

## COASTAL HYPOXIA WORKING GROUP

The working group on Consequences of Coastal Hypoxia in the California Current Large Marine Ecosystem, led by Stanford biology professor and Hopkins Marine Station researcher Fio Micheli and Center science director Larry Crowder, advanced the understanding of coastal hypoxia by examining fundamental questions regarding the causes and impacts of increasingly frequent hypoxic events. Working group members led the analysis of this unique dataset and published the key finding that oxygen levels have rapidly declined in the Southern California Bight over the past 15 years, and at an unprecedented rate over the last 50 years. The working group also convened a session on “Drivers and Ecological Effects of Hypoxia in Coastal Upwelling Systems” at the Coastal and Estuarine Research Federation meeting in November of 2013, where members and other experts shared their research results. In the session, the emerging results on the natural and anthropogenic drivers of coastal hypoxia, the effects on nearshore ecosystems and fisheries, and the implications for managing coastal systems were presented. The work was reported in the journal *Limnology and Oceanography* in a review authored by the working group members: A.T. Booth, C.B. Woodson, M. Sutula, F. Micheli, S.B. Weisberg, S.J. Bograd, A. Steele, J. Schoen, and L.B. Crowder.

As a follow-up to this foundational research, the Center co-sponsored a workshop with the Southern California Coastal Water Research Project Authority and the California Ocean Science Trust in December 2013. Titled “Modeling in Support of Management of Coastal Hypoxia and Acidification in the California Current Ecosystem,” the workshop was convened to determine the likely effectiveness of regional management actions on reducing the rate—or mitigating the effects of—coastal hypoxia and acidification. Participants represented the range of key stakeholders, including state and federal water quality regulators, industry representatives and leading academic researchers. In this two-day meeting they concluded that addressing management needs requires developing coupled biogeochemical and physical circulation models that presently do not exist for coastal systems.

In addition, the working group was the catalyst for a recently funded three-year grant from the National Science Foundation Ocean Acidification program, authored by members Giulio De Leo of Hopkins Marine Station, affiliated researcher Steven Litvin, affiliated researcher Stephen Monismith, former early career science fellow and affiliated researcher Brock Woodson from the University of Georgia and affiliated researcher James Barry from MBARI. The grant will allow the team to study the interactive effects of hypoxia and acidification on abalone populations and fisheries in the California Current Ecosystem.

The efforts of the Coastal Hypoxia working group are improving our understanding of the causes and consequences of coastal hypoxia (and acidification) in upwelling systems like the California Current.