

**OCEAN RESEARCH AND RESOURCES ADVISORY PANEL  
OCEAN ACIDIFICATION TASK FORCE**

*Actions and Summary from the Meeting  
6-7 December 2010*

**ACTIONS:**

<b>Description</b>	<b>Who / By When</b>
<b>Update OATF Recommendations Report:</b>	<b>Send updates to <a href="mailto:hgoodwin@oceanleadership.org">hgoodwin@oceanleadership.org</a> and cc <a href="mailto:costa@ucsc.edu">costa@ucsc.edu</a> by January 5th</b>
Foundations	<b>S. Huseby</b>
Federal, Regional, State and Local Interactions	<b>M. Caldwell</b>
Industry (include oyster hatchery case study)	<b>A. Barton / P. Betzer</b>
Science Needs / Preamble on NRC OA Report	<b>S. Doney / J. Kleypas</b>
Communications	<b>A. Stamper</b>
Socio-economic Recommendations	<b>A. Stamper / S. Doney</b>
International Collaboration	<b>P. Betzer / S. Huseby</b>
Data Management / Ocean Observations	<b>M. McCammon</b>
Case Study on Multi-Stakeholder Workshop	<b>D. Costa / S. Weisberg</b>
Summary on models for National Program Office	<b>D. Costa, ASAP</b>
Summary on Centers of Excellence for S. Huseby	<b>B. Cowen, ASAP</b>
Summary on December 15 <sup>th</sup> Foundation Meeting	<b>S. Huseby, December 20<sup>th</sup> to <a href="mailto:hgoodwin@oceanleadership.org">hgoodwin@oceanleadership.org</a></b>
Provide list of contacts at NOAA Fishery Science Centers conducting research on OA	<b>M. Rubino, January 2011</b>
Send OATF Recommendations Report and A. Barton's presentation to Ocean Observations Sub-Panel	<b>H. Goodwin, Completed</b>
Circulate updated OATF Recommendations Report to OATF members for review before telecon	<b>H. Goodwin / D. Costa, January 14<sup>th</sup></b>
<b>Telecon to discuss updated OATF Recommendations Report</b>	<b>ALL, January 26<sup>th</sup></b>
Review IWGOA Strategic Plan	<b>ALL, ~March 2011</b>

**SUMMARY:****I. Joint Session with IWGOA**

D. Costa announced that the Ocean Acidification Task Force (OATF) will provide an updated Recommendations Report to the IWGOA by February 2011. N. Cyr mentioned that the Interagency Working Group on Ocean Acidification (IWGOA) incorporated parts of the OATF Recommendations Report into the draft Strategic Plan. The Strategic Plan is due to Congress in April 2011 and will be reviewed the National Research Council (NRC). The IWGOA invited the OATF to review the Strategic Plan as well. D. Costa noted that the OATF Recommendations Report was developed before the NRC report on ocean acidification was released and that the OATF Report focuses more on logistics and

interactions on ocean acidification. N. Cyr highlighted that the Strategic Plan is separate from the Implementation Plan, which will be created after the Strategic Plan is approved.

N. Cyr announced that the IWGOA agrees that a National Ocean Acidification Program Office should be established outside of any one agency, in order to coordinate agency activities and avoid duplication. The IWGOA welcomes input from the OATF on organization models for the national office. The OATF highlighted the Global Ocean Ecosystem Dynamics project and the Consortium for Ocean Leadership as examples and will provide more detailed input by January 2011. The European Project on Ocean Acidification (EPOCA) was discussed as another potential model, with a focus on a unified outreach message, a scientific steering committee to provide advice, and annual open science meetings to provide information exchange. B. Cowen noted that both the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) and the Communication Partnership for Science and the Sea (COMPASS) are good models to follow for outreach programs and bridging science to policy and science to education.

The IWGOA and OATF discussed the possibility of the OATF continuing in advisory capacity and the OATF decided to ask the Ocean Research and Resources Advisory Panel (ORRAP) for an extension of their charter in order to review the Strategic Plan, update the OATF Recommendations Report, continue to facilitate interaction on ocean acidification in the foundation and industry community.

## **II. Ocean Acidification Briefings**

P. Betzer provided an overview of the Surface Ocean Lower Atmosphere Study (SOLAS) Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) Working Group Meeting on Ocean Acidification, which he attended 29-30 November 2010 in Washington, DC. Representatives from over seven countries attended and discussed the substantial international efforts on ocean acidification. P. Betzer mentioned the Meso Aqua facilities in Europe are conducting ocean acidification experiments and the facility is open to international scientists.

A. Barton, Whiskey Creek Hatchery Consultant, presented on *Farming Shellfish in a Changing Ocean: Understanding the Effects of Acidified Seawater on the Pacific Northwest Shellfish Industry*. A. Barton noted that 25 percent of oysters in the U.S. come from Willapa Bay, WA but the oyster hatcheries cannot rely on natural recruitment for seed anymore due to the acidified waters. The Whiskey Creek Shellfish Hatchery produces 75-80 percent of all oyster larvae sold to independent growers in the Pacific NW and the hatchery experienced losses in 2007-2008 that reduced production to 25 percent of normal levels. NOAA administered emergency funds (\$500K) to the Pacific Coast Shellfish Growers Association for equipment and monitoring of water quality at oyster hatcheries in OR and WA through October 2011. Studies show that south winds produce downwelling which results in fast growth and good survival of oyster larvae, but north winds produce upwelling which results in poor growth and mass mortality of oyster larvae; young larvae are particularly susceptible to the acidified waters Whiskey Creek has tried managing around the problem by filling the tanks in the afternoon when the pH is higher, and by buffering seawater. A. Barton noted that a monitoring station is needed outside Willapa Bay in order to have an oceanic signal of pCO<sub>2</sub> changes.

M. Rubino, Manager of the NOAA Aquaculture Program, presented on *Addressing Ocean Acidification through Research and Policy at the NOAA Aquaculture Program*. M. Rubino gave a review of aquaculture programs in different regions of the U.S. and noted that the U.S. imports 84 percent of its seafood and U.S. freshwater and marine aquaculture combined provide about five percent of the seafood consumed in the U.S. The NOAA Aquaculture Program priorities include strengthening NOAA's science knowledge and capabilities, emphasizing an efficient regulatory process, instigating technology innovation, focusing on shellfish farming and restoration, and collaborating internationally on inspections and science. Both the Northwest and Northeast NOAA Fisheries Science Centers are conducting research on acidified conditions on shellfish. M. Rubino will provide a list of contacts at these centers who are conducting ocean acidification research.

S. Huseby, board member of the Educational Foundation of America, gave an update on the foundation meetings on ocean acidification. The foundations were introduced to the subject of ocean acidification at the Consultative Group for Biological Diversity in March 2010. A steering committee was formed to explore the subject further at a three-day meeting with foundation representatives and NGO representatives was held at the Moore Foundation in Palo Alto in October 2010. The meeting focused on the science of ocean acidification, outreach on the topic, and the role of foundations. The representatives agreed to meet in London, UK in November 2010 to bring together scientists, NGOs and policy representatives in the UK. The foundations agreed to pursue the ocean acidification sector further at a meeting in NYC on 15 December 2010. S. Huseby requested input from the OATF on recommended mechanisms for collaboration and investment in ocean acidification research. S. Huseby also noted that the foundations are interested in hiring a coordinator on ocean acidification efforts.

### **III. Joint Session with Ocean Observations Sub-Panel**

The ORRAP Ocean Observations Sub-Panel met with the OATF to discuss sensor development and the need for ocean observations. D. Costa mentioned that the OATF Recommendations Report estimated \$40M is needed to develop and deploy dependable new sensing systems for physical, chemical and biological variables; the National Oceanographic Partnership Program was recommended as a possible vehicle to support additional sensor research. P. Betzer highlighted the need for in-situ and real time sensors. R. Byrne expressed concern regarding the research community's lack of access to instruments to measure total carbon outside of the laboratory. B. Cowen pointed out the need for additional sensors close to shore due to the level of changes in the coastal zone; similarly, F. Chan mentioned that the NOAA Integrated Ocean Observing System (IOOS) program is largely an outer continental shelf monitoring program, yet many impacts of climate change are coastal.

S. Weisberg provided an overview of the West Coast Ocean Acidification Shellfish Workshop which was held 7-8 July 2010 in Costa Mesa, CA with 51 invited participants, including biologists, oceanographers, state and federal agency managers, industry members, and representatives from Sea Grant. S. Weisberg reported three main take away messages from this multi-stakeholder workshop: 1) opportunity to use this information for decision making 2) need for technology transition between different

sectors 3) an impediment to the research is the sectors work on different spatial and temporal scales.

M. McCammon highlighted the need for strategically considering sensors added to monitoring networks. D. Costa mentioned that IOOS should have pH and pCO<sub>2</sub> sensors but the community lacks instrumentation that can sustain long term weathering. M. Luther noted that the Alliance for Coastal Technologies (ACT) evaluated pCO<sub>2</sub> sensors in the Puget Sound, WA and in Hawaii. A report of this testing is available on their website ([http://www.act-us.info/evaluation\\_reports.php](http://www.act-us.info/evaluation_reports.php)) and ACT is currently conducting further pCO<sub>2</sub> tests in Alaska.

#### **IV. OATF Discussion**

The OATF discussed various models for the National Program Office on Ocean Acidification and it was noted a cooperative agreement would allow for increased collaboration between agencies and non-agencies, in addition to making the transfer of funds easier.

D. Hutchins emphasized that waiting another year for a detailed implementation plan on ocean acidification research was a concern. J. Kleypas noted the IWGOA was supposed to develop the implementation plan but they are now stating the plan will be developed by the National Program Office on Ocean Acidification. D. Hutchins also expressed concern that the funding for the Federal Ocean Acidification Research and Monitoring (FOARAM) Act has not yet been appropriated.

Regarding input to the foundation meeting in December, B. Cowen suggested several Centers of Excellence (COE) be created in different regions in the US to jumpstart ocean acidification research and awareness in the U.S., similar to the Gordon and Betty Moore Foundation initiative in marine microbiology. A. Stamper suggested that one of the centers focus on outreach and education in order to develop a unified message. B. Cowen also mentioned the four components of PISCO could be a model for the COEs: science, data monitoring/collection, education and science to policy aspects. D. Costa suggested that the foundations could facilitate international collaborations by supporting travel funds for collaboration. S. Huseby will provide a summary of the 15 December 2010 foundation meeting to the OATF by 20 December 2010.

**OATF Meeting Participants:**

<b>Daniel Costa</b>	University of California-Santa Cruz
<b>Peter Betzer</b>	St. Petersburg Downtown Partnership
<b>Robert Cowen</b>	University of Miami
<b>Robert Byrne</b>	University of South Florida
<b>Meg Caldwell</b> – <i>Via phone</i>	Stanford University
<b>Francis Chan</b>	Oregon State University
<b>Scott Doney</b>	Woods Hole Oceanographic Institution
<b>Sven Huseby</b> – <i>Via phone</i>	Nijji Films
<b>David Hutchins</b>	University of Southern California
<b>Joan Kleypas</b> – <i>Via phone</i>	National Center for Atmospheric Research
<b>Andy Stamper</b>	Walt Disney Animal Programs

**Other Meeting Participants:**

<b>Alan Barton</b>	Pacific Coast Shellfish Growers Association
<b>Michael Rubino</b>	National Oceanographic and Atmospheric Administration
<b>Ned Cyr</b>	National Oceanographic and Atmospheric Administration
<b>Libby Jewett</b>	National Oceanographic and Atmospheric Administration
<b>Kenric Osgood</b>	National Oceanographic and Atmospheric Administration
<b>Erin Seney</b>	National Oceanographic and Atmospheric Administration
<b>Lisa Robbins</b> – <i>Via phone</i>	US Geological Survey
<b>Phil Taylor</b> – <i>Via phone</i>	National Science Foundation
<b>Molly McCammon</b>	Alaska Ocean Observing System
<b>Charlie Alexander</b> – <i>Via phone</i>	National Oceanographic and Atmospheric Administration
<b>Owen Howard</b> – <i>Via phone</i>	
<b>Steve Weisberg</b> – <i>Via phone</i>	Southern California Coastal Water Research Project Authority
<b>Mark Luther</b> – <i>Via phone</i>	University of South Florida
<b>Mel Briscoe</b>	Consortium for Ocean Leadership
<b>Hilary Goodwin</b>	Consortium for Ocean Leadership
<b>Leigh Zimmermann</b>	Consortium for Ocean Leadership