately 18 months before being considered for native oyster restoration and other uses.
 - The Kenneth K. Chew Center for Shellfish Research and Restoration has produced more than 30 million native oysters, and additional abalone research capacity has been established at Shannon Point Marine Center.
 - Puget Sound Restoration Fund is also testing remote grow-out approaches for Olympia oysters and is approaching a 150-acre restoration milestone.
 - A congressionally directed spending request supporting a coalition focused on wild kelp forest recovery was submitted to Senators Murray and Cantwell and has been included on Senator Cantwell's list for consideration.
- Shallin Busch, NOAA Northwest Fisheries Science Center, reported that NOAA has awarded a contract for a new building at the Manchester Research Facility, with completion anticipated in 2028. Ocean acidification research is a major rationale for the new facility. NOAA's Ocean Acidification Program is also developing its FY 2027–29 internal research work plans, including Northwest Fisheries Science Center proposals related to aquaculture, krill, and social science. Shallin also noted that the West Coast Ocean Acidification Survey was underway at the time of the meeting.
- Cynthia Catton, Washington Department of Natural Resources, shared updates from DNR's Acidification Nearshore Monitoring Network (ANeMoNe), which collects environmental and biological data at sites throughout Puget Sound and the coastal estuaries of Willapa Bay and Grays Harbor. The program has also been developing methods to monitor carbon in sediments and eelgrass beds and is beginning to apply those methods at additional sites.
 - Cynthia highlighted recent research examining patterns of bull kelp decline and recovery following marine heatwaves, as well as a new technical report examining factors associated with floating kelp loss and resilience in Puget Sound and surrounding waters.
 - Claar, Danielle C., Helen Berry, and Bart Christiaen. "Geographic variability of floating kelp recovery after a marine heatwave event in the

Salish Sea and adjacent open coast." *PLoS One* 20.12 (2025): e0336574.
<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0336574>

- Cox, Aidan M., Andrea Fieber, Samantha T. Linhardt, Catherine A. Pfister, Megan Dethier, Julia F. Ledbetter, Danielle C. Claar, Helen Berry, Pete Dowty. 2026. Factors associated with patterns in floating kelp loss and resilience in Puget Sound and surrounding waters. Washington State Department of Natural Resources, Olympia, WA.
https://dnr.wa.gov/sites/default/files/2026-07/aqr_nrsh_resil_tech.pdf
- Bill Dewey, Taylor Shellfish Farms, shared an update on the University of Washington's Blue Carbon to Green Fields project, which is testing whether *Ulva* harvested from shellfish farms can be used as a soil amendment on terrestrial farms. The project was temporarily defunded and subsequently restored in modified form. Recent harvests from Chuckanut Shellfish were successfully transported to participating farms, including one on Camano Island.
 - Photos of *Ulva* harvesting: <https://photos.app.goo.gl/ZjgBryfuK3xuRRTw8>
- Meg Chadsey, Washington Sea Grant, noted that Washington Sea Grant's broader seaweed programming and the Washington Seaweed Collaborative have been retired for the time being because of funding changes and limited commercial seaweed cultivation activity in Washington.
 - Meg continues to work extensively on marine carbon dioxide removal (mCDR). Washington Sea Grant recently hosted the second of three public workshops on mCDR, bringing practitioners and technical experts together to respond to interests and concerns raised during an earlier workshop with coastal constituents, interest groups, and rights holders. A third workshop is planned.
 - Meg noted that Betsy participated in the workshop as an invited speaker and clarified that her participation did not constitute an MRAC endorsement of mCDR.
 - Meg also shared upcoming leadership transitions at NOAA's Pacific Marine Environmental Laboratory, including the planned retirements of Michelle McClure and Diane Stanitski.
- Lucas Hart, Northwest Straits Commission, shared updates from the Northwest Straits Commission and local Marine Resources Committees. These included floating kelp monitoring that contributes to the Puget Sound Kelp Conservation and Recovery Plan, cross-border voluntary no-anchor zones intended to reduce anchor damage to eelgrass, and continued Olympia oyster restoration work.
 - [Marine Resources Committee's Floating Kelp Monitoring](#)
 - [Cross-border voluntary no anchor zone map of sites](#)
- Micah Horwith, Washington Department of Ecology, provided two science updates from Ecology's Marine Monitoring Unit:
 - An 18-month deep-water ocean acidification sampling effort has completed its field phase. The project collected samples closer to the seafloor to better characterize conditions experienced by adult Dungeness crab, geoduck, and other benthic organisms. Samples will be analyzed and incorporated into products expected in 2027.

- Ecology is also piloting intensive three-dimensional dissolved oxygen mapping in Budd Inlet. The project uses repeated transects and CTD casts to better characterize low-oxygen conditions in a shallow system that can be difficult to represent in models. If successful, the approach may be used to complement Ecology's ongoing long-term monitoring.
- Aaron Dufault, Washington Department of Fish and Wildlife, reported on an unprecedented biotoxin event affecting Hood Canal and Admiralty Inlet. WDFW and the Washington Department of Health coordinated closures, testing, and public outreach. At the time of the meeting, affected areas remained closed while testing continued. Aaron emphasized the scale of the outreach effort and the challenge of reaching intertidal harvesters, noting that despite toxin concentrations reaching dangerous levels, no major illnesses had been reported.
- Jennifer Hennessey, Washington State Department of Ecology, shared several updates from the Washington Department of Ecology:
 - Ecology continues work to improve understanding of Washington's blue carbon sources and sinks.
 - Through the Cap-and-Invest Program, a working group is evaluating methods and feasibility for allowing certain blue carbon ecosystems to qualify for carbon offsets. The group is currently gathering technical information and developing potential recommendations; the work has not yet entered rulemaking.
 - [Department of Ecology - Committees, Boards, and Workgroups](#)
 - Jennifer also highlighted Washington's new [Comprehensive Climate Action Plan](#), developed jointly by Ecology and the Department of Commerce with EPA funding. The plan evaluates a broad range of strategies for meeting state greenhouse gas limits, including carbon sequestration.
 - Meg Chadsey asked whether the blue carbon offset work could eventually include technological forms of marine carbon dioxide removal. Jennifer clarified that the current effort is primarily focused on more established, biologically based blue carbon systems such as salt marshes and eelgrass. She noted that emerging technological approaches are still too new to demonstrate the long-term carbon sequestration verification required for current offset standards.
- Angie Thomson, facilitator, provided an update on MRAC's budget strategy. Given the challenging state budget outlook, MRAC has not identified any new funding requests to advance this year and will instead focus on maintaining existing investments.
 - Jennifer Hennessey provided additional context on the state budget outlook, noting pressures related to the General Fund, Cap-and-Invest revenues, and the Model Toxics Control Account. She cautioned that previously funded programs may still face reductions and emphasized the importance of being prepared to demonstrate the value of existing work.
 - Jan Newton, Washington Ocean Acidification Center/NANOOS, asked what an effective funding defense would look like for ocean acidification programs. Jennifer encouraged programs to engage supporters and demonstrate their value to Washington residents and decision-makers.
 - Betsy Peabody noted that MRAC will continue proactive communication with supportive legislators, to help protect ongoing ocean acidification funding.

OASeS Symposium update

Katie Wrubel, Olympic Coast National Marine Sanctuary/Ocean Acidification Sentinel Site, provided an overview of the third Ocean Acidification Sentinel Site (OASeS) Symposium, held in May in Ocean Shores. More than 70 participants attended the two-day symposium and subsequent half-day steering committee meeting. Katie noted that the event brought together a strong mix of Indigenous knowledge and Western science perspectives.

The symposium focused on restoration and resilience efforts on the Olympic Coast and connections to changing ocean conditions. Sessions addressed community and cultural resilience, educational resources, and species vulnerability, including impacts to razor clams, Dungeness crab, orange cup coral, coho salmon, and sablefish. Participants also joined breakout discussions focused on fisheries data and information needs and opportunities to expand community science on the Olympic Coast.

Participants visited Taholah and the Quinault Indian Nation's ocean-going canoe shed and heard about the cultural significance of canoe traditions.

The symposium also premiered a video focused on the importance of Dungeness crab to coastal communities and the implications of ocean acidification. The video features representatives from all four coastal treaty Tribes. OASeS partners are considering ways to expand distribution while continuing to coordinate with Tribal partners regarding its use. Link:

<https://www.youtube.com/watch?v=7hMl6N0DjFc>

Discussion:

- Micah Horwith shared that a companion StoryMap focused on the sensitivity and importance of Dungeness crab on the Washington coast is under development. The StoryMap is expected to undergo additional review at the next OASeS Steering Committee meeting.
 - Micah also described interest in developing a short, distributable product focused on the OASeS razor clam story. The product would illustrate how observations from coastal Tribal communities about changing razor clam shells helped generate scientific research, with findings later brought back to those communities.
- Meg Chadsey asked the group for ideas about how to broaden distribution of the Dungeness crab video. Because the video includes representatives from all four coastal treaty Tribes, OASeS partners will continue coordinating with Tribal partners on specific dissemination approaches even though the video has been approved for general distribution.
 - Cory Archer, facilitator, suggested exploring partnerships with coastal or seafood-focused restaurants to show the Dungeness crab video or provide QR codes linking customers to the video. Other outreach approaches may also be explored as OASeS works with coastal Tribal partners to expand distribution.
- Jan Newton reflected that one of the symposium's greatest successes was the level of trust among participants and the integration of Indigenous knowledge and Western

science throughout the agenda. She noted that the meeting felt more cohesive than earlier symposiums, where different knowledge systems had sometimes been presented in more separate tracks.

WOAC Update - LiveOcean

Jan Newton, Washington Ocean Acidification Center/NANOOS, provided an update on the Washington Ocean Acidification Center (WOAC), including ongoing monitoring, seasonal research cruises, biological research, and modeling. WOAC-supported cruises have occurred seasonally since 2014 and involve students and volunteers.

Jan also noted a leadership transition for the LiveOcean model. Parker MacCready is retiring, and Kate Hewett has taken on the role of principal investigator for LiveOcean.

Jan highlighted concerns about developing ocean conditions, including strong coastal hypoxia and the potential arrival of El Niño conditions, noting that ocean acidification and low oxygen conditions can co-occur.

NANOOS LiveOcean Transect Tool

Jan demonstrated the NANOOS Visualization System and the LiveOcean model, including a new transect-viewing tool. The tool allows users to draw or select transects and visualize modeled ocean conditions by depth and distance. Users can explore variables including temperature, oxygen, and aragonite saturation state.

Jan discussed potential applications for fisheries and resource management. For example, fishers could examine bottom oxygen conditions across fishing grounds, while managers could use transects to understand changing conditions across specific geographic areas. She emphasized that outreach and direct engagement are essential to helping users understand and apply the tool effectively.

Jan also highlighted NANOOS's Averages and Anomalies application as another tool for assessing whether current ocean conditions differ substantially from historical averages.

Q&A:

- Meg Chadsey asked how the new LiveOcean transect tool could be useful beyond technical oceanographers, including for fishers. Jan Newton explained that users can examine conditions throughout the water column across a specific fishing ground rather than relying only on surface or bottom values. For example, a crab fisher could use the tool to identify the location and thickness of low-oxygen water and consider those conditions when deciding where to fish.
 - Jan noted that similar information could be useful to resource managers when evaluating restoration locations or understanding whether areas experience persistent hypoxic or corrosive conditions.

- Members discussed the importance of pairing the tool with direct outreach rather than relying solely on passive materials. Jan noted that staff from the University of Washington and Oregon Sea Grant work directly with fishing communities to demonstrate the tools and gather feedback. Videos and other resources can supplement this work, but interactive engagement has been more effective.
- Bill Dewey asked Jan to demonstrate whether the tool could create a transect through Dabob Bay. Jan created a transect and explored aragonite saturation conditions, which showed healthier conditions near the surface and more corrosive conditions at depth.
 - Bill noted that this type of information could have been particularly useful to shellfish hatcheries before treatment systems were available. Hatcheries with shallow and deep-water intakes could potentially have used information about conditions at different depths to determine which intake to use.

Introducing MRAC's 2026-27 BRP Strategies progress check

The facilitation team introduced a proposed process for assessing progress on the Blue Ribbon Panel Strategies over the next several MRAC meetings.

MRAC originated from the 2012 Blue Ribbon Panel process and remains responsible for maintaining coordinated focus on Washington's ocean acidification strategies. The strategies received a comprehensive update in 2017. In 2022, rather than completing another full update, MRAC assessed its ongoing role and subsequently received an extension through 2032. More recently, MRAC developed a series of one-page products summarizing progress and timely priorities.

With nearly a decade having passed since the 2017 update, MRAC will undertake a more robust assessment of progress. The intent is not to develop another full plan or rewrite the strategies. Instead, the process will identify progress, remaining gaps, emerging science, continued or new areas of urgency, and opportunities for MRAC to add value. The facilitation team will use the discussions to develop a tangible final product rather than asking MRAC members to draft the product themselves.

The proposed work plan organizes the six BRP strategy areas across the next three meetings:

August 2026 (we are here)	Virtual • Introduce the progress update process and get input from MRAC
October 2026	In-person meeting (~6 hrs) • Reduce Emissions of Carbon Dioxide • Reduce Local Land-Based Contributions to Ocean Acidification
February 2027	Virtual (~3.5 hrs) • Increase Our Ability to Adapt and Remediate the Impacts of Ocean Acidification

	Invest in Washington’s Ability to Monitor and Investigate the Causes and Effects of Ocean Acidification
May 2027	Virtual (~3.5 hrs) - Inform, Educate, and Engage Stakeholders, the Public, and Decision Makers in Addressing Ocean Acidification - Maintain a Sustainable and Coordinated Focus on Ocean Acidification

Topic-specific subcommittees may meet in advance of the full MRAC discussions to review information already tracked by the facilitation team, identify additional progress and gaps, and help frame the questions brought to the full Council.

Q&A and Discussion:

- Shallin Busch observed that the proposed work plan begins with two particularly challenging topics: reducing carbon dioxide emissions and reducing local land-based contributions to ocean acidification. She noted that beginning with the most difficult strategies may be beneficial because it provides additional time to identify gaps and continue working through them during later meetings.
- Micah Horwith supported beginning with these two topics. He noted that MRAC is unlikely to resolve all of the issues during one meeting, but starting with them will help identify remaining gaps and additional work early in the process. The group could then return to these topics later if more discussion is needed.
- The facilitation team emphasized that the proposed work plan is intended to be adaptive. Following the first strategy discussion, MRAC can adjust the process, schedule, or amount of time devoted to individual topics based on what is learned.
- Jennifer Hennessey also supported beginning with emissions and land-based contributions and suggested bringing relevant Ecology subject-matter experts into the October in-person meeting. Their participation could help ground the discussion in current state programs, existing challenges, and opportunities for MRAC to add value.
- Jan Newton supported the overall progress-check approach and encouraged MRAC to build from the concise communication products it has already developed rather than creating another lengthy plan. She noted that short products can be particularly useful for legislators and other decision-makers.
- Members generally supported moving forward with the proposed approach. The facilitation team will invite members to participate in topic-specific subcommittees before the October meeting and will adjust the process as needed based on experience with the first round of discussions.

Next steps

- Continue recruitment for vacant MRAC membership positions.
- Facilitation team will convene BRP strategy subcommittees in advance of the October MRAC meeting, as needed.

- The October 2026 in-person MRAC meeting will begin the BRP Strategies Progress Check with focused discussions on reducing carbon dioxide emissions and reducing local land-based contributions to ocean acidification.