PROJECT SUMMARY

Title: MERHAB - RAPDALERT: Rapid Analysis of *Pseudo-nitzschia* & Domoic Acid, Locating Events in near-Real Time
Investigators: David A. Caron, Burton H. Jones, Gaurav S. Sukhatme, University of Southern California, Deborah Estrin, University of California, Los Angeles, Peter Miller, University of California Santa Cruz, Diane Stoecker, University of Maryland, Stephen Weisberg, Southern California Water Research Project
Project Period: 08/01/2005 – 07/31/2010
Total Project Costs: $2,858,159

The goal of this MERHAB effort is to implement a fine-scale HAB monitoring/sampling effort of unprecedented spatial and temporal coverage by incorporating (1) innovative *in situ* sensor networking technology, (2) state-of-the-art remote sensing and (3) cutting-edge species identification and domoic acid quantification methods. This 3-pronged, highly novel approach will establish a pilot project off the southern California coast in the Southern California Bight, where new technologies will be incorporated into an intensive monitoring program. This project will serve as a template for ultimately shifting much of the burden of HAB monitoring to an automated system that ensures early warning of impending blooms while minimizing unnecessary and expensive field-based sampling and lab-based testing. The resulting information should also advance our understanding and ability to predict HAB events in nature. Use of the *in situ* sensor and remote sensing data in conjunction with field sampling will enable tracking of the inception, proliferation, advection and decline of bloom events in real-time. In turn, this will provide managers with the necessary information to make informed decisions on when and where to direct their staff in the field to efficiently increase their efforts. The *in situ* sensor network (a network of 10 stationary nodes and an autonomous glider) will provide synoptic coverage of the study area, within-network data collection and communication, and ultimately sensor-actuated sampling and sample retrieval. Coupled with information from remote sensing, the network will also facilitate real-time data visualization, enabling a rapid response by agencies to emerging events. Integration of sensor information will provide unprecedented spatial and temporal resolution of pertinent chemical/physical/biological parameters in the coastal ocean study site on time and spatial scales sufficient to resolve algal bloom dynamics.

Transfer of emerging technologies for identifying *Pseudo-nitzschia* species and concentrations of domoic acid will significantly improve the efficiency and effectiveness of HAB programs charged with these analyses. The national impact of our program will be considerable due to strong collaborative ties to east coast labs and agencies. The latter effort will be a fundamental component of species isolation and culture, methodological development and application, and the characterization of toxin in east coast estuaries where toxin-producing *Pseudo-nitzschia* species occur but where toxic events have not yet been linked to domoic acid.

We will accomplish these tasks through the establishment of 'working partnerships' of scientists within the HAB research community and agencies charged with monitoring water quality to facilitate the transfer of cutting edge technology from academia into the hands of end-users directly involved with monitoring coastal ecosystems and responding to water quality issues. This transfer will be accomplished via direct exchange of personnel between academia and the agencies, and through annual workshops of classroom instruction and hands-on training.