Title: Improving an Ocean Acidification Observing System in Support of Pacific Coast Shell Fish Growers

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Abstract:

Each of the IOOS Regional Associations along the Pacific coast, the Northwest Association of Networked Ocean Observing Systems (NANOOS), the Alaska Ocean Observing System (AOOS), the Central and Northern California Ocean Observing System (CeNCOOS), and the Southern California Coastal Ocean Observing System (SCCOOS), has seen the impacts of ocean acidification (OA) on regional shellfish industries. Rising atmospheric CO2 and accompanying changes in ocean chemistry, including a declining calcium carbonate saturation state in the ocean, make it more difficult for calcifying organisms (e.g., oysters, clams, mussels) to produce or maintain their calcium carbonate shells. Due to the seasonal upwelling of acidic water along the West Coast, shellfish in this region are already living in water that is close to harmful saturation thresholds, making them particularly vulnerable to decreases in the calcium carbonate saturation state. In 2014, the four Regional Associations successfully proposed to strengthen the ocean acidification observing programs on the west coast with funding from the NOAA Ocean Acidification Program. This three year project, now in its second year, seeks to advance three main objectives. 1) operate and maintain five pCO2/DIC systems capable of monitoring saturation state and deployed at shellfish growing sites in each region (Tomales Bay, CA; Carlsbad, CA; Netarts Bay, OR; Puget Sound, WA; and Resurrection Bay, AK). 2) Develop lower cost and higher accuracy "weather grade" sensor technology that can measure pCO2, temperature (T) and salinity (S), and ultimately pH and dissolved O2 in a variety of deployment configurations (including small commercial fishing or tourist vessels, field moored locations, and autonomous free-drifting systems); these systems will provide a low-cost way to expand measurement capability to stakeholders operating in conditions where the research-grade equipment would be not be functional, while providing data of sufficient quality to resolve carbonate-chemistry at actionable levels. 3) Establish data handling and dissemination mechanisms that are user-friendly and developed in coordination with technical experts, shellfish growers, and other stakeholders; OA data will be provided through each of the regional associations' data portals and through a new IOOS Pacific Ocean Acidification data portal that has been developed specifically for this project (ipacoa.org). As we near the halfway point of the project, we see significant progress on all three objectives, including new sensor field testing results and the release of the publically accessible data explorer.