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Assessing Sanctuary Shorelines: A Role for High School Students in Resource Management

John Pearse

University of California, Santa Cruz

The goal of this project is to develop a set of protocols for monitoring marine organisms living in the rocky intertidal habitats of the Monterey Bay National Marine Sanctuary, an area that stretches from San Luis Obispo to San Francisco. What distinguishes this project, called the Seymour Intertidal Monitoring Program, from others is that it is being designed to be carried out by high school students—not just as a learning experience for their benefit but also as a real contribution to professional science.

Background and Application

The rugged Central California coastline has one of the world’s most productive and diverse intertidal zones. Within the region,



A student participating in the monitoring program logs her observations. Photo: UC Santa Cruz.



Emeritus biology professor John Pearse, center, helps students speciate and count intertidal organisms in the Santa Cruz area. Photo: UC Santa Cruz.

however, there is remarkable spatial and temporal variation in species diversity, distribution and abundance. Although regional patterns have been documented, little is known about local, site-specific, variations. This was pointedly illustrated after an oil spill in the Santa Barbara Channel in 1969. Although it was indisputable the spill had devastated marine biota in some locations, a more quantitative assessment of damage was impossible because of the absence of a detailed marine census.

This project, if successful and sustained over time, will provide a baseline for detecting change in the future. This will make it possible, for example, to evaluate the impacts of disaster, as well as the effects of physical oceanographic changes—rising sea levels and ocean warming—on intertidal life.

The Project

The project is the brainchild of emeritus biology professor Dr. John

Pearse of Long Marine Laboratory at University of California, Santa Cruz, who has for years led college students on trips to local tide pools and taught marine field courses. For this Sea Grant project, he adapted his college curriculum for high schoolers. Instead of memorizing the Latin names of legion marine organisms, students are taught to recognize the major and relatively easy-to-identify intertidal organisms –

anemones, starfish, limpets, abalone, mussels and some types of marine algae. In effect, they are learning the natural history of local intertidal life. “They learn the things that are there, practice sampling on another visit and then on the next visit, begin counting,” Pearse said.

In addition to counting animals, the students are taught how to plot species abundance as a function of grid location. From this, they see for themselves that intertidal marine animals tend to live in bands corresponding to the three zones of the intertidal: the high-zone, exposed to air most of the time; the mid-zone, rhythmically submerged and exposed by the daily tides; and the low zone, almost always submerged.

So far, Pearse and his team have worked with teachers and students from Aptos High School, Harbor High School, Watsonville High School, the Monterey Academy of Ocean Sciences, Santa Cruz Homeschool Association, Pacific

Collegiate School, Stewards of Save Our Shores, San Lorenzo High School, and Santa Catalina School for Girls.

Much of the survey work has been located at a model site at Natural Bridges, which has been periodically monitored by college students for 24 years. Pearse has also begun to develop monitoring protocols at Davenport Landing, Wilder Ranch State Park, Soquel Point and Almar Street in Santa Cruz, and Point Pinos in Monterey.

Applications

Besides the project's value as an educational tool for both teachers and students, the Monterey Bay National Marine Sanctuary has begun including its results in its overview of marine surveys in the region.

Pearse said, "My dream is that students will one day be able to plug in their data (into a computer) and compare it to what their parents got."

As a first step in making this happen, he is building an interactive, educational website (at www2.ucsc.edu/simp/index.html) that will store the students' tallies in a central database connected to the Seymour Marine Discovery Center website of the University of California, Santa Cruz.

Media Coverage

The Santa Cruz Sentinel ran a feature story on the project, titled "Students Get Their Feet Wet in Intertidal Monitoring Project," on November 19, 2000. Marilyn Reigler, host of radio station KUSP, interviewed Dr. Pearse and four participating students on *Prime Time at Noon* on April 12, 2001.

Cooperating Organization

Monterey Bay National Marine Sanctuary

Trainee

Osborn, Dawn, doctoral student in the Department of Ocean Sciences at the University of California, Santa Cruz. Osborn is studying the role of geology on intertidal ecology.

For more information:

Dr. John Pearse
Professor Emeritus of Biology
Long Marine Laboratory
University of California, Santa Cruz
Tel.: (831) 459-2455
Email: pearse@biology.ucsc.edu

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Russell A. Moll, Director • Dolores M. Wesson, Deputy Director • Paul Olin, Interim Associate Director for Extension
• Marsha Gear, Communications Coordinator

University of California, San Diego, 9500 Gilman Drive, La Jolla, CA 92093-0232
Phone: (858) 534-4440 Fax: (858) 453-2948 Web site: <http://www-csgc.ucsd.edu>