

2013 Marine Science Fund Grantees Explore the Ocean



Suzanne Garcia

Over the summer two grantees of a newly established Marine Science Fund delved into research aimed at advancing the scientific knowledge of the unique marine environment in the Point Reyes National Seashore. Local researchers, Suzanne Garcia and Erin Satterthwaite were awarded grants in May, and these two young researchers (under the guidance of world renowned experts - advisors John Largier at Bodega Marine Lab and Karina Nielson at Sonoma State University) are tackling highly relevant and important problems in marine ecology.

Suzanne's project, *Oceanography of Harmful Algal Blooms*, is investigating harmful algal blooms (HABs), often referred to as "red tides". There is evidence that HABs are increasing around the world and specifically in the California current. HABs harm marine life directly via toxins (such as the recent Sonoma County event which impacted abalone populations and other intertidal life), and indirectly via low oxygen zones that are produced when the algae are decomposed by bacteria that use up all available oxygen. Such "dead zones" have been increasingly documented off the Oregon coast resulting in dead crabs and other marine life.

Physical oceanographic properties of coastal waters (e.g. salinity, temperature, nutrient concentration) can vary dramatically among relatively close geographic regions. As part of her Master's work, she is investigating the relationship between physical properties of source water and phytoplankton community structure. Specifically, her research hopes to answer the question: Will distinctive phytoplankton communities be supported when physically dissimilar bodies of water converge? Understanding the connections between phytoplankton growth and oceanographic conditions will help inform management practices and strengthen our predictive capacity for harmful algal blooms (HABs), which can severely impact local wildlife and fisheries.

Erin's project, *Swimming Behavior and Ocean Currents on the Linkage Between Larvae and Adult Phases of Marine Organisms*, looks at the critical question of what connects populations of marine organisms. To help preserve populations, design



Erin Satterthwaite

marine protected areas, and manage marine resources, we need to understand how populations of marine plants and animals disperse and connect with one another. Erin and her field assistant are using the Sacramento Landing Field Station as a home base when they are working in the park.

Many marine species depend on planktonic, free swimming babies (larvae) to replenish the adult populations. Since the planktonic phase of many marine animals is when they disperse to new habitats, the connection among different populations plays a central role in the management of marine plants and animals. Few studies have linked the planktonic (larvae) and benthic (adult) phases of marine organisms to provide an understanding of how separate populations of marine organisms are connected by dispersing individuals. These connections between populations are central to population survival, but little is known about how swimming behavior and ocean currents affect larvae traveling to new locations. Erin is using field, modeling, and genetic data to determine how dispersal operates and affects the population dynamics and dispersal of an intertidal crab, the Flat Porcelain Crab.

An important component of both of these students research is the fact that while it occurs in the nearshore environments of Point Reyes National Seashore, the results will inform how HABs and population connectivity occur on a far broader scale. We believe this is a critical part of all science and underscores the contribution of the Point Reyes National Seashore as a natural laboratory for science.

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