MARINE RESOURCES ADVISORY COUNCIL

Meeting summary
Feb. 13, 2019 10:00 a.m. to 12:30 p.m.
Conference call, Seattle, WA

Meeting attendance and objectives
The Washington Marine Resources Advisory Council (MRAC) held its 18th meeting by phone on February 13, 2019. The meeting was facilitated by Martha Kongsgaard, MRAC Chair, and Angie Thomson, EnviroIssues.

Members in attendance: Martha Kongsgaard (Chair), Mike Cassinelli (City of Ilwaco), Rich Childers (Department of Fish and Wildlife), Brian Cochrane (Washington State Conservation Commission), Bill Dewey (Taylor Shellfish), Kirsten Feifel (Washington State Department of Natural Resources), Gus Gates (SurfRider), Libby Jewett (National Oceanic and Atmospheric Administration), Erica McPhee-Shaw (Western Washington University), Mindy Roberts (Washington Environmental Council)

MRAC members not in attendance: Brian Allison (Puget Sound Commercial Crab Association), Maia Bellon (Department of Ecology), Michele Culver (Washington Department of Natural Resources), Garrett Dalan (Washington Coast Marine Advisory Committee), Tom Davis (Washington Farm Bureau), Norm Dicks (Van Ness Feldman, LLP), Megan Duffy (Washington Department of Natural Resources), Tony Floor (Northwest Marine Trade Association), Hilary Franz (Department of Natural Resources), Lisa Graumlich (University of Washington), Phillipa Kohn (Department of Fish and Wildlife), Nan McKay (Northwest Straits Commission), Jay Manning (Puget Sound Partnership), Mike Rechner (Washington State Department of Natural Resources), Marilyn Sheldon (Coastal Shellfish Grower), Ron Shultz (Washington State Conservation Commission), Douglas Steding (Association of Washington Business), Terry Williams (Tulalip Tribes of Washington)

Other participants: Linda Anderson-Carnahan (Environmental Protection Agency), Simone Alin (National Oceanic and Atmospheric Administration), Shallin Busch (National Oceanic and Atmospheric Administration), Meg Chadsey (Washington Sea Grant), Mike Chang (University of Washington), Richard Feely (National Oceanic and Atmospheric Administration), Kelly Ferron (Washington Department of Ecology), Cristina Figueroa-Kaminsky (Washington Department of Ecology), Alison Halpern (Washington State Conservation Commission), Lynn Helbrecht (Department of Fish and Wildlife), Jennifer Hennessey (Office of the Governor), Jim Kaldy (Environmental Protection Agency), Terrie Klinger (Washington Ocean Acidification Center), Julie-Ann Koehlinger (National Oceanic and Atmospheric Administration), Stephanie Jaeger (King County), Parker MacCready (University of Washington), Anji Morales (Vulcan), Peter Murchie (Environmental Protection Agency), Jan Newton (Washington Ocean Acidification Center), Dale Norton (Washington Department of Ecology), Greg Pelletier (Washington Department of Ecology), Katrina Radach (Washington Sea Grant, The Nature Conservancy), Julia Sanders (Global Ocean Health), Reed Schuler (Office of the Governor), Paul Williams (Suquamish Tribe)

Meeting objectives:

- Share an update on recent ocean acidification activities and events.
- Hear an update on the 2019-2021 biennium budget requests.
- Hear from the Governor's Office on carbon and climate priorities.
- Hear a summary of recent scientific developments & review management survey results.

Welcome and introductions

Martha Kongsgaard, MRAC Chair, and Angie Thomson, EnviroIssues, opened the meeting and thanked council members for their participation.

Recent OA happenings

Angie Thomson invited participants to share updates on recent happenings related to ocean acidification.

- Several members reported on recent and upcoming global events where ocean acidification is a key topic, including:
    - Bill Dewey, Taylor Shellfish, attended an ocean acidification symposium in Santa Marta, Colombia where participants highlighted recent ocean acidification work, challenges, and opportunities for collaboration.
    - Jennifer Hennessey, Governor's Office, mentioned presentations by the OA Alliance at the Global Climate Action Summit in California and at an event to mobilize global leadership on ocean acidification action plans in Poland.
    - Martha stated the OA Alliance and the Pacific Coast Collaborative on OA are gearing up to showcase the Washington model at an east coast-west coast gathering.
    - Jan Newton, Washington Ocean Acidification Center, and Libby Jewett, NOAA, announced an invitation to present on the WA Blue Ribbon Panel process and work with shellfish growers to the OA Action Group in New Zealand.
    - Similarly, Terrie Klinger, Washington Ocean Acidification Center, and Jennifer Hennessey plan to travel to Japan to share the ocean acidification experience in Washington.

- Libby Jewett noted upcoming federal funding opportunities for projects focused on ocean observing optimization, specifically on the west coast.

- Meg Chadsey, Washington Sea Grant, mentioned two funding opportunities for ocean acidification research through Washington Sea Grant and the SeaDoc Society.

- Jennifer Hennessey announced her role in the Governor's Office and with the Ocean Acidification Alliance. The OA Alliance expects to have 20 new ocean acidification action plans and over 100 members by the end of 2019. There are currently over 70 members; new members include the Netherlands and the City of Vancouver.

- Paul Williams, Suquamish Tribe, announced a SB 5576 hearing February 18 on climate and science K-12 education.

- Jan Newton mentioned that Washington's collaborative work between shellfish growers and scientists on ocean acidification has received attention at the state and national level.

- Shallin Busch and Richard Feely, NOAA PMEL, are working to revise the NOAA ocean acidification research plan, schedule, and strategy.

- Richard Feely added a Task Force will continue through the next year to understand observational capabilities and gaps.

- Mindy Roberts, Washington Environmental Council, shared an update that Surfrider Foundation/WEC are part of a coalition working for a bill to transition to 100% clean energy.

- Dale Norton, Department of Ecology, announced Ecology received funding to incorporate pH monitoring at multiple sites throughout Puget Sound.

- Erika McPhee-Shaw, Western Washington University, announced the Marine & Coastal Studies undergraduate program. The new curriculum will include interdisciplinary oceanography and uses the LiveOcean model as a teaching tool.

- Martha Konsgaard and the group discussed a need to identify ocean tipping points and thresholds. Shallin Busch noted the National Climate Assessment includes some information on ocean tipping points. Additionally, the Northwest Fisheries Science Center developed an integrated science assessment that evaluates tipping points and is working to deliver outputs; the research is still underway. The group agreed there are still knowledge gaps in how ecosystems operate, providing a challenge in identifying a tipping point for ocean acidification.

2019-2021 budget update

Martha Kongsgaard shared an update on ocean acidification funding requests that were included in the Governor's 2019-21 budget and discussed next steps for the budget process.

New budget requests:

- Biological response to ocean acidification ($501,000) – WOAC
- Co-locating field observations with biological sampling ($200,000) – WOAC
- Sustain and enhance the acidification nearshore monitoring network (ANeMoNe) program ($986,000) – DNR
- Enhance the Puget Sound observation network ($682,000) – Ecology

Existing carry-forward priorities:

- Continuing facilitation and coordination of the Marine Resources Advisory Council ($150,000) – DNR budget

- Continuing operations of the Kenneth K. Chew conservation hatchery ($448,000) – WDFW
- Supporting operations of the Washington Ocean Acidification Center ($575,000) – UW
- Sustaining the ocean acidification monitoring network ($625,000) – UW
- Sustaining and improving the Ocean Acidification Forecast Model ($150,000) – UW

Martha and others will continue to build legislative strategies to secure funding for MRAC priorities in the next biennium.

Carbon update
Reed Schuler, Senior Policy Advisor – Office of the Governor, presented an overview of a proposal package to address carbon pollution in Washington state. Highlights include:

- Initiative 1631 was an attempt to reduce carbon emissions in one single approach, although it did not pass, it sparked conversations with legislators and stakeholders.

- Going forward, five separate bills are proposed to encourage greenhouse gas reductions across Washington state:
    1. **100% clean electricity**: Target a 100% carbon neutral Washington by 2030.
    2. **Clean buildings**: Goal of 70% of all buildings carbon neutral by 2030. This targets large scale commercial buildings (50,000 square feet) with an incentive program and adopts performance standard by 2026 to meet mandatory energy standards.
    3. **Clean fuel standard**: Integrate a more intensive standard of how much carbon is released per minute per vehicle. Includes incentives for biofuels and vehicle electrification.
    4. **Eliminating HFC super pollutants**: Reduce HFC emissions from sources like air conditioning, heat pumps, and refrigerators.
    5. **Clean transportation**: Reduce conventional air pollutants and improve air quality with a $1,000 tax incentive on electric car sales. Part of this bill proposes a zero-emission vehicle requirement on automakers to offer sales at increasingly high percentages by 2025.

The following points were discussed:
- An increase in gas prices was a point of concern when the carbon tax bill 1631 was proposed. Reed confirmed discussions around projected changes in cost are ongoing.
- Participants discussed how MRAC can support work to understand carbon emissions and what information would be helpful to support policy decisions. The group agreed OA conditions forecasted under target carbon emission scenarios would be valuable.
- Participants noted that reducing carbon emissions was an area of focus for the Blue Ribbon Panel and agreed to further discuss MRAC's mission statement around carbon reduction efforts.

Science update
Terrie Klinger, Jan Newton, Richard Feely, and Greg Pelletier presented on recent science developments. Highlights include:

- Juvenile Coho salmon show changes in sensory behavior when exposed to elevated carbon dioxide concentrations. Changes included impaired neural signaling and could negatively influence detection of prey, predators, and natal streams. Results suggest that anadromous fish (those that migrate from the ocean to rivers to spawn) are susceptible to elevated carbon dioxide.

- Forecasts of ocean acidification in the Salish Sea and Pacific Northwest coastal waters are now available in an updated model of LiveOcean. The update includes full biogeochemistry (salinity, pH, aragonite saturation, etc.) forecasts based on data from NOAA, Washington Department of Ecology, Environment Canada, OCNMS, and WOAC cruises. Next steps for the LiveOcean model include:
    - High resolution nested models of coastal estuaries and selected parts of Puget Sound
    - Longer hindcasts with new high-resolution grid to cover the Marine Heat Wave of 2014-2015
    - Improvements to carbon modeling based on analysis of NOAA and NANOOS observations
    - Future projections (25-100 years) by embedding global climate models

- Recent research indicates ocean acidification conditions are accelerating at a faster rate in the Salish Sea than in the open ocean. Factors such as upwelling and hypoxic zones contribute to a higher level of sensitivity to elevated carbon dioxide levels. Increasing understanding of carbon emission scenarios is crucial.

- Recent results from the Salish Sea Model on the connection between ocean acidification conditions and nutrient sources include:
    - Human sources of nutrients account for up to about 30% of nutrients available for algae growth and contribute to increased algae biomass and accumulation of total organic carbon
    - Dissolution of crab megalopae may have increased up to about 15% due to increased pH gradients caused by human nutrient sources
    - Severity in adverse conditions for pteropod egg development may be significantly increased to due decreased aragonite saturation caused by human nutrient sources

The following points were discussed:

- Washington State University is continuing research on sensory behavior for Chum or pink salmon. Previous work focused on sablefish.
    - Bill Dewey noted studies on Chinook may be of particular interest.

- Canadian partners, including the University of British Columbia and the British Columbia Administration of the Environment are contributing to Salish Sea modeling work.

    - Jennifer Hennessey noted Washington and Canada are part of the West Coast collaboration, and some newer members to the OA Alliance are from Canada. Plans are in place to utilize networking for modeling and funding.

- The current version of LiveOcean does not apply to intertidal zones shallower than three-meters depth. A higher resolution model will provide more meaningful nearshore results.

- Christina Figueroa-Kaminsky, Washington Department of Ecology, noted the importance of presenting the full story of human induced impact on rivers, carbon in the atmosphere, ocean conditions and how it all ties together.

- The group agreed on the need for model forecasts of various carbon dioxide emission predictions.

Management priorities survey results

Kirsten Feifel, Department of Natural Resources, provided an overview of the ocean acidification resource managers survey to identify concerns and priorities in the context of changing ocean conditions. The online survey asked 90 individuals from 45 entities (state, tribal, commercial fisherman, private industry, etc.) about top priorities and concerns related to ocean acidification. Survey results revealed five key priorities:

- Biological response of species to changing ocean conditions
- Increased monitoring in nearshore environments
- A map summarizing the most vulnerable locations
- Improved data sharing research collaboration efforts
- Current abundance of shellfish and fish species

A final report will be available in Spring 2019.

Next steps

Angie Thomson reviewed immediate next steps, including scheduling an in-person meeting in Spring 2019 and continuing legislative conversations.

Martha Kongsgaard thanked everyone for their participation and adjourned the meeting.