



June 27, 2016

The Honorable John Laird, Chair  
California Ocean Protection Council  
California Resources Agency  
1416 Ninth Street, Suite 1311  
Sacramento, CA 95814

**Re: Ocean acidification and hypoxia**

**Attachment: April 18 SAT workshop summary**

Dear Chairman Laird and Members of the Ocean Protection Council,

On April 18, the Ocean Protection Council Science Advisory Team (SAT), convened by Ocean Science Trust, came together with Ocean Protection Council (OPC) staff, agency leaders, and additional experts to discuss how to prepare for climate and global change. As farmers and fishermen have known for centuries, climate fluctuations are both important and normal. But humans are also affecting climate by increasing atmospheric carbon dioxide (CO<sub>2</sub>), and the biological consequences for the ocean are not at present predictable and could be potentially catastrophic. Additional threats to the marine environment come from exploitation and pollution. Human-derived atmospheric CO<sub>2</sub> also acts as a pollutant, getting absorbed by the ocean at an alarming rate leading to so-called ocean acidification. Scientists have also reported steady decreases of oxygen at depth in coastal California waters and have linked these to increased degradation of organic matter. Degradation of organic matter leads to further increases in CO<sub>2</sub> compounding the acidification problem. Reducing oxygen to low (hypoxic) levels creates a separate and additive threat to West Coast marine ecosystems.

A major focus of the April 18 SAT workshop was on the **“Major Findings, Recommendations, and Actions”** of the West Coast Ocean Acidification and Hypoxia Science Panel (the OAH Panel), and on identifying and prioritizing potential next steps. Three years ago when the OPC called upon Ocean Science Trust to convene experts to discuss the state of the science of ocean acidification and hypoxia (OAH), and potential action items – Ocean Science Trust started with the SAT. They called upon us to provide guidance in establishing what then became the OAH Panel, and to scope its work (*SAT workshop, November 19, 2012*). SAT member, Dr. Alexandria Boehm (Stanford University) served as co-chair of the Panel, and SAT members Drs. Stephen Weisberg (Southern California Coastal Water Research Project) and Gretchen Hofmann (University of California, Santa Barbara) were among the 20 panelists from across the West Coast brought together to carry out this effort.



The main message of the OAH Panel is that we must indeed prepare for change on multiple fronts. OAH are examples of on-going and widespread changing ocean conditions that are expected to grow in intensity, particularly along the West Coast, where regional circulation patterns and processes dramatically heighten potential effects. While our understanding of changing ocean conditions is accelerating at a rapid rate, how these changes might impact the species, ecosystems, and coastal communities is still the subject of ongoing research. Decision-makers must have access to a mobilized and interdisciplinary scientific community to synthesize new knowledge as it emerges, and translate it into strategic, coordinated, management and policy actions at the local, state, and regional levels.

Working with Ocean Science Trust, the SAT is well positioned to continue to move the OAH Panel's work forward and to provide the scientific leadership needed to guide the State as it prepares to deal with OAH and other concerns associated with changing ocean conditions. The interdisciplinary nature of the SAT brings the diversity of perspectives and creative thinking necessary to confront this challenge at short and longer scales. The term "horizon-scanning" – looking further into the future – emerged from the workshop as an activity agency leaders agreed was well suited to the SAT. Further, changing ocean conditions is an all hands on deck challenge with myriad scientific questions. As your conduit to the broader scientific community, the SAT (with support from Ocean Science Trust) is prepared to link decision-makers to our colleagues across many fields of expertise to ensure your access to the best available science. And, we are relying upon the OPC and the Ocean Science Trust to continue to expand the range of agencies and state entities that can benefit from the scientific work of the SAT.

The OAH Panel report indicates that there are actions we can take now, and we urge bold follow up on the OAH Panel's recommendations. The SAT is in the process of creating working groups to address the highest priority recommendations identified at our recent workshop (brief workshop summary also attached to this letter), including:

- exploring potential roles and importance of aquatic vegetative habitats in ameliorating ocean acidification and storing carbon, among other ecological benefits;
- incorporating OAH considerations into marine protected area monitoring statewide to track changing ocean conditions and associated impacts; and
- addressing science needs to revise water quality criteria to incorporate OAH.

In addition to the OAH Panel and its work, the SAT is also engaged on several other management fronts involving issues driven by changing ocean conditions. Currently underway are two active SAT working groups examining:

- how to incorporate climate variability and change into fisheries management; and
- science needs related to managing in the face of harmful algal blooms.

In conclusion, the SAT lauds the OAH Panel for making tangible – and actionable – recommendations to confront OAH up and down the West Coast. We commend the Ocean Protection Council and its staff for your commitment to the OAH Panel, the SAT, and to advancing the role of the best available and independent science in decision-making. We also commend Ocean Science Trust in convening and positioning the OAH Panel to inform high-level decision-makers at the state, regional, and federal levels.

As the current leadership team for the SAT, we look forward to continuing our interaction and to responding to your science needs, as we work together to address the impacts of changing ocean conditions and other marine issues of environmental concern. We also pledge to continue to use the

SAT's scientific expertise in collaboration with Ocean Science Trust to proactively identify and raise emerging issues. Our goal is to provide the science needed to best position the State as it moves forward in addressing current and future impacts of changing ocean conditions and other threats to California's marine species, ecosystems and coastal communities.

Best Regards,



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