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## Governor's Blue Ribbon Panel on Ocean Acidification

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### **Summary of Fourth Meeting**

Wednesday, June 20, 2012, 9:00 a.m. – 4:00 p.m.

UW Center for Urban Horticulture – NHS Hall

3501 NE 41<sup>st</sup> Street, Seattle

Meeting documents are available on the WA Dept. Ecology Ocean Acidification webpage:

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

### **Meeting Attendance and Objectives**

The Blue Ribbon Panel on Ocean Acidification held its fourth meeting on June 20, 2012, at the UW Center for Urban Horticulture, in Seattle, WA. The meeting was open to the public and broadcast as a webinar.

Panel members, staff and invited guests participating in this meeting included Hedia Adelman, Lisa Ayers, Brian Blake, Steven Bloomfield, Shallin Busch, Meg Chadsey, Bill Dewey, Paul Dye (Nature Conservancy alternate for Chris Davis), Richard Feely, Carolyn Friedman, Peter Goldmark, Kate Kelly (EPA alternate for Dennis McLerran), Ryan Kelly (Stanford University Center for Ocean Solutions), Sara Kendall, Terrie Klinger, Jay Manning, Micah McCarty, Jan Newton, Betsy Peabody, Kevin Ranker, Bill Ruckelshaus, Jennifer Ruesink, Norma Smith, Ted Sturdevant, Dan Swecker, George Waldbusser, Terry Williams, Brad Warren, and Lara Whitely Binder.

Over 45 members of the public and interested stakeholders participated, most via webinar.

Meeting objectives included:

1. Present and discuss initial action recommendations collected to date, and gather additional recommendations or concepts.
2. Introduce plans for Panel workgroups and begin soliciting volunteers to draft recommendations for the following action categories:
  - Research and monitoring;
  - Local source reduction (focus: nutrient and atmospheric sources);
  - Adaptation and remediation;
  - Outreach and education; and
  - Post-Panel institutional framework needs.

Recommendations included in the meeting's presentations were collected in advance via: 1) an online collection tool created for Panel members, 2) emails sent by Panel members, 3) meetings

by Panel scientists (who developed the core set of research and monitoring recommendations), and 4) the white papers being produced by Ryan Kelly (policy tool kit) and Brad Warren and Eric Scigliano (technical feasibility of response options).

### **Presentations and Discussions**

All presentations are available on the WA Dept. of Ecology Ocean Acidification webpage (<http://www.ecy.wa.gov/water/marine/oceanacidification.html>) and should be consulted for details. This summary focuses on discussions generated by the presentations.

### **Welcome**

Co-chairs Jay Manning and Bill Ruckelshaus welcomed the Panel members. Facilitator Lara Whitely Binder outlined the meeting agenda and expectations, and announced that the additional Panel meeting tentatively scheduled for August 8, 2012 will be held. Location information will be provided at a later date. Lara then provided an update on the status of major products associated with the Panel's charge, including two new scientific analyses being launched by Panel scientists in response to information gaps identified during the development of the science white paper. Members of the public attending in person and via the webinar were asked to submit comments and questions via email for the public comment period at 3:45pm.

An unscheduled discussion arose about the timing and anticipated outcomes of the new scientific analyses. These will be short-term, preliminary assessments of the contribution of local land-based nutrients and local atmospheric CO<sub>2</sub> emissions to acidification in Washington marine waters, based on historical data. The scientists stressed that while these studies should indicate whether these local drivers could be impacting local water chemistry, more definitive results will require additional funding and time to develop models that link nutrient and carbon variables to pH (a possible Panel recommendation). Panel members debated the merits of waiting for science to reduce uncertainty about source contributions vs. taking immediate steps to curb sources. Both policy actions, and the science on which they are based, will need to be revisited in the near future, as our understanding of local acidification drivers develops.

Scheduled updates on the status of 1) Brad Warren's and Eric Scigliano's white paper on the technical feasibility of adaptation options, and 2) the communications strategy were deferred as a result of the unscheduled discussion.

*Related presentation slides:*

[http://www.ecy.wa.gov/water/marine/oa/20120620\\_expectations.pdf](http://www.ecy.wa.gov/water/marine/oa/20120620_expectations.pdf)

[http://www.ecy.wa.gov/water/marine/oa/20120620\\_updates.pdf](http://www.ecy.wa.gov/water/marine/oa/20120620_updates.pdf)

## Initial Recommendations for Research and Monitoring

*Jan Newton, UW Applied Physics Laboratory, and Terrie Klinger, UW School of Marine and Environmental Affairs.*

This presentation summarized the initial recommendations of the Panel scientists, with input from the Washington Dept. of Ecology, for research and monitoring to 1) advance our understanding of ocean acidification status and trends in Washington marine waters, 2) support the development of tools to predict and forecast corrosive conditions, and 3) characterize the risk to, and adaptive capacity of biological systems facing these conditions. The scientists' recommendations emphasized the need for integrated physical and biological studies that could link water chemistry observations with biological responses. Integration is also necessary at the programmatic level; enhanced monitoring capacity must align with modeling and management needs. Their recommendations recognized and built upon existing efforts, calling for sustained funding for these programs. New areas of focus should include: the deployment of geographically diverse monitoring platforms; models to describe how carbonate chemistry and pH vary over space and time; the development of predictive relationships that will allow inexpensive, commonly-measured variables to be used for forecasts; characterization of the response of local species to acidification; and the development of science-based strategies to protect the shellfish industry. They acknowledged the need to prioritize species at risk according to ecological, economic, conservation and cultural concern. They strongly recommend that a Consortium of scientists, managers, resource users and policy makers be established to plan and oversee the implementation of these measures beyond Oct. 1, 2012.

During the presentation, panel members asked for clarification on the following points:

- The nature and utility of short-term vs. long-term forecasts of corrosive conditions
- Whether these recommendations prioritized shellfish over other marine species
- Whether the scientifically-accurate term 'corrosive' implied shellfish consumption risks
- The degree to which upwelled coastal waters (which reflect long-term global atmospheric CO<sub>2</sub> trends), will contribute to acidification in Puget Sound in the future.
- Whether there are institutional models for the proposed Consortium

The 90 minutes following this presentation were spent addressing questions and points raised by the Panel. Hedia Adelman, Washington Dept. of Ecology, opened the discussion with a review of 16 science recommendations submitted by non-scientist Panel members, aimed at increasing our understanding of ocean acidification in Washington waters, and noted that most aligned well with Panel scientists' recommendations, particularly with regards to nutrient loading.

Several themes emerged from this discussion:

- **The implications of the guaranteed increase in the corrosivity of upwelled coastal water over the next 50 years.** Panel members discussed the value of reducing local nutrient inputs

given the potential that the contribution of coastal waters (the ‘ocean signal’) to acidification in Puget Sound will eventually dominate the process. Responses included: 1) portions of Puget Sound, such as Hood Canal and the south Sound, are more susceptible to local inputs, and will likely benefit from local source control measures; 2) local inputs are also expected to increase with increasing population and development; programs put in place now to control land-based nutrients will help mitigate this pressure in the future; 3) Washington’s shellfish industry is already at a crisis point, and stands to benefit from immediate local action to mitigate local acidification drivers; 4) ocean acidification is one of multiple stressors facing Puget Sound, several of which stem from excess nutrient inputs. Controlling nutrients could increase resilience by reducing the overall stress on the system.

- **Addressing non-local acidification drivers.** Washington State contributes only 0.03% of global CO<sub>2</sub> emissions. Does this fact argue that Panel recommendations should focus on reducing only those inputs that affect local water chemistry? Several Panel members expressed the opinion Washington State should demonstrate leadership with a strong recommendation for reducing greenhouse gas emissions.
- **Prioritizing research and monitoring recommendations.** The Panel scientists presented a set of seven broad recommendations (see presentation slide #2) intended to serve as the framework for an integrated strategic plan. While prioritizing *between* these seven recommendations would be difficult, prioritizing specific actions supporting individual recommendations can and should be done. Though rough estimates of the cost of various actions will be made, cost should not be the principle consideration, as many of these actions are scalable, or could be implemented in stages (there is also the risk that only the least expensive recommendations would be enacted). A better strategy may be to prioritize in terms of sequence (i.e. which are most essential now; which can be implemented later?). At least some of the recommended actions should be short term (i.e. implemented within the next 18 months; visible results by 2016).
- **Input from the agriculture industry.** If Panel recommendations will focus on reducing local nutrient inputs, the agriculture industry should be consulted about best management practices for reducing runoff and controlling greenhouse gas emissions. A representative from this sector may be added to the Panel, or recruited for one of the workgroups.
- **Uncertainty.** Detailed information on how much local inputs specifically contribute to acidification in Puget Sound, and how that contribution varies by location, is unresolved at this point but the Panel must proceed at this stage based on what is known. More detailed research on this topic is in the set of initial research and monitoring recommendations currently being considered by the Panel. There is uncertainty about potential technological fixes and policy actions as well but uncertainty is always present; the Panel’s

recommendations will be contingent on reducing these uncertainties to a level that gives the Panel confidence that we are acting in the public interest.

*Related presentation slides:*

[http://www.ecy.wa.gov/water/marine/oa/20120620\\_newton.pdf](http://www.ecy.wa.gov/water/marine/oa/20120620_newton.pdf)

## **Initial Recommendations for Local Source Reduction**

*Hedia Adelsman, WA Dept. of Ecology*

Three categories of local input sources have the potential to influence the pH of Washington marine waters: atmospheric inputs, such as CO<sub>2</sub> and NO<sub>x</sub>; terrestrial point sources, such as wastewater treatment plants; and terrestrial non-point sources, such as agricultural and residential runoff, and septic systems. Hedia presented 39 Panel member recommendations for local source reductions, grouped into the following objectives based on these categories: reducing CO<sub>2</sub> and NO<sub>x</sub> emissions; reducing allowable nutrient limits from point sources; reducing non-point source nutrient loading through land use management; reducing non-point source nutrient loading from septic systems; and reducing non-point source nutrient loading using voluntary/incentive-based approaches.

A major theme of the subsequent discussion was how these recommendations fit in with existing laws and programs. Better enforcement of and support for ongoing efforts might be more effective than seeking new solutions; aligning and tweaking existing efforts with similar objectives was also proposed as a means of maximizing return on investment. Washington State should also seek to align with other states affected by acidification as a means of consolidating funding for common goals. The Panel should reach out to organizations currently engaged in local source reduction and encourage them to make acidification part of their message. At the same time, Washington State has an opportunity to lead by example, and the Panel should explore novel mitigation strategies.

A second theme was the appropriate level of granularity for local source reduction recommendations. The Panel should avoid recommendations that are too general and high-level but not be overly-detailed prescriptive either; the recommendations should be specific enough that ownership of the recommendation is clear, but they should allow for some freedom in determining how to meet the recommendation's goals. Granularity will be different for recommendations dealing with atmospheric inputs vs. land-based inputs. The Panel agreed on a template for 4-5 'global' recommendations (strategy statements) per workgroup, each supported by 3-4 more detailed action examples (e.g., specific actions that will help accomplish the strategy).

*Related presentation slides:*

[http://www.ecy.wa.gov/water/marine/oa/20120620\\_localsourcereduction.pdf](http://www.ecy.wa.gov/water/marine/oa/20120620_localsourcereduction.pdf)

## **Initial Recommendations for Managing and Adapting to the Impacts of OA**

*Lara Whitely Binder, UW Climate Impacts Group*

This presentation reviewed 13 Panel member recommendations aimed at remediating low pH conditions in situ, and increasing the capacity to adapt to ocean acidification. Panel members were asked to consider strategies that deliver more than one benefit ('two-fers'), such as co-cultivation of eelgrass and shellfish.

Recommendations that involved cultivation of algae and seagrasses stimulated the most interest. Panel members discussed the merits and feasibility of co-cultivation of shellfish and eelgrass, harvest vs. leaving biomass in place, and potential uses for cultivated biomass. The remediation potential of such strategies is untested; conservation of existing eelgrass beds may be more feasible and less expensive than cultivation of new beds.

The Panel debated whether adaptive strategies should be prioritized over local source reduction. Adaptive measures, such as monitoring systems to provide hatcheries with early warning of corrosive conditions, and modifying water chemistry in hatcheries, would protect the shellfish industry more immediately than longer-term mitigation strategies based on source control. Wild shellfish populations, and the people who depend on them, would not be helped by such measures however. Source control would be most effective in small embayments, and to the extent that science supports reducing nutrients in such areas, it should be attempted. Panel scientists will look to identify locations for pilot studies (e.g., Dabob Bay was raised as an example where state agencies, landowners and the Taylor hatchery are already collaborating to manage water quality). Several Panel members pointed out that the shellfish industry has contributed resources and expertise to understanding and mitigating acidification in the Northwest, and that this collaboration will continue.

*Related presentation slides:*

[http://www.ecy.wa.gov/water/marine/oa/20120620\\_adaptation.pdf](http://www.ecy.wa.gov/water/marine/oa/20120620_adaptation.pdf)

## **Cross-cutting Initial Recommendations**

*Lara Whitely Binder, UW Climate Impacts Group*

This presentation was omitted due to time constraints. Cross-cutting recommendations are those that related to more than one topic area. The two cross-cutting themes addressed in the presentation prepared for this session were public education and outreach (5 recommendations) and post-Panel needs for maintaining a focus on ocean acidification (1 recommendation; this was not a topic for which recommendations were actively solicited via the online tool). Both of these topics will be the focus of Panel workgroups.

*Related presentation slides:*

[http://www.ecy.wa.gov/water/marine/oa/20120620\\_recommendations.pdf](http://www.ecy.wa.gov/water/marine/oa/20120620_recommendations.pdf)

## **Panel Process: Updates and Next Steps**

*Lara Whitely Binder, UW Climate Impacts Group*

Lara introduced the workgroups plan: between the June and July Panel meetings, workgroups will meet 2-3 times to draft condensed sets of recommendations (4-5 ‘global’ recommendations, each supported by 2-4 action examples) under the following action categories:

- Research and monitoring (Lead: Panel Scientists)
- Source reduction (focus: nutrient and atmospheric sources; Lead: Ted Sturdevant)
- Adaptation and remediation (Lead: Bill Dewey and Brad Warren)
- Outreach and education (Lead: Betsy Peabody)
- Post-Panel institutional framework needs. (Lead: Bill Ruckelshaus)

Workgroups will present their recommendations at the July 20 meeting. Lara invited Panel members to join these workgroups, and to recommend outside experts for possible inclusion.

## **Public Comment**

Jim Murray, Professor at the University of Washington’s School of Oceanography, announced that the UW has a proposal pending with the National Science Foundation to establish a Science and Technology Center for ocean acidification research and education at Friday Harbor Labs on San Juan Island. Jim is expected to hear soon if this proposal is ranked in the top ten. Ultimately, the top six proposals will be funded in June 2013. This will be very significant work if funded, and can build upon the recommendations of the Panel. *(Post-meeting note: Jim Murray was informed on June 30 that UW’s proposal did not make the top 10 cut and is therefore no longer being considered by the NSF for this call.)*

## **Document Appendix**

May 23, 2012 Blue Ribbon Panel on Ocean Acidification Meeting Agenda:

[http://www.ecy.wa.gov/water/marine/oa/20120620\\_agenda.pdf](http://www.ecy.wa.gov/water/marine/oa/20120620_agenda.pdf)