

# SANCTUARY ADVISORY COUNCIL



**Lee Whitford, Chair**  
**Heather Reed, Vice-Chair**  
**George Hart, Secretary**

March 26, 2015

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*U.S. Coast Guard*  
*U.S. Fish and Wildlife Service*  
*U.S. Geological Survey*  
*U.S. Navy*

*Artwork: David Sones*

Dear Superintendent Bernthal:

At the November 7, 2014 OCNMS Advisory Council (AC) meeting council members requested reconvening the Oceanographic Monitoring Working Group to follow up on previous efforts and recommendations made, including a resolution letter in March 2013 highlighting science needs provided by OCNMS oceanographic moorings, input on mooring program design, future needs. OCNMS Advisory Council followed up in January 2014 voicing strong support for maintaining a strong and viable OCNMS oceanographic monitoring program.

An Oceanographic Monitoring Group (OMG) was formed in January 2015 and met with the purpose of assessing the most effective and efficient sanctuary oceanographic moorings deployment under four budget scenarios. They provided their report and recommendations to the full Advisory Council at the March 20 Advisory Council meeting, recommending the following:

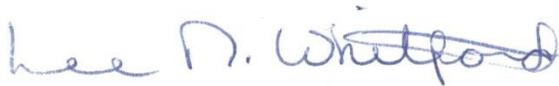
- Priority locations for mooring deployment should maintain the longest time series and retain deeper moorings on all transects. If more than five moorings can be supported, the priority is to deploy southern moorings at 15m depth and then add moorings at this depth to the north.
- Key monitoring parameters identified include temperature, salinity, and dissolved oxygen – the triplet of parameters used in aragonite saturation models.
- If OCNMS receives increased funding, it was recommended to prioritize obtaining newer, better sensors, to enable real time data delivery with priority at the southern sites and to support staff time to ensure the data is analyzed and shared faster, and published.
- OCNMS should maintain the current mooring design to ensure consistency with the long term dataset and that the Acoustic Doppler Current Profiler should be placed near the Cape Elizabeth 42m mooring.

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Olympic Coast National Marine Sanctuary Advisory Council, by consensus, agreed to approve and adopt OMG's recommendations.

As the OCNMS AC, we represent a diverse group of constituencies that have a strong interest in sanctuary and marine resource management in the Olympic Coast region. Our role is to advise the OCNMS Superintendent on sanctuary management topics and concerns. We volunteer our time to assist OCNMS in maintaining a transparent, interdisciplinary, and comprehensive management structure for the sanctuary. The opinions and findings of this letter do not necessarily reflect the position of Olympic Coast National Marine Sanctuary and National Oceanic and Atmospheric Administration.

Sincerely,

A handwritten signature in blue ink that reads "Lee N. Whitford". The signature is written in a cursive style with a small mark above the 'i' in "Whitford".

Lee Whitford  
Chair, Olympic Coast National Marine Sanctuary Advisory Council

Olympic Coast National Marine Sanctuary's Advisory Council  
Oceanographic Monitoring Group  
Final Report  
March 20, 2015

**Working Group Members**

Jan Newton – AC Research  
Joe Schumacker – AC Quinault Nation, Natural Resources  
Jennifer Hagen – AC Quileute Tribe, Natural Resources  
Lee Whitford – AC Education and Chair  
John Mickett – University of Washington  
Simone Alin – NOAA, PMEL  
Christopher Krembs – AC WDOE alternate  
Steve Fradkin – Olympic National Park  
Joe Gilbertson – Hoh Tribe  
Kevin Grant – (Staff Lead) OCNMS Deputy Superintendent  
Liam Antrim – OCNMS Acting Research Coordinator  
Kathy Hough – OCNMS Survey Technician  
Justin Ellis – OCNMS Marine Operations Coordinator  
Karlyn Langjahr – OCNMS AC Coordinator

**Purpose**

The purpose of the Oceanographic Monitoring Group (OMG), as identified in the group's Charter, is to assess the most effective and efficient deployment of the sanctuary oceanographic moorings under various scenarios. The four scenarios assessed were based on potential sanctuary budgets and represent the sanctuary annually deploying a) minimal, b) medium, c) current, or d) expanded mooring arrays. Key questions addressed included:

- Key parameters to be monitored? Ideally, what instrumentation should be used? Where in the water column should instruments be deployed?;
- Geographic location of moorings under each of the four scenarios (e.g., if the sanctuary only has enough funding to deploy four moorings – where should they be deployed?)

The purposes and questions were fused into a Mission Statement from the OMG's Charter: *The Oceanographic Moorings Group will identify recommendations to maximize the efficiency of the sanctuary mooring array and to identify the most useful and relevant data to be collected by the moorings.*

**Background**

OCNMS Advisory Council members requested reconvening the Oceanographic Monitoring Working Group at the November 7, 2014 AC meeting as a follow up from their previous efforts, including:

- AC resolution letter in January 2014 reinforcing strong support to keep OCNMS oceanographic mooring program viable
- AC resolution letter in March 2013 highlighting science needs provided by OCNMS oceanographic moorings, input on mooring program design, future needs, and recommendations

## Meetings

OMG meetings were held as conference calls, conducted on February 20 and March 12, 2015. The OMG consisted of several members of previous Oceanographic Mooring Working Group as well as additional experts in the field. OCNMS staff provided context for discussions and distributed preliminary draft documents to facilitate discussion. The group achieved consensus on these recommendations.

## Recommendations and Actions

1. Priority Locations: Overall, participants agreed that oceanographic mooring deployments that would maintain the longest time series was of vital importance, with the following priority locations for continued mooring deployment:
  - Keep deeper moorings on all transects (five moorings @ ~42m depth) because they provide more height/depth of the water column and are more likely to capture the onset of hypoxic conditions as oxygen-depleted waters near the seafloor approach the coast
  - If more than five moorings can be supported, the priority is to deploy southern moorings at 15m depth and then add moorings at this depth to the north to improve spatial and temporal tracking of hypoxic events, which typically are initiated at the southern locations.
2. Key Parameters: The key monitoring parameters identified were temperature/salinity/dissolved oxygen - the triplet of parameters used in aragonite saturation models. Participants also noted the importance of current meters and fluorometer instrumentation, which provide information on the movement of water masses and inference between primary productivity, carbon and hypoxia.
3. Priorities for Increased Funding: As funding allows, suggestions for program development were:
  - Obtain newer, better sensors (i.e., ocean acidification sensors, which are currently under development, and Seabird SBE temperature loggers, which provide higher resolution data and longer deployment capacity than TidBits currently used)
  - Enable real time data delivery, with a priority at the southern sites
  - Support staff time to ensure the data is analyzed and shared faster, and published
4. Mooring Design: There was much discussion regarding the pros and cons of either leaving the mooring set up as is, or changing them slightly so that the top 15m of both the 15m and 42m moorings were set up identically. It was agreed to maintain the current mooring set up to ensure consistency with the long term dataset.
5. Acoustic Doppler Current Profiler (ADCP): It was agreed that the OCNMS ADCP should be placed near the Cape Elizabeth 42m mooring. Reasons supporting this decision include:
  - Continuity of data – this is where the ADCP was placed last year. Keeping the same location is important due to the unusual temperature/currents experienced in 2014;
  - Having the ADCP located with other instruments provides a richer dataset and offers efficiencies when servicing an instrument placed near other OCNMS moorings;

- As you near Cape Flattery the ADCP data may become less desirable due to the unusual currents/environment (maybe too variable to get useable data).
- OCNMS is still looking for a trawl-resistant bottom mount for the ADCP (last year a prototype was used – no longer available).

A question was posed to the group asking if anyone had additional instrumentation that they would consider placing on the OCNMS moorings. John Mickett (UW) suggested that he'd like to place a pressure sensor on one of the 42m moorings. Preliminary data analysis of the tilt data on OCNMS current meters (CE, TH and MB 42m) shows the moorings are being pushed around (down). The tilt on the current meters maxed out at 45 degrees last year. Adding a pressure sensor will allow for a more complete evaluation of mooring data by incorporating possible 'blow downs' into data analysis and modelling. Eric Boget of UW's Applied Physics Lab (APL) has a great deal of experience in mooring design and is conducting some modelling of the OCNMS arrays. His models can incorporate a new pressure sensor and/or correct for the tilt associated with blow downs.

Finally, the OMG discussed opportunities for collaboration. These opportunities usually arise on a project-by-project basis. OCNMS staff are already working closely with PMEL/APL on data analysis/QC/etc. Overall collaborations have been improving and are expected to continue to strengthen. In addition, OCNMS is hoping to collaborate on shore-side ORHAB monitoring, possibly with Quinault who are looking at surf diatoms.