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# Ocean Acidification

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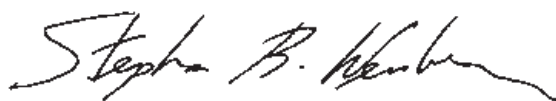
Four years ago, SCCWRP hosted a workshop that brought together shellfish industry representatives and ocean acidification (OA) scientists to address concerns that acidification might be responsible for West Coast shellfish hatchery failures. After three days, 50 participants left SCCWRP feeling confident in the validity of those concerns and motivated to refocus acidification science from deep-ocean water to near-coastal areas. Since that workshop, the partnership has flourished: scientists now regularly visit (or work for) shellfish hatcheries and hatcheries have become the best-instrumented coastal locations for measuring acidification on the West Coast.

That workshop and others that followed, several of which were held at SCCWRP, led me to the conclusion that OA poses a greater threat to ocean health than anything else SCCWRP studies. The potential impact of stressors that SCCWRP typically studies has limited geographical boundaries and achievable pathways for recovery. For example, the Santa Barbara oil spill that sparked passage of the 1969 Porter-Cologne Water Quality Control Act affected a limited regional zone and dissipated within a few years. Even the long-term toxic effects of DDT discharges on the Palos Verdes shelf have ameliorated over time, with recent observations of increased reproduction by bird populations previously affected by eggshell thinning.

These formative pollution issues that grabbed so much of our attention over the past several decades recovered because they were associated with inherently local inputs. Even after disastrous local effects, a large reproductive pool of organisms living outside the immediate impact area provided recolonization potential. In contrast, OA stems from global atmospheric inputs of CO<sub>2</sub> absorbed into the ocean, with origins primarily beyond the reach of local managers. Perhaps more importantly, OA manifests over much larger oceanographic systems, such as the California Current, with the potential to impact the entire geographic range of many species. Thus, as acidification progresses, some of its effects may be irreversible.

This concern about acidification is changing the research we do at SCCWRP, with activities focused in three areas: assessing the potential for local nutrient inputs to exacerbate acidification, testing new technology to measure and rapidly respond to acidification, and facilitating communication and consensus among acidification scientists. Local nutrient inputs can exacerbate acidification by causing large diurnal swings in productivity, wherein higher CO<sub>2</sub> production at night leads to greater acidity. SCCWRP's research is addressing whether these locally-modulated effects are meaningful, and whether mitigating local nutrient sources is likely to forestall a bigger problem. SCCWRP's technology development is exemplified by our partnership with the X-PRIZE Foundation to promote development of new, more sensitive pH sensors. The Wendy Schmidt Ocean Health X-PRIZE offers \$1.5M for sensors capable of profiling pH in the ocean. SCCWRP and its member agencies will help to set performance criteria and test the new technologies developed by X-PRIZE contenders. Because managers need clear, unambiguous language on what scientists agree upon to be confident about moving forward, building consensus is a stalwart of SCCWRP science. In order to help build that consensus among acidification experts, SCCWRP is now leading the California Current Acidification Network (<http://can.msi.ucsb.edu>).

When friends and colleagues ask about current ocean issues, I tell them acidification is the definitive issue for our generation. I believe our success or failure in addressing this issue will define how future generations will view our stewardship of the ocean. As with many other water issues of the past, SCCWRP is committed to providing a scientific foundation that informs potential management actions to address it.



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