# Alolkoy

## *Sustainable Seas Expeditions (SSE)*

***The Publication of the Channel Islands Marine Sanctuary Foundation***

*Spring/Summer 1999*

*Volume 12 Number 1*

*Inside*

Alolkoy *is published quarterly through a cooperative agreement between the Channel Islands National Marine Sanctuary and the Channel Islands Marine Sanctuary Foundation, pursuant to the Channel Islands Marine Sanctuary Foundation Financial Award No. NA87OM0319. Opinions expressed in* Alolkoy *do not necessarily reflect the official position of the Sanctuary or the Foundation.*

*The Channel Islands National Marine Sanctuary is part of the National Marine Sanctuary Program, established under Title III of the Marine Protection, Research, and Sanctuaries Act, as amended. For more information, contact: Sanctuaries and Reserves Division, Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 1305 East-West Highway, SSMC4, 12th Floor, Silver Spring, MD 20910.*

*Direct correspondence, submissions, and address changes to Editor,* Alolkoy, *CINMS, 113 Harbor Way, Santa Barbara, CA 93109, 805/966-7107.*

*Editor: Cynthia Anderson*
*Production: Rebecca Ditmore*

*"Alolkoy" is a Chumash word meaning dolphin.*
*Printed with soy-based ink on recycled paper.*

CHANNEL ISLANDS MARINE SANCTUARY FOUNDATION

CHANNEL ISLANDS NATIONAL MARINE SANCTUARY

## From the Bridge

# Welcome to SSE

*By Ed Cassano, Sanctuary Manager*



***Sanctuary Manager Ed Cassano and daughter Tara at the first MBARI* DeepWorker *training session, Fall 1998.***

Awareness of the nation's National Marine Sanctuaries is about to take a quantum leap forward. Through the vision of Dr. Sylvia Earle, the Sustainable Seas Expeditions (SSE) begins a five-year exploration of National Marine Sanctuaries.

The SSE is a project of the National Geographic Society, funded by the Richard & Rhoda Goldman Fund in partnership with NOAA's National Marine Sanctuary program, and features important collaborations with entities like the Navy, NASA, and Monterey Bay Aquarium Research Institute. Using a NEWTSUB *DeepWorker 2000* DOV (Directly Operated Vehicle manned submersible), Dr. Earle and expedition members from each sanctuary will explore the world's oceans in a new and exciting way.

This issue of the *Alolkoy* describes the SSE and how we will utilize this amazing gift to increase our understanding of CINMS. You can follow the progress of the SSE on the web at **www.nationalgeographic.com/seas**.

I have the honor of the being the SSE Mission Coordinator for CINMS and one of the *DeepWorker 2000* pilots for our expedition. I find few words to describe the joy, thrill and excitement of piloting one of these subs.

CINMS is also pleased to recognize Francesca Cava, SSE Project Director. Francesca is a former Director of the National Marine Sanctuary program and a former Manager of CINMS.

The Sustainable Seas Expeditions will be nothing short of revolutionary in our nation's understanding and commitment to protect the world's oceans. Thank you, Dr. Earle and Francesca Cava, for your vision, dream and "let's get it done" attitude.

## Editor's Watch

# Diving Deep

*By Cynthia Anderson,* Alolkoy *Editor*

The Sustainable Sea Expeditions represent "one giant leap" for ocean exploration. Using the *DeepWorker 2000*, scientists will be able to explore uncharted depths, discover new species and gain invaluable new knowledge about ocean habitats.

The 1999 schedule for the SSE on the West Coast appears below. On the back cover of this issue of the *Alolkoy*, you'll find a schedule of special events during the Santa Barbara Expedition, May 24-June 5. We invite you to join us to celebrate this landmark occasion!

***Cover Photo:* Dr. Sylvia A. Earle, National Geographic Explorer-in-Residence and Project Director for the Sustainable Seas Expeditions, on board the DeepWorker 2000. *Photo by Natalie Forbes, ©1998 National Geographic Society.***

**Sustainable Seas Expeditions, 1999 West Coast Schedule**

April 14 - April 27: Gulf of the Farallones National Marine Sanctuary, San Francisco
April 29 - May 7: Cordell Bank National Marine Sanctuary, San Francisco
May 9 - May 22: Monterey Bay National Marine Sanctuary, Monterey
May 24 - June 5: Channel Islands National Marine Sanctuary, Santa, Barbara
June 17 - June 30: Olympic Coast National Marine Sanctuary, Seattle

# SSE Project Update

*By Francesca Cava*

On April 22, 1998, the National Geographic Society, the National Oceanic and Atmospheric Administration (NOAA) and the Richard & Rhoda Goldman Fund announced an unprecedented mission for the ocean: the Sustainable Seas Expeditions (SSE). Dr. Sylvia A. Earle, Explorer-in-Residence at the National Geographic Society, and Francesca Cava, former Director of the National Marine Sanctuary program, launched a five-year project of deep-water exploration and public education in NOAA's National Marine Sanctuaries using a one-person submersible, *DeepWorker,* capable of diving to 2,000 feet.

Nearly 100 proposals were received from scientists, educators and ocean-related professionals to participate in SSE. Of these, over 60 participants were invited to pilot training for the *DeepWorker* submersible at the Monterey Bay Aquarium Research Institute (MBARI).

In mid-March of this year, training continued at NOAA's offices at Sand Point in Seattle, Washington, as pilots learned navigation, use of submersible sonar and how to handle scientific equipment on board *DeepWorker*. The final phase of training will occur at each sanctuary as pilots learn launch and recovery procedures from NOAA and Navy ships, the diving platforms for the submersibles.

Many special people joined the SSE *DeepWorker* training in Monterey. Two in particular, Carolyn Jensen and Alex Chadwick from National Public Radio, captured their experience on tape and hosted a SSE Radio Expedition in mid-April.

The Expeditions were launched on April 14, 1999 at the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries near San Francisco. During April, NOAA and the National Geographic Society also introduced an SSE website that allows the public to become part of the Expeditions as they occur. This website hosts the Expeditions Log; personal accounts of daily dives by Dr. Sylvia Earle, Francesca Cava and other SSE participants; a photo gallery of fauna and habitats in the sanctuaries; and a "virtual tour" of Monterey Bay National Marine Sanctuary.

James A. Sugar ©1998 National Geographic Society

***"This is a historic event. We can go deeper than anyone else has been, in the most fantastic places in the country." Francesca Cava, Project Manager, SSE.***

© 1998 Kip Evans

***"It is my personal dream that we do whatever we can in our lifetime to protect the wild ocean." Dr. Sylvia Earle, Project Director, SSE.***

From time to time, the website will host "chats" for local schools to pose questions directly to the Expeditions. The web will also house educational materials for high school teachers and students that connect science and geography learning objectives to Expedition activities. Check it out at **www.nationalgeographic.com/seas**.

In addition to her involvement in SSE, Dr. Sylvia Earle has continued a breakneck pace with her writing and other adventures. She has completed two new children's books, published by the National Geographic Society, titled *Dive* and *Hello Fish!* She is also completing a book with the Society titled *Wild Ocean—America's Parks Under the Sea*, available early next summer. In February she dove with NGS/TV in southern Japan on a documentary shoot of giant blue fin tuna, and in March she led the Society's Grosvenor Council Expedition to the Galapagos Islands. On March 20, she received the National Wildlife Federation's annual Ding Darling Award for lifetime achievement.

Dr. Sylvia Earle will be in Santa Barbara during the Channel Islands SSE. The public is invited to meet her at an evening hosted by Heal the Ocean on June 2 and at the Sanctuary Open House on June 5. We look forward to seeing you there!

*Francesca Cava is Project Manager of the Sustainable Seas Expeditions and former Director of the National Marine Sanctuary program. She currently serves as a California Coastal Commissioner.*

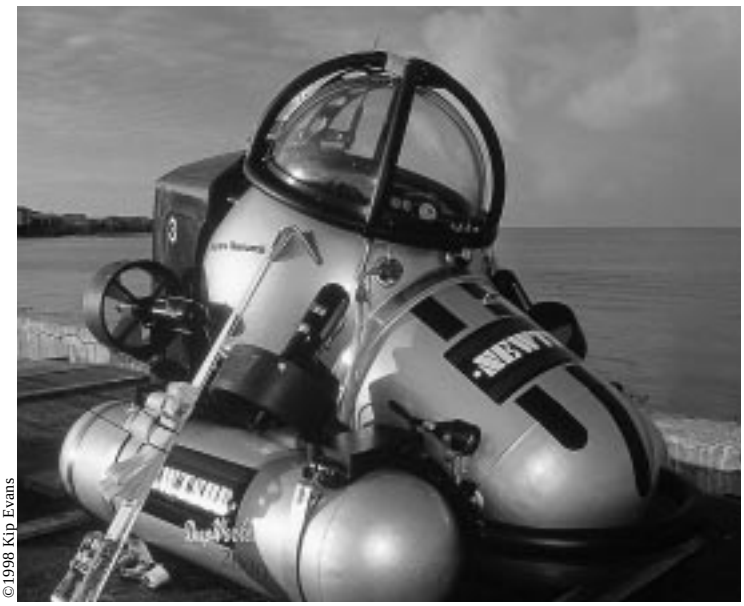
# DeepWorker 2000: *An Inside View*

Between October 12-17, 1998, a group of marine scientists agreed to be "guinea pigs" in the first *DeepWorker 2000* training course held at the Monterey Bay Aquarium Research Institute, Moss Landing, California. This article contains excerpts from the participants' Expedition Log.

**Gale Mead, Expedition Log Editor, SSE**

In the early 1980s, Dr. Sylvia Earle and Graham Hawkes dreamed up a submersible, the *Deep Rover,* that has been a capable tool ever since. But Dr. Phil Nuytten, President of Nuytco Research, Ltd., overcame many of the *Deep Rover's* limitations in the *DeepWorker 2000.* Scientists who have piloted both call it a revolution.

Because *DeepWorker* is a one-person system, researchers for the Sustainable Seas Expeditions need to pilot the subs themselves. Fortunately, *DeepWorker* is easy and intuitive to use. Of course, there's a lot you need to know to dive safely—how the life support system works, what to do in emergencies, buoyancy control, and so on.



©1998 Kip Evans

*DeepWorker 2000 consists of a sphere where the pilot sits with an attached cylinder (for the pilot's legs) and a Plexiglass viewing dome. The sub weighs just over 2,000 lbs with a total payload of 250 lbs, including the pilot.*

**Laura Francis, Education Coordinator, SSE**

We learned that the sub has 80 hours of life support (most dives will be 4-6 hours). There is a constant supply of oxygen and a carbon dioxide scrubber. The sub has a traditional soft ballast tank filled with air or water. The primary ballast system is separate; the hollow pilot's seat can be made heavier by admitting fluid from a container stored under the sub, or lighter by pumping the fluid back.

You steer the sub using two foot pedals. The right foot controls forward, reverse, and lateral movement; the left foot controls ascent and descent. The design is so intuitive that you quickly stop thinking about what you're doing, and just do it.

**Edie Widder, Senior Scientist, Harbor Branch Oceanographic Institute**

At first I thought I must be forgetting something because *DeepWorker* is so simple to operate. Compared to other submersibles, there are relatively few instruments to check (oxygen sensor, carbon dioxide blower and altimeter) plus a computer touch screen that turns on thruster control and external lights, and monitors depth.

I will use *DeepWorker* in the Flower Garden Banks National Marine Sanctuary to observe coral spawning at night, using a specially designed low light camera. The project is named "Eye in the Sea." Until now, coral spawning has only been observed with artificial light, which adversely affects behavior of the coral and other associated organisms.

**Dr. Steve Gittings, Science Coordinator, National Marine Sanctuary Program**

All I could think of on my first dive was Will Smith's line from *Independence Day* when he piloted the alien spacecraft: "I have GOT to get me one of these!" *DeepWorker* makes about three knots and turns on a dime. It's like having an underwater helicopter.

We tested our skills in a 30-foot diameter training tank by doing figure eights, donuts, and spy hops. None of us could contain our excitement about getting a chance to leave the nest! At that point, poor visibility, waves, currents and other obstacles will make us less like rodeo cowboys and, presumably, more like submersible pilots.

**Andy Shepard, Associate Director, National Undersea Research Program, University of North Carolina, Wilmington**

Last year, the National Undersea Research Program reconsidered its policy regarding one-person subs. Formerly, we believed it inadvisable for a scientist to also be a pilot.

Is the *DeepWorker* just another technical gizmo, or is it a new concept that will take off in the diving world? Time will tell. However, I am more confident about this system than past one-person subs. Its innovations are simple, not over-engineered.

When Neil Armstrong stepped on the moon 30 years ago, many lives were changed. The excitement propelled kids and adults into new careers. Perhaps these little subs will similarly propel interest in the oceans. And a *DeepWorker* costs about 2,500 times less than a space shuttle!

# Virtual Submersible at Maritime Museum

*By Robert Schwemmer*

*"I leaped headlong into the sea, and thereby have become better acquainted with the soundings, the quicksands, and the rocks, than if I had stayed upon the green shore, and piped a silly pipe, and took tea and comfortable advice."* —John Keats (1795-1821)

When scientists explore CINMS this spring in the *DeepWorker* submersible, their videotaped footage will be used to create a submersible simulator exhibit at the new Santa Barbara Maritime Museum. The exhibit, a cooperative effort between the Sustainable Seas Expeditions, the Maritime Museum and CINMS, will provide museum visitors with a unique opportunity to "visit" the depths of the Sanctuary.

Imagine you and eleven of your friends arriving at the Maritime Museum and boarding a virtual full-motion submersible simulator. The simulator will be "launched" into the harbor and thrust into motion, passing the harbor buoy where playful pinnipeds find refuge.

Next, descending deep into the Santa Barbara Channel, your team of observers may witness encounters with schooling krill, vampire squid and inquisitive blue whales.

As the submersible ascends the dramatic underwater topography along an underwater escarpment, a golden kelp forest will come into view along with scuba divers counting the fish population for science.

The submersible will be contacted by the NOAA Research Vessel *Ballena:* "Re-deploy to our position. Underwater archaeologists have discovered the remains of a shipwreck." Arriving at the site, you will view scientists recording the remains of the steamer *Cuba*, a casualty of the treacherous reefs off San Miguel Island. The submersible will establish communication with the archaeologists, who will describe their important discovery.

Returning to Santa Barbara, the submersible will fly through the massive support legs of an offshore oil platform that sustain a diverse ecosystem of marine life.

The virtual submersible exhibit is scheduled for completion in the year 2000.

*Robert Schwemmer is Cultural Resource Coordinator at the Santa Barbara Maritime Museum and CINMS.*

Drawing Courtesy of Santa Barbara Maritime Museum © 1999

***Look for the interactive virtual submersible exhibit at the Santa Barbara Maritime Museum in the Year 2000.***

## *CINMS Student Summit Conference*

*The Student Summit Conference will involve area high school teachers and students in the Sustainable Seas Expedition at CINMS. Thirty students from high schools in Santa Barbara, Ventura and San Luis Obispo counties will be selected to participate.*

*The goal of this year's student team is to recommend a research project for the Year 2000 SSE. Students will work with a panel of experts to gather background information on fishery resources. At the Student Summit Conference, the student team will discuss their findings and make their recommendation for a research project.*

## *Camp Internet and SSE*

*Camp Internet will link up to 40 classrooms and public libraries with scientists and database resources during the Sustaintable Seas Expeditions. Five counties in Southern California will participate: Santa Barbara, Ventura, San Luis Obispo, San Bernardino and Riverside.*

*Students will create a dynamic GIS (Geographic Information System) database and contribute to Camp Internet's SSE website. Camp Internet will host daily online chats with SSE team members and marine science educators.*

*To have your classroom take part in the Camp Internet SSE project, email* ***rain@rain.org****.*

# We Know They're Out There...

*By Paul Valentich Scott*

It is a clear, moonless night. You sit on a park bench overlooking the crashing surf. While gazing up at the uncountable stars that brightly sparkle in the sky, your mind drifts to the mysteries of the heavens. Do other life-forms live in the zillions of galaxies that you see tonight? Will we ever know just how many stars are visible from our small planet, or how many planets exist in our universe?



***Figure 1. The Santa Barbara Channel supports an amazing array of life, including giant white sea anemones, solitary cup corals, feathery soft corals, and fragile sea urchins.***

As a marine biologist, I ask similar questions about our ocean planet. I look out at the Santa Barbara Channel and wonder when we will really know how many life-forms live in our watery backyard. How many species remain unknown and undiscovered? One thing is certain: we will not come close to answering these questions in my lifetime, or for many generations in the future.



***Figure 2. This delicate basket star reaches for planktonic food that floats by in swift ocean currents.***

At the Santa Barbara Museum of Natural History, I embarked on a quest of discovery in the Santa Barbara Channel over ten years ago. Collaborating with an international group of 40 scientists, my colleagues and I have found the channel to be teeming with undiscovered life-forms.

After closely examining ocean bottom samples off the Santa Barbara coast, we have discovered and described over 130 new species of animals in the last five years. Some of these animals have remarkable lifestyles. One small clam slowly crawls between the sharp spines of sea urchins and is afforded protection from hungry predators. A species of worm twists its body into a tight swirling corkscrew, thereby creating a vortex of food particles that it can quickly devour. These organisms are important parts of the intricate web of life in our region.



***Figure 3. A hungry seastar gorges on lamp shells along the Channel bottom.***

These exciting discoveries, and hundreds more, are brought to light in a series of books entitled the *Taxonomic Atlas of the Santa Barbara Channel.* The 14-volume *Atlas*, published by the Santa Barbara Museum of Natural History, describes over 1,500 species in the region. Distributed to 29 countries, the *Atlas* has become an international best seller in the world of marine biology. We find it gratifying to know that so many scientists around the globe are interested in the fascinating creatures that inhabit the oceanic depths off California.

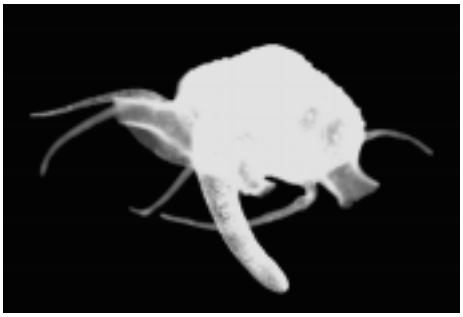




***Figure 4. A species of clam discovered by Paul Valentich Scott uses its long foot to crawl between the spines of sea urchins.***

A new adventure in the Santa Barbara Channel is about to begin: the Sustainable Seas Expedition, May 24-June 5. One of the Expedition's goals is to discover and describe the fauna that exists in this lush environment. Using the *DeepWorker* submersible, scientists will study animals in their native habitat and perhaps see undiscovered life-forms frolicking along the ocean bottom.

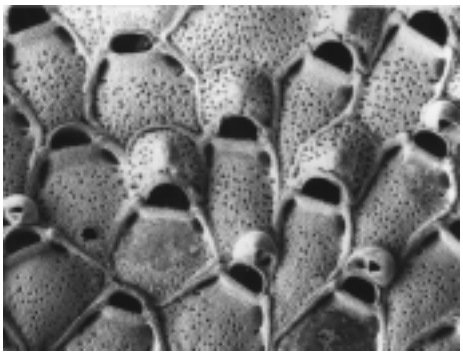




***Figure 5. Colonial moss animals cover most rocks in the depths off the California coast. This is a recently discovered species.***

The next time you are outdoors enjoying the twinkling heavens, think about the scientists out in the Santa Barbara Channel discovering new "stars" in the ocean depths. We know they're out there...

*Paul Valentich Scott has been a marine biologist at the Santa Barbara Museum of Natural History for 17 years. He is publication director and co-editor of the* Taxonomic Atlas of the Santa Barbara Channel.

# SSE and Sea Floor Mapping

*By Guy Cochrane*

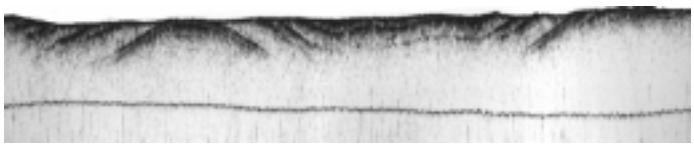
From May 24-June 5, 1999, project dives for the Sustainable Seas Expedition are planned in an area north of Anacapa Island, where a joint U.S. Geological Survey and CINMS habitat mapping project is underway. The dives will use a combination of *DeepWorker* exploration and remote sensing techniques (sonar) for sea floor mapping.

Submersibles are valuable tools for exploring the ocean environment. Many discoveries in the fields of marine biology and geology would not have been made without them. However, exploration with submersibles suffers from the same problem that beset early exploration of the Earth's surface: limited visibility.

On land, aerial photography and satellite remote sensing solve the visibility problem. Unfortunately, these techniques do not apply well to the undersea domain except in very shallow or very clear water. The solution for ocean exploration is the same one present in a variety of marine mammals: sonar.

The word "sonar" is an acronym for "sound navigation and ranging." The first patent for an echo ranging sonar was filed at the British Patent Office by L. F. Richardson, one month after the sinking of the *Titanic*. The theory behind sonar is that echoes are stronger when sound bounces off hard surfaces or surfaces that are at right angles to the sound source. Marine mammals produce high energy sound waves naturally and interpret the echoes they hear directly. However, because humans are visually oriented creatures, we use specialized electronics to produce sound signals and then convert the echoes to visual images.

The first working sonar system was designed and built in the United States by R. A. Fessenden in 1914. The Fessenden sonar could detect icebergs up to two miles away, and it was also used for signaling submarines. Sonar systems evolved slowly until World War II, when they came into use for locating enemy submarines. The science of interpreting sound echoes developed along with the technology. After the war, many well-trained sonar scientists left the military and applied their skills in non-military pursuits, including depth soundings for nautical charts, side-scan sonars for imaging objects on the seafloor, fish finding, sub-seafloor echo profiling for locating offshore oil and geologic structures, and acoustic marking and tracking of moving objects.



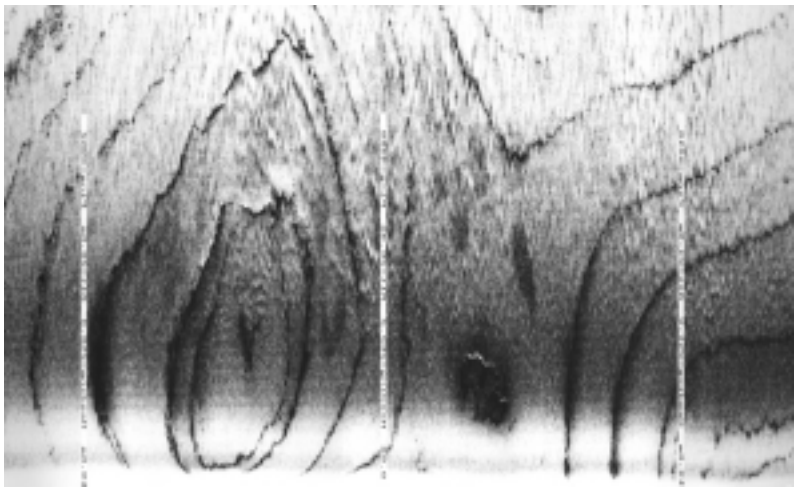


***USGS side-scan sonar record north of Anacapa Island, June 1998. This sub-seafloor layer image is a geologic structural profile of the ocean bottom down to about 30 meters. The sub-floor profile reveals the thickness of sediment types over bedrock.***

For each of these tasks, and others, specialized sonar instruments are now available. A combination of side-scan sonar and sub-seafloor profiling is being used to map the nearshore benthic habitat of CINMS. The side-scan sonar provides a continuous seafloor surface image by emitting a cone of sound outward and detecting the strength of the returning sounds from all directions as it is towed behind a boat. The sub-seafloor profiler focuses sound straight down so that some of the sound penetrates the seafloor and echoes off deeper layers of the Earth's crust, revealing the thickness of sediments over bedrock.

When we combine these images with navigation data, we will have completed the first part of a map of the benthic habitat. The final habitat maps will include the side-scan imagery along with an interpretive layer where the distinct types of habitat—rocky to muddy, steeply sloping to flat bottom, thin sediment cover to thick, etc.—are delineated.

The *DeepWorker* submersible will be used to examine areas where interpretation of the sonar image is in question. In addition, counts of fauna will add to our knowledge about habitat features essential for the survival of key species. For example, knowing the type, location and amount of habitat available for commercially valuable benthic fish and other fauna will greatly improve the ability of CINMS to manage its resources.



***USGS side-scan sonar record north of Anacapa Island, June 1998. This is a one square kilometer image of the seafloor surface. Dark areas indicate hard rock layers, while lighter areas show softer rock. The tree-ring pattern on the sea floor is the result of wave erosion.***

*Dr. Guy R. Cochrane is a Marine Geophysicist working in the Coastal and Marine Geology Research Program of the U.S. Geological Survey.*

## Research

# *Plumes and Blooms Update*

*By Michael Neumann*

Knowledge of the composition, concentration, sources and fates of suspended and dissolved materials in the coastal ocean is critical for properly monitoring marine resources and evaluating the impacts of human activities. The goal of the Plumes and Blooms (PnB) program is to assess the impacts of sediment plumes and phytoplankton blooms on waters of, and surrounding, the Santa Barbara Channel and Channel Islands.

The PnB program is a collaboration among researchers at the Institute of Computational Earth System Science, University of California, Santa Barbara; and NOAA sanctuary managers at CINMS. Funding for the program is provided by the NOAA Coastal Ocean Program, Office of Naval Research, and NASA.

Since August 1996, twice-monthly cruises have been conducted across the Santa Barbara Channel from the shelf waters north of Santa Rosa Island to Goleta Point using the CINMS research vessel *Ballena*. Sampling during cruises evaluates optical, biological, chemical and physical properties of the water column. The comprehensive sampling program provides a near-complete characterization of the ocean color variability in this coastal environment. This data helps develop state-of-the-art models for use with satellite imagery to monitor changes in marine environmental quality.



***PnB Project Manager Michael Neumann (right) and Lab Technician Nick Cohn (left) of UCSB inspect the PnB water sampler. The water column is a crucial component in studying marine habitats.***

The first two years of sampling tracked a wide range of conditions common to the coastal environment: among them, intense phytoplankton blooms, sediment plumes, brown tides and offshore oil seeps. Numerous episodic events, including a toxic phytoplankton bloom and the 1998 El Niño, were also captured. Storms during the 1998 El Niño played a major role in affecting marine habitats of coastal California. In February 1998, stormwater runoff from El Niño inundated coastal waters, blanketing approximately 6,000 km2.

Following intense storms during the week of February 1-9, 1998, the PnB project sampled 38 locations in the Santa Barbara Channel to quantify the impact of stormwater runoff. Discrete sample measurements, coupled with satellite imagery analysis, suggest that 19 million metric tons of sediment were discharged into the Santa Barbara Channel. Impacts of stormwater discharge included decreased salinity, increased turbidity, and elevated nutrient, dissolved organic matter and total suspended material concentrations. Changes in these parameters formed a significant disturbance to the marine habitat.

In May 1999, the PnB project will join the Sustainable Seas Expedition (SSE) team to assist in characterizing the marine habitats of CINMS. Marine habitats are complex environments influenced not only by the seafloor substrate, but also by the overlying water column. The PnB program will provide water column characterization for this study. Sampling locations will be based on the paths of the SSE submersible *DeepWorker*. The PnB data will provide a link between the SSE seafloor characterization and satellite data, enabling us to extend the observation of water column and habitat characterizations to other sites.

The partnership between SSE and the PnB project represents an opportunity to increase our understanding of coastal marine habitats. This knowledge is crucial for resolving a host of scientific and resource management questions, from understanding impacts of human activities on the ocean, to the effects of stormwater runoff events and detailed analysis of the marine habitats of CINMS.

*Michael Neumann manages the scientific and field operations for the Plumes and Blooms project. He also teaches a Marine Weather course at the University of Southern California.*

# An "SOS" for Clean Water

*By Robert Almy and Darcy Aston*

As the tide runs up the sand at Arroyo Burro Beach in Santa Barbara, it curls around the base of a red sign: "Beach Closed, Due to High Levels of Bacteria." This can't happen in beautiful Santa Barbara! Whose fault is the pollution, and what is being done about it?

Creek and ocean pollution went undocumented for years. During Summer 1998, several beaches near flowing creeks were posted "closed" more often than open. The public outcry motivated local governments to set up an interagency task force to study the contamination. Under the aegis "Project Clean Water" (PCW), the County of Santa Barbara, the Cities of Carpinteria and Santa Barbara, and community groups confronted this challenge with unusual commonality of purpose.

In September 1998, Project Clean Water began studying beach and stream conditions, focusing on the seven local beaches where the most closures occurred. These efforts were coordinated with the ongoing South Coast Watershed Characterization Study (SCWCS), set up in 1998 to study pollution in stormwater runoff.

**South Coast Watershed Characterization Study**

In 1998, the SCWCS selected four creeks—Rincon, Carpinteria, Mission and Arroyo Burro—for baseline sampling and water quality monitoring during a storm season. To date, sampling during two storm events has been completed, and two more sampling events are planned. Initial results suggest that bacteria levels in stormwater are much higher than during low flow, and that only modest amounts of other contaminants enter the ocean with stormwater.

**Project Clean Water**

Project Clean Water (PCW) picks up where SCWCS leaves off by examining bacteria sources during low flows. PCW seeks to identify and eliminate sources of contamination and keep the beaches open. In addition to the creeks sampled by SCWCS, PCW added the Sycamore, Arroyo Quemada, and Jalama watersheds.

Key PCW objectives are: 1) assessing seven creeks and their tributaries; 2) developing public information and outreach; 3) enhancing existing pollution prevention programs; and 4) evaluating treatment options (if necessary) to open beaches.



*Water sampling technician Jeremy Koonce walked Sycamore Creek in Fall 1998 to identify possible pollution sources. Project Clean Water staff studied seven creeks in the Santa Barbara area.*

Results of PCW data indicate that:

- Numerous sources of bacteria occur throughout the watersheds.
- Most upper watersheds have acceptable levels of bacteria.
- No direct link exists between septic systems and local beach closures.
- Storm drains, creek encampments and lagoon fauna are probable sources of bacteria in Carpinteria, Mission and Arroyo Burro Creeks.
- Lagoon fauna are probable sources of bacteria in lower Arroyo Quemada and Jalama Creeks.
- Clean-up efforts by cities and community groups help reduce bacteria levels.

PCW relies on the participation of community groups and individuals, the "stakeholders" in the process. A Stakeholders Advisory Committee meets to tackle a wide range of issues and identify both short- and long-term solutions. Short-term solutions already being implemented include:

- Sewer system testing.
- Storm drain stenciling.
- Installing trash cans and "No Dumping" signs near creeks.
- Creek cleanups and storm drain cleanouts.
- Hotline for pollution reporting, enforcement, & information. (1-877-687-6232)

An aggressive public outreach program is under way, with public service announcements on radio, television, and in print, targeted information brochures, a youth education program, a speakers bureau, and a Project Clean Water website (**www.sbcphd.org/cleanwater**).

**Conclusion**

In the past six months, SCWCS has broadened our understanding of stormwater runoff, while PCW has identified sources of contamination during low-flow conditions. PCW has also developed community education and source-reduction projects.

The next challenge is to meld the projects proposed by Project Clean Water working groups into a single water quality program. The groundwork laid by PCW gives local agencies a head start in developing the mandated Clean Water Act stormwater permit due in 2002.

*Robert Almy is the Manager of the Santa Barbara County Water Agency and Project Clean Water. Darcy Aston is a Water Conservation Specialist for the Santa Barbara County Water Agency and a program specialist for Project Clean Water.*

# *Voices from the Sanctuary: Glen Fritzler*

*By Shauna Bingham*

*Glen Fritzler is the President of Truth Aquatics in Santa Barbara, California, a dive boat concessionaire with the Channel Islands National Park. A veteran boatbuilder and diver, Glen is extremely knowledgeable about the Santa Barbara Channel. Shauna Bingham of CINMS recently spoke to him about his long association with Truth Aquatics and his views of conditions in the Santa Barbara Channel. For more information about Truth Aquatics, visit their web site at* ***www.truthaquatics.com****.*

*What year did you start Truth Aquatics and how did you decide to get into the dive boat business?*

I did not personally start Truth Aquatics; my partner, Roy Hauser, did in 1974. I met Roy on his old boat, also named *Truth*, in 1972. After losing his boat on San Clemente Island, Roy asked me to help him with the construction of his new *Truth*. That was 1973, and the new boat was launched in 1974. I became deckhand with him, and after receiving my captain's papers, became a partner in 1979. My love of scuba diving was my primary reason for staying involved in the dive boat business.

*How did you and Roy come up with the design for the Truth Aquatics dive boats?*

We designed and built our boats—*Conception*, *Truth* and *Vision*—in various boatyards in California. The designs were taken from various sportfishing boats, plus all of the dive amenities we could dream up ourselves. When it came time to build the *Vision*, we had a really good idea of the task at hand, hence the name.

*How many years have you been diving in the Santa Barbara Channel?*

My first scuba dive at the Channel Islands was on Glenn Miller's boat the *Emerald* in 1973. I still have pictures of Bob Evans (Force Fin inventor) filling tanks on the back deck at Santa Cruz Island. We came up to the Channel Islands from San Pedro on the *Truth* during the summer of 1974 for a two-week exploration of the islands.

*Do you think that SCUBA divers are more knowledgeable about the marine environment now than when you started diving?*

I believe they are. Back when I started, the majority of divers were only interested in taking game. Now with the decline in game, divers appear to have more of an ecological awareness.

*Have you observed any environmental impacts at popular dive sites over the years?*

Yes, probably to all sites. Some of the problems lie with impacts from scuba divers, some with commercial fishing, and some with water quality. For example, there is a site on the back side (south side) of Santa Cruz Island that has always been one of my favorite dives. The topography is dramatic with sheer walls and large rocks. I dove this site on February 21, 1999 and saw that the reef was dying. The bottom appeared to be covered in silt, and empty abalone shells littered the bottom. I feel strongly that what I witnessed is a water quality issue.


Photo Courtesy of Santa Barbara County Air Pollution Control District, ©1999

***Glen Fritzler, President of Truth Aquatics, aboard the* Truth *at Sea Landing in Santa Barbara Harbor.***

*Has Truth Aquatics worked with the Sanctuary over the years? Do you see a benefit from having the Channel Islands National Marine Sanctuary?*

We have not worked with the Sanctuary as much as I would like. We have participated in the Great American Fish Count and various other projects, but I hope in the near future we can establish a relationship that will benefit not only the Sanctuary, but the public's experience as well.

The Sustainable Seas Expedition will help provide the in-depth studies that are needed before fishing rights are taken away from anyone.

*Shauna Bingham is a contract volunteer/ intern coordinator with CINMS. She coordinates the Sanctuary Naturalist Corps and the Sanctuary Marine Watch volunteer programs.*

# Sanctuary Waves

## Get Ready To Count Fish!

The Great American Fish Count (GAFC) is an annual fish counting event for volunteer divers and snorkelers. Each July 1-15, trained volunteers dive into the GAFC and conduct fish surveys along the coasts and in our National Marine Sanctuaries. To date, 194 surveys have been completed in CINMS. Please help us add to this database.

To participate in the Fish Count, you are encouraged to attend a free seminar where you will learn the most common fishes in the area and how to do the surveys. Once you learn the method, fish surveying can be done year round, not just in July.

The GAFC is made possible by a partnership between the National Marine Sanctuary program, including CINMS, the Reef Environmental Education Foundation (REEF) and the American Ocean Campaign (AOC). GAFC data are displayed on REEF's website (**www.reef.org**).

For a complete list of GAFC activities around the country and seminar registration information, please visit the website www.fishcount.org or call 1-800-8ocean0.

There will be a special GAFC dive trip on July 6 to Anacapa Island aboard the *Truth*. To sign up call Truth Aquatics at 805-963-3564. (Please note that there is a seminar the night before in Santa Barbara.)



*Participants in the Great American Fish Count use underwater slates to record fauna in the Santa Barbara Channel.*

## New Faces at the Channel Islands National Marine Sanctuary

**LCDR Matt Pickett** is Assistant Manager for CINMS. His background with NOAA spans an 11-year period. Currently Matt flies a seaplane for CINMS and MBNMS as part of the NOAA Flight program, conducting aerial surveys to monitor sanctuary resources. During the Sustainable Seas Expedition, Matt will be overseeing operation of the *R/V Ballena*, which will be a support ship to the *R/V McArthur* throughout the expedition.

**Sarah Fangman** is Research Program Specialist for CINMS. Her responsibilities include overseeing all research programs used in monitoring sanctuary resources. She joined CINMS in February 1998 as an intern with the National Marine Fisheries Service as part of the Presidential Management Internship program. Sarah will be one of the *DeepWorker* pilots and will help characterize the habitat types and living resources off Anacapa Island during the Sustainable Seas Expedition.

**Sean Hastings** is Policy Program Specialist for CINMS. He works closely with the Sanctuary Advisory Council and the Sanctuary Manager on CINMS policy issues related to the living and non-living resources of the CINMS. Sean will be instrumental in developing the new CINMS management plan. He started with CINMS in 1997 coordinating Sanctuary research. In 1998, he was nominated to the Presidential Management Internship program.

**Anne Walton** is Management Program Specialist, responsible for developing the new CINMS management plan in conjunction with the Sanctuary Advisory Council and Sanctuary Manager. Anne has been involved with CINMS on a number of projects such as the development of curriculum and training programs for Sanctuary user groups. She has extensive experience in field research programs, including census studies of right and humpback whales off the coast of Madagascar.

**Shauna Bingham** is under contract as Volunteer/Internship Coordinator for CINMS. She is currently developing the Sanctuary Naturalist Corps and Sanctuary Marine Watch volunteer programs. Shauna has over seven years of experience working with non-profit educational organizations and most recently coordinated the Whale Corps, a naturalist program with over 80 volunteers. She holds a 50-ton master's license and is enrolled in the Santa Barbara City College Marine Diving Technology program.

**Julie Goodson** is Education Coordinator for CINMS, working to develop education programs and partnerships that increase awareness about the Sanctuary's cultural and living resources. She has over 10 years' experience in non-profit educational organizations, most recently as Director of At Sea programs for the Orange County Marine Institute in Dana Point Harbor. Julie will coordinate all of the educational outreach for the Sustainable Seas Expedition at CINMS.

*U. S. Department of Commerce*
*National Oceanic and Atmospheric Administration*
*Channel Islands National Marine Sanctuary*
*113 Harbor Way*
*Santa Barbara, CA 93109*

*Address Correction Requested*

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***Need more information? Contact:***

***Channel Islands National Marine Sanctuary***
*113 Harbor Way*
*Santa Barbara, CA 93109*
*805/966-7107*
*Email: channel_islands@ocean.nos.noaa.gov*
*Web Page: http://www.cinms.nos.noaa.gov*

***Channel Islands National Park***
*1901 Spinnaker Drive*
*Ventura, CA 93001*
*805/658-5700*
*Web Page: www.nps.gov/chis/*

***Channel Islands Marine Sanctuary Foundation***
*113 Harbor Way*
*Santa Barbara, CA 93109*
*805/966-7107 x379*

## Things to Do, Places to Go

### Sanctuary Advisory Council Meeting Dates

The Sanctuary Advisory Council will meet on **May 20** at Chase Palm Park Center. On **July 22** a Sanctuary trip is proposed for Council members. For more information contact Sean Hastings at CINMS, 805-966-7107.

### Great American Fish Count 1999 California Seminars

For a complete list of GAFC seminars please visit the website **www.fishcount.org** or call 1-800-8ocean0.
**June 2:** Anacapa Dive Center, Santa Barbara
**June 10:** Channel Islands National Park, Ventura
**July 5:** Patagonia Store, Santa Barbara
**July 10:** Casino Point, Catalina Island

### Sustainable Seas Expedition Calendar

**May 24-June 5, 1999**

For more information about the events listed below or other SSE activities, please contact the CINMS office at 805-966-7107.

**May 24:** Student Summit Conference.

**May 24–May 27:** Mock *DeepWorker* exhibit at Channel Islands National Park Headquarters, Ventura Harbor.

**May 27:** Media and Education Day. Volunteer Fish Survey Dive off Anacapa Island. Live chat sessions via Camp Internet and live video uplinks from the *DeepWorker*.

**May 28–31:** Mock *DeepWorker* exhibit at Ventura County Maritime Museum, Channel Islands Harbor, Oxnard.

**June 2:** Heal The Ocean's "Coral Casino Day." 7 p.m. dinner featuring Dr. Sylvia Earle. Contact Heal The Ocean, 805-565-4742.

**June 5:** Santa Barbara Maritime Museum Open House, Santa Barbara Harbor. Includes: Cabrillo High School Aquarium *Conqfish 1* exhibit; Mock *DeepWorker* exhibit manned by Student Summit Teams; Camp Internet exhibit; Chumash Maritime Association Tomol exhibit; and Dr. Sylvia Earle and CINMS manager Ed Cassano driving *DeepWorker* into Santa Barbara Harbor.