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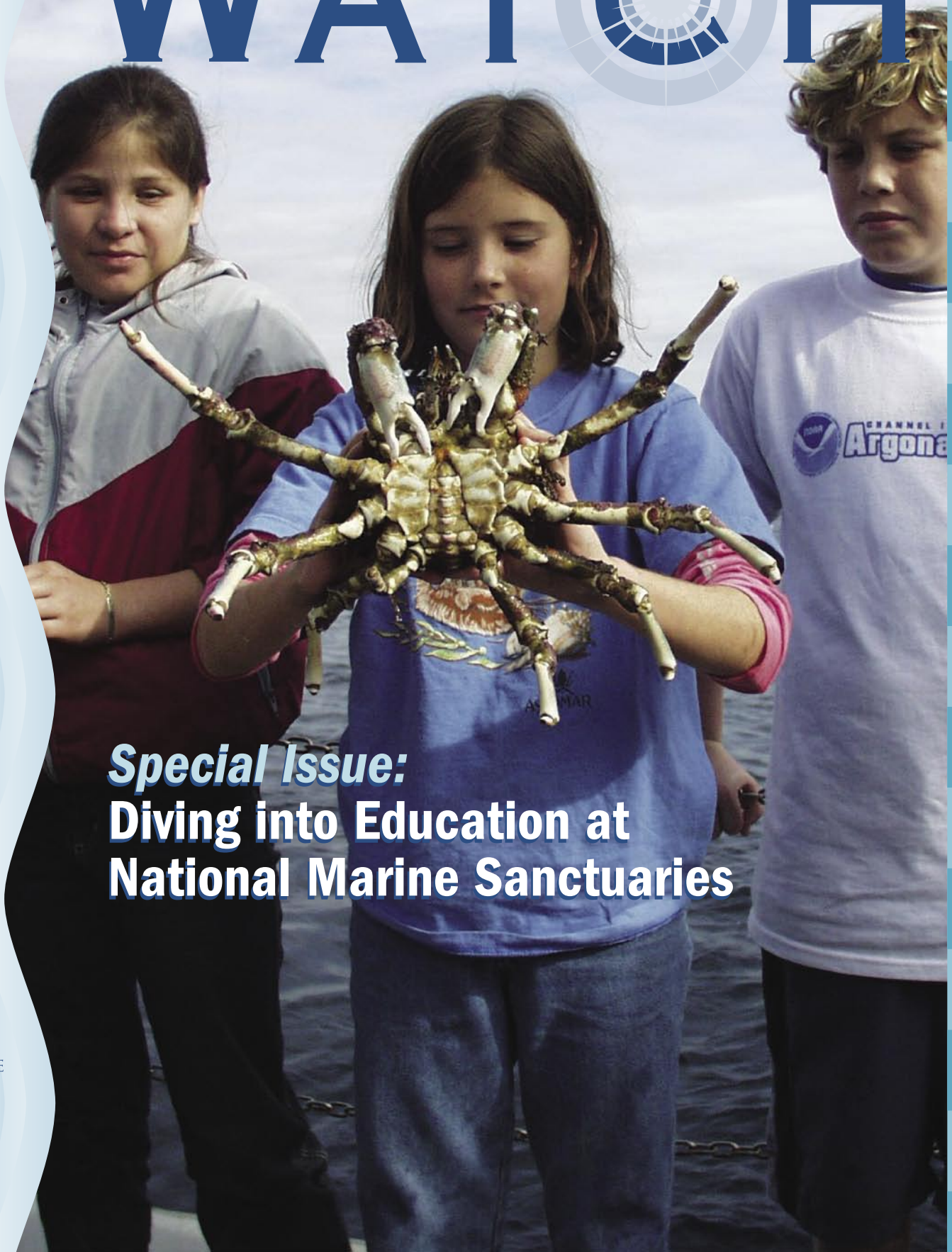
SANCTUARY WATCH



Special Issue:
Diving into Education at National Marine Sanctuaries

National Marine Sanctuaries

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

SANCTUARY WATCH

INSIDE.....

Sanctuary Watch is a publication of the Communications Branch of the National Oceanic and Atmospheric Administration's (NOAA) National Marine Sanctuary Program. NOAA is an agency of the U.S. Department of Commerce.

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Cover: Middle school students selected as Channel Islands Argonauts experience the living classroom aspect of the sanctuary aboard the Research Vessel *Shearwater*. Photo Credit: Julie Bursek/NOAA.

Coral Reef Classroom teacher Necie Moore and student. Photo: Ivy Kelley

Letter from the Director

There is no better way to learn about the world around us than to set out into nature and explore it first hand. When it comes to the oceans, our national marine sanctuaries are the perfect classrooms for learning about our ocean planet.

Educating all U.S. citizens about our nation's marine environment is one of the principal mandates of NOAA's National Marine Sanctuary Program. For more than 30 years, we have set out to develop education programs that cater to the needs of young and old alike.

It is rewarding to see how much our education programs have grown over the last several years. Our education efforts incorporate the talents of trainers, facilitators and scientists—all with the sole focus of educating the public about the marine environment, marine science and conservation through the lens of national marine sanctuaries.

I am proud that the sanctuary program has been recognized nationally as a leader in the development of focused and creative educational programs that connect the public with our marine resources and promote "ocean literacy."

As Rear Adm. Richard West, president and CEO of the Consortium for Oceanographic Research and Education, points out in our guest column, the health of the oceans depends on a society that understands and values the marine environment. We couldn't agree more.

This issue of *Sanctuary Watch* is dedicated to informing our readers about the wide variety of exciting, standards-based, results-oriented education programs and services available to teachers, students and the public.

The resources described in this issue are only a fraction of the education programs and resources offered by the sanctuary program. We hope that you will dive into the information presented in this issue and learn how you can help to protect America's ocean and Great Lakes treasures.

Sincerely,

Daniel J. Basta, Director
NOAA's National Marine Sanctuary Program

National marine sanctuaries provide a special place for all educators to use. At Florida Keys National Marine Sanctuary, middle school students learn how to collect water samples. Photo: Ivy Kelley/FKNMS

Diving into Education
at National Marine Sanctuaries

National marine sanctuaries are living classrooms that offer hands-on opportunities to learn about our ocean world. Photo: Claire Johnson/NOAA

With a fresh, salt-tinged breeze blowing through their hair, students and teachers walk among tidepools as they monitor sand crab populations at Gulf of the Farallones National Marine Sanctuary.

Thousands of miles away in the South Pacific Ocean off the islands of Tutuila and Manu`a, ninth grade students identify reef fish as they snorkel in the warm, tropical waters of Fagatele Bay National Marine Sanctuary.

Meanwhile, students in Washington State take to the seas of Olympic Coast National Marine Sanctuary to learn what it's like to conduct marine research on a ship.

Coral reefs are the focus of student research at the Florida Keys National Marine Sanctuary. At Thunder Bay National Marine Sanctuary and Underwater Preserve in Lake Huron, it's shipwrecks and our nation's maritime heritage.

These are only a few of the many hands-on learning activities taking place every day at national marine sanctuaries, America's living classrooms.

Field studies at national marine sanctuaries educate teachers and students alike about the physical, biological and ecological characteristics of our oceans and Great Lakes.

Participants take part in activities that demonstrate the use of large-scale observing systems; learn how data is collected, analyzed and applied; and experience the unique ecosystems of the national marine sanctuaries.

According to the National Science Education Standards (National Academy Press, 1996), field studies promote serious, extended, scientific investigation that results in life-long learning.

Thanks to a number of innovative National Marine Sanctuary Education Program initiatives, teachers and students don't have to get their feet wet to explore and learn about the oceans.

National marine sanctuaries also offer creative, engaging, high-quality curricula that introduce teachers and students to the world of ocean science and exploration while meeting national and state science education standards.

Channel Islands National Marine Sanctuary's *Mapping an Ocean Sanctuary* is but one example. Developed in partnership with the Center for Image Processing in Education, the curriculum introduces students to geographic information systems, an important research tool used to track environmental changes, study marine life populations, and more.

"It's neat to actually work with the real data that scientists obtained," said one high school student. "I'm using this remote sensing data to understand the distribution of Gardibaldi [a species of fish] the same way that researchers would."

In 2004, NOAA's National Marine Sanctuary Program, National Undersea Research Center at the University of Connecticut, Nauticus-the National Maritime Center and the U.S. Naval Academy engaged teachers and students with multi-disciplinary curricula focused on the hunt for the lost Civil War-era submarine *Alligator*.

Through a dynamic Web site, video on demand, field studies and lesson plans, student "*Alligator* hunters" across the country have been immersed in the worlds of oceanography, meteorology, engineering, archaeology, and even literature (Jules Verne's *20,000 Leagues Under the Sea*).

"Our partnerships with different education and research institutions enable us to involve teachers and students in real-life research that makes a difference," said Michiko Martin, national education coordinator for the sanctuary program. "It wouldn't surprise me at all if a student finds that one clue that leads us to the *Alligator* or some other exciting discovery."

The National Marine Sanctuary Education Program's commitment does not end with curricula production. The program is also dedicated to providing professional development for educators.

Flower Garden Banks National Marine Sanctuary's award-winning *Down Under, Out Yonder* professional development workshops, for example, offers teachers the opportunity to learn how to bring marine science into the classroom during a three-day expedition to a remote Gulf of Mexico coral reef.

The sanctuary program's *Dive into Education* workshops also offer teachers hands-on professional development training. During the 2004 *Dive into Education* workshop, educators representing all 14 sites within the National Marine Sanctuary System converged on the island of O`ahu to provide 36 ocean education sessions to 85 teachers.

"The greatest thing about the workshop was that it sent me back to the classroom with renewed energy," said one *Dive into Education* participant. "The energy needed to excite my students and get them exploring the marine environment in a way that will ensure its preservation."

The workshop was so successful that sanctuary educators are committed to bringing this professional development opportunity to educators across the nation once a year. Educators along the south Atlantic are invited to attend the second annual *Dive into Education* workshop on May 13-14, 2005, in Savannah, Ga.

Teachers can stay abreast of special educational offerings, including upcoming field studies, professional development opportunities, outreach events, monitoring projects, funding opportunities and more, by becoming a member of the National Marine Sanctuary Education Network. Educators can subscribe to this free network by e-mailing sanctuary.education@noaa.gov.

Sanctuary Education Programs
for Teachers and Students

Professional Development

Taking Teachers 'Down Under, Out Yonder'

Teachers get the opportunity to test their diving skills at Flower Garden Banks National Marine Sanctuary during a *Down Under, Out Yonder* workshop. Photo: FGBNMS

Each summer, Flower Garden Banks National Marine Sanctuary invites scuba-certified K-12 educators from around the country to get out of their classroom and into the Gulf of Mexico for a week-long underwater exploration workshop called *Down Under, Out Yonder.*

Covering topics such as coral biology, reef fish identification, geology, sustainable fisheries and natural resource management, the workshop's goals are to inspire and motivate educators to include coral reefs and the resources of Flower Garden Banks National Marine Sanctuary in their lesson plans.

Each workshop includes 14 hours of classroom lectures followed by a three-day dive trip to Flower Garden Banks National Marine Sanctuary, located roughly 100 miles south of the Texas/Louisiana coast.

Sponsored by the Gulf of Mexico Foundation, *Down Under, Out Yonder* workshops were established in July 1996 in response to requests from teachers for high quality, affordable, science-based, experiential learning workshops.

Eighteen teachers participated in the 2004 workshop sessions, held aboard a 100-foot dive boat. During the dives, the teachers counted fish and other animals and conducted general observations on the status of the coral reef environment. More importantly, they developed material that they could share with their students back home.

For more information on this experiential field study, visit Flower Garden Banks National Marine Sanctuary's Web site at flowergarden.noaa.gov or send an e-mail to flowergarden@noaa.gov.

Student Programs

Gray's Reef Student Ocean Council Comes to Order

Gray's Reef Student Ocean Council members prepare to snorkel at Georgia's Salt Springs. Photo: Leah Cooling

Attention Savannah, Ga., high school students: If you have a desire to learn scuba diving, go on archaeological digs, swim with manatees or sail on a research ship, then the Gray's Reef Student Ocean Council may be for you!

An education initiative created in 1999 by Gray's Reef National Marine Sanctuary, the council offers 15 students the opportunity to learn about various ocean science-related careers and to interact personally with professionals in those careers, including oceanographers, marine biologists, archaeologists, marine educators, marine operations professionals, search and rescue personnel, fisheries technicians and aquarists.

Student ocean council activities include field trips to Gray's Reef and to several of Georgia's barrier islands, during which students participate in archaeological digs, perform water quality tests, receive introductory scuba lessons, and more.

Students have also competed for and won spaces on NOAA research vessels.

Student ocean council members are recruited and selected by an intern from Savannah State University, who also coordinates activities and field trips throughout the school year.

"The Gray's Reef Student Ocean Council could be easily replicated at other schools by working with local sanctuary sites," said Cathy Sakas, the sanctuary's education coordinator. "Teachers can help identify interested students who can handle the extra load to their already busy academic schedules and who would benefit from this type of intensive, hands-on science program."

For more information about the Gray's Reef Student Ocean Council and why it consistently receives high praise from students, teachers and school administrators, visit graysreef.noaa.gov/studentcouncil.html or contact graysreef@noaa.gov.

'ROV'ing into National Marine Sanctuaries

What would you think if we were to tell you that the National Marine Sanctuary Program regularly encourages high school and college students to work with LEGOs®?

Believe it or not, the popular plastic building blocks can be used to build a device that has become indispensable to marine researchers: a remotely operated vehicle (ROV).

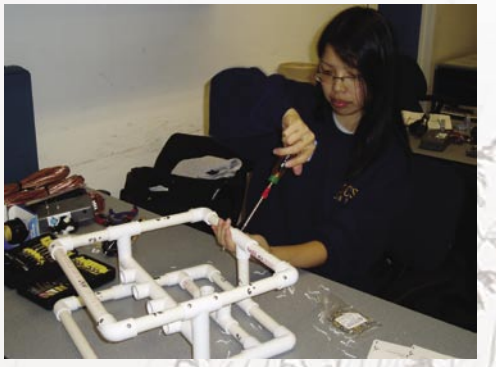
ROVs are unmanned, highly-maneuverable submersibles that are connected to a ship or other platform by a cable. They are often equipped with video cameras and other tools that allow scientists to see, and even recover, submerged objects.

The sanctuary program has teamed up with the Marine

Advanced Technology Education (MATE) Center and Tufts University to teach students how to design and build ROVs not only out of LEGOs®, but also PVC pipe and other materials that can be found at the local hardware store.

Students can also put their ROVs to the test in nationwide competitions that simulate real-life underwater exploration missions.

"The ROV competition provides students with a fun, exciting learning experience that helps them to see how what they're learning in the classroom can be applied to the real, working world," said Jill Zande outreach director for the MATE Center. "Designing and building an ROV is interdisciplinary – just like life! It involves math, science, physics and engineering as well as problem-solving, critical thinking and teamwork."



Building an ROV is a unique way to educate teachers and students about marine technology. Photo: Claire Johnson/ NOAA

In support of its partnership with the National Marine Sanctuary Program, a competition hosted in 2004 by the MATE Center was based on exploration missions conducted within the National Marine Sanctuary System.

According to Zande, this focus "gave students the opportunity to 'explore' our national marine sanctuaries, providing them with a better understanding and appreciation of these treasures and how technology is being used to explore and better understand and manage them."

Four ROV workshops will be conducted around the sanctuary program in the fall and winter of 2004-2005. For more information, send an e-mail to sanctuary.education@noaa.gov.

Students study marine life in the waters of Hawaiian Islands Humpback Whale National Marine Sanctuary. Photo: HIHWNMS

Program of Hawaiian Islands Humpback Whale National Marine Sanctuary.

Developed in 1997, the program works to enhance understanding and appreciation of Native Hawaiian culture and its relationship to the *koholä* (humpback whale) and its habitat. A public education center, Web site, brochures and other materials offer a wealth of information to anyone interested in learning more about this fascinating subject.

The sanctuary's education center, located in Maui, Hawai`i, has become a popular resource for both teachers and students. Here, students practice the traditional craft of *ulana lau niu*, or coconut leaf weaving, and have a chance to test their hand-eye coordination as they turn a coconut leaf into a whale. Students also learn about the whale's anatomy and Hawaiian words associated with the art.

Educators have discovered that a 500-year-old Native Hawaiian fishpond located on the shore of the sanctuary, Kö`ie`ie, is also a great learning tool, and use it to teach over 700 students annually about Hawaiian culture and its importance to the sanctuary.

At the site, students perform water quality tests to see what may influence the health of the sanctuary and the fishpond. The Pacific American Foundation's Project Kähea Loko uses the fishpond to teach science, social studies and language arts.

For more information on Hawaiian Islands Humpback Whale National Marine Sanctuary and its cultural education program, visit hawaiihumpbackwhale.noaa.gov.

Multicultural Education

Making the Environment-Culture Connection in Hawai`i

The native people of Hawai`i have lived in harmony with the land and sea for centuries and have recorded the creation of these elements in an ancient chant known as the *Kumulipo*. It states, *"Hänau ka palaoa noho i kai...Kia`i `ia e ka `aoa,"* meaning "The whale is born into the sea...Protected by the sandalwood."

Whales have long been a significant part of Hawaiian culture. There are ancient Hawaiian legends of a man being transported on the back of a whale across the Pacific ocean, whale petroglyphs and legendary whale-related place names found throughout the islands.

Today, the bond between Hawaiians and nature continues to be shared through the Hawaiian Cultural Resource Enhancement

Monterey Bay National Marine Sanctuary's bilingual MERTIO program offers California students the opportunity to enhance their science and language skills. Photo: MBNMS

Crossing the Language Barrier with MERITO

When it comes to protecting and managing ocean resources, everyone's help is needed. Recognizing that simple fact, the National Marine Sanctuary Program is reaching out to members of the community who have not traditionally been sought out as

(Cont'd. from pg. 4)

conservation partners.

Since 2001, Monterey Bay National Marine Sanctuary has been providing education opportunities for Spanish-speaking residents and visitors in the central California coast region, with the goal of involving the entire community in ocean conservation.

During its first year alone, the sanctuary's Multicultural Education for Resource Issues Threatening Oceans (MERITO) program directly reached over 5,500 Spanish-speaking citizens in the Monterey and Santa Cruz counties surrounding marine sanctuary.

In response to a need for science education opportunities for English language learners, MERITO developed the Watershed Academy.

This after-school science program offers a variety of field and in-class experiences that expose students to locally relevant watershed issues and science career opportunities, while being fully aligned with 5th–8th grade California state standards in mathematics, science, language, visual and performing arts, and English language development.

Teachers running the MERITO Watershed Academy all receive training on how to use the guide and how to provide students with meaningful field experiences. Activities such as invasive green crab monitoring, plankton studies and water quality monitoring give students the chance to be scientists.

MERITO developed a similar partnership with adult education programs, providing adults from 16-75 years of age opportunities to learn more about watershed and marine protection through classroom instruction and field experiences.

The sanctuary program plans to expand MERITO to address additional multilingual and multicultural communities residing along the central California Coast area and eventually the entire nation.

For more information on MERITO or its programs, please contact MERITO Program Manager Michelle Templeton at (831) 647-4211 or michelle.templeton@noaa.gov.

Field Studies

Explore Our National Marine Sanctuaries with the National Geographic Society

NOAA's National Marine Sanctuary Program and the National Geographic Society have partnered to highlight the importance of our oceans through the National Marine Sanctuaries Field Studies Program.

These field studies introduce student/teacher teams to what makes marine sanctuaries some of our nation's most treasured places. They also teach how to use the power of photography to capture the field study experience, so that what is learned can be shared with others once participants return home.

Field studies allow participants to visit a marine sanctuary on a research vessel or by snorkeling or kayaking. Because each sanctuary is unique, each field study is a unique experience. This past summer, geographic and sanctuary staff conducted two field studies in Channel Islands and Gray's Reef national marine sanctuaries for approximately 50 teachers and students from across the nation.

Students document their exploration of California's Channel Islands with help from NOAA's National Marine Sanctuary Program and the National Geographic Society. Photo: Susanna Frohman/NGS

Participants learn about the region's natural and cultural heritage by interacting with National Geographic and sanctuary experts. Teachers are given an array of marine education resources that help to build ocean literacy into classroom curriculum.

Field study participants perform water-monitoring activities, investigate beach and dune ecology, explore marshes and wetlands, pilot remotely operated vehicles to explore the underwater environment and discover the unique cultures of the sanctuaries.

"Good field experiences give kids relevant hands-on ways to learn about the places and creatures that are their natural heritage, places they'll be inspired to want to protect, conserve and enjoy," said Barbara Chow, vice president for National Geographic Education and Children's Programs. "The skills they acquired on

this trip will help them be wise stewards of their environment."

Ultimately, students and teachers learn why oceans are important to all life on Earth, how to become personally involved in conserving these resources and how the oceans can be used to learn multi-disciplinary concepts—science, geography, social studies, photography or just about anything else.

Educators are selected through a competitive application process with priority given to teachers and students from schools that predominantly serve underrepresented populations and/or urban or underserved school districts. For more information, contact the National Marine Sanctuary Education Program at sanctuary.education@noaa.gov.

Coral Reef Classroom Key to Ocean Education

If you live near a wetland, river or ocean, shoreline walks and boat excursions are great ways for students to experience our water universe a more direct and sensory way. If you live near the warm waters of the Florida Keys, what would be more appropriate than a trip to a coral reef?

Since its inception in the early 1990s, Florida Keys National Marine Sanctuary's Coral Reef Classroom has provided free snorkeling trips for more than 4,500 local middle school students. Developed with a grant from the National Fish and Wildlife Foundation, the program has become a regular part of educational enhancement in Florida Keys schools.

The goal of Coral Reef Classroom is to encourage an ethic of environmental responsibility by giving students a firsthand encounter with their unique surroundings and emphasizing the importance of each habitat in the interrelated ecosystem.

"I learned that the coral reef ecosystem is very important to both the fish and the economy of the Florida Keys," said Julio Martinez, a Coral Reef Classroom graduate.

Each program includes a classroom and field component. In the classroom, a Florida Keys Sanctuary instructor reviews basic marine ecology and biology and introduces simple water quality sampling equipment. During the field trip, students perform water tests and take wind measurements. After leaving the reef, students set up a plankton tow and observe their "catch" using two-way viewers.

Teachers use Coral Reef Classroom to complement their regular units and have contributed many improvements to the program.

"I have as much fun as the kids do," said teacher Jean Timmins of Sugarloaf School. "It's a great way to link real-life situations with the theoretical learning we do in the classroom."

Enthusiastic support from community volunteers and charter businesses in the Florida Keys help make this program possible, and provide a vital link in students' exploration of career possibilities. For further information, contact Ivy Kelley of Florida Keys National Marine Sanctuary at (305) 852-7717, ext. 36, or Ivy.Kelley@noaa.gov.

Florida Keys National Marine Sanctuary's Coral Reef Classroom program gives students an up-close look at reefs. Photo: Ivy Kelley/FKNMS

Star of the Sea

Kim Rusk

Kindergarten is not the grade most people think of when they hear "science in the classroom." In fact, many people consider five-year-olds too young to absorb much "real science." Kindergarten teacher Kim Rusk of Madge Griffin Elementary in Clute, Tex., proves otherwise.

Rusk's students can identify major fish groups based on shape and color, create their own imaginary fish and discuss the special adaptations they give their fish for living in the ocean. Students never know what crazy—and educational—activity Ms. Rusk will have them doing next.

Rusk's teaching does not end with her kindergarten students. She also volunteers as a teacher mentor at her school, helping other primary grade teachers bring more science into the classroom.

Flower Garden Banks National Marine Sanctuary has benefited greatly from Rusk's talents. Since participating in the sanctuary's very first *Down Under, Out Yonder* education workshop in 1996, Rusk has been an avid supporter of the sanctuary's education and outreach programs, securing free meeting facilities and actively encouraging other teachers to participate in the workshops.

"What greatly surprised me was that so few people that live on the Gulf Coast even knew that we had a national marine sanctuary at our doorstep," said Rusk. "Many people had never heard of Flower Garden Banks."

Despite a very busy professional and personal life, Rusk also volunteers as a Naturalist on Board, going out on recreational dive trips to teach divers about the sanctuary resources and how they can help protect them.

"By presenting and teaching a few, the domino effect of education continues to reach many different constituents," said Rusk. "I will continue to volunteer and help Flower Garden Banks National Marine Sanctuary as much as I can. It is not only a personal endeavor to teach others about Flower Garden Banks National Marine Sanctuary, it is something that I truly love."

Rusk is the perfect role model for both children and adults to see that exploration, learning and discovery continue long after school ends.

Newsplash

New Sanctuary Education Resources

NOAA Launches New Online Guide to Marine Life

Working with the Ocean Channel, NOAA has developed an online guide to marine species found within national marine sanctuaries. To explore the *Encyclopedia of the Sanctuaries*, which covers everything from sea stars to blue whales, visit marinelife.noaa.gov.

Explore California's Channel Islands 'From Shore to Sea'

Educators are invited to explore the new *From Shore to Sea* Web page for access to digital labs and other activities related to the JASON Foundation for Education's multi-disciplinary curriculum. Developed in partnership with the Channel Islands National Marine Sanctuary, this comprehensive, standards-based resource engages students in science, math and technology using the Channel Islands the surrounding sea as its focus. The *From Shore to Sea* curriculum includes lesson plans on geography, natural history, culture, watersheds, kelp forests, marine conservation and much more. Supporting material, access to curriculum and professional development opportunities are available at channelislands.noaa.gov/edu/shoretosea.html.

Get SPLASHED with Education

Thanks to a new Web-based project developed by Hawaiian Islands Humpback Whale National Marine Sanctuary, students nationwide will have the opportunity in spring 2005 to become humpback whale researchers. Through *SPLASHED with Education*, students will learn about the biology, life cycle and migrations of the humpback whales by working with data collected as part of an exciting international humpback whale population study. Students will be encouraged to work in teams and share and compare their data just as real scientists do. Check out the *SPLASHED with Education* Web site at hawaiihumpbackwhale.noaa.gov for more information.

NOAA Grant Focuses on Watershed Education

Did you know that NOAA provides funds for innovative outdoor education programs in the Hawaiian Islands and the Chesapeake and Monterey Bay watersheds? If you are an educator in those areas who has developed a curriculum that aims to improve students' understanding of environmental stewardship by using the outdoors, a bay, a stream or the surrounding landscape as a living classroom, visit sanctuaries.noaa.gov/bwet for a Bay Watershed Education and Training Program grant application.

Teachers monitor the rocky intertidal ecosystem as part of the LiMPETS network. Photo: Kathy deWet-Oleson

Environmental Monitoring Not Just for Scientists

Five West Coast national marine sanctuaries have developed an integrated, hands-on program that enlists the help of students and teachers to track changes in intertidal species populations. Through LiMPETS (Long-term Monitoring Program and Experiential Training for Students), educators and students receive training in the scientific collection and compilation of long-term databases, on rocky intertidal, sandy beach and offshore species found in the Channel Islands, Cordell Bank, Gulf of the Farallones, Monterey Bay and Olympic Coast national marine sanctuaries. For more information about becoming a part of the LiMPETS network, please visit limpets.noaa.gov.

Become an Ocean Explorer!

Through a National Science Foundation grant, the Channel Islands National Marine Sanctuary presents Ocean Explorers. Ocean Explorers empowers California teachers to involve their students in original research on issues of interest. The program also helps teachers create ocean-themed, inquiry-based learning activities that meet federal, state and local standards. To learn more about Ocean Explorers, visit www.exploreoceans.org.

Helping Students Navigate Change in Hawai`i

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve and partners have developed an exciting new educational program designed to inspire and empower students in Hawai`i to take better care of their island home. The program uses the Northwestern Hawaiian Islands as an example of what Hawai`i's marine environment once was and can be. Teacher resources include curriculum and classroom videos. Visit hawaiireef.noaa.gov/education/NavChange.html to begin your exploration of this unique marine ecosystem.

New Education Program Taps the Power of GIS

Channel Islands, Florida Keys, Gray's Reef and Stellwagen Bank national marine sanctuaries have joined forces to develop three exciting lesson plans that combine geographic information systems and national marine sanctuaries to teach students about the oceans. *Underwater Treasures* helps students learn basic Cartesian map skills; *Submerged Lands* compares the bathymetry and width of the continental shelves of the Pacific and Atlantic oceans; and *Monitoring from Afar* explores how we study oceans using satellites, stationary buoys and drifting buoys. Write to sanctuary.education@noaa.gov for more information.

Explore Monterey Bay with Coralito

Follow a young boy's imaginary underwater adventures through Monterey Bay National Marine Sanctuary in the new bilingual, Spanish-English children's book, *Coralito's Bay*. During his dream-like journey, Coralito discovers the natural wonders in the sanctuary, and how important healthy oceans are to their inhabitants. Written by award-winning author Juan Felipe Herrera and richly illustrated with the artwork of Lena Shiffman, *Coralito's Bay* is a wonderful addition to any science or Spanish-language classroom. Copies of *Coralito's Bay* can be ordered by contacting Petra Witkowski at (831) 647-4209 or ordering online at www.mbnmsf.org.

The beloved Polynesian Voyaging Canoe Hokule'a helps students and teachers "Navigate Change" in Hawai`i. Photo: Ka'iulani Murphy/Polynesian Voyaging Society

Critter Files: Black-footed Albatross

Photo: Scott Hein, www.heinphoto.com

How far would you walk to get your next meal? A mile? Two miles?

How about 2,800 miles?

During a recent study, scientists learned that one tagged female black-footed albatross flew 2,800 miles to California's Cordell Bank National Marine Sanctuary (50 miles northwest of San Francisco) and returned to its nest in the Northwestern Hawaiian Islands to feed its chick.

She did this round trip over a 20-day period. She liked it so much, the parent flew back two more times to gather food for her chick, totaling almost 17,000 miles between all three round trips!

Black-footed albatross are open ocean seabirds that come to land only to breed. The majority of their life is spent riding the surface currents of the ocean and feeding.

The birds nest throughout the Northwestern Hawaiian Islands and the small Japanese island of Torishima, where there is little or no human habitation. After spending one to five years apart, albatrosses attempt to reconnect with their lifetime mate, also known as their pair bond.

If their mates do not return, it may take widowed albatrosses up to five years to find another mate, forgoing reproduction during that time.

When they do meet, the romantic mood is set with a tropical breeze and some lengthy bill clacking. After mating, one immense fertilized egg the size of a soda can is laid and both parents take turns protecting it from the intense sun in the sub-tropical Pacific. While one parent sits on the nest, the other has the job of finding food.

Once the chick hatches, the parents intensify their efforts to find food. These fast and furious migrations to productive waters, such as the northeast Pacific, are necessary to get the caloric requirements to raise a chick. Parent albatrosses may lose up to 20 percent of their body weight during breeding season, but quickly make that up by soaring back to the California current to feed on the abundant food supply.

In addition to surviving the hardships of the open ocean and natural predation, black-footed albatross suffer from additional impacts. Populations have steadily decreased due to threats, such as long-line fisheries, plastic ingestion, drift nets, non-native trees on nesting islands and PCBs.

Cordell Bank National Marine Sanctuary is supporting a collaborative study of the post-breeding season movements of the black-footed albatross through Cordell Bank, Gulf of the Farallones and Monterey Bay national marine sanctuaries, which are important breeding and feeding areas for this incredible species.

Studying pelagic seabirds offers opportunity to learn about geography, marine biology, physical oceanography, conservation and management. More information about these magnificent birds and exciting educational opportunities is available at cordellbank.noaa.gov/education.

If you had to travel 2,800 miles to get to your next meal, you'd want it to be worth the trip. Help us keep the buffet open by taking care of these special sanctuaries in the ocean.

Researcher's Notebook

Common name: Black-footed Albatross
Scientific name: Phoebastria nigripes
Max wingspan: 7 feet (2.13 m) in length from wing tip to wing tip and 12 inches (30 cm) in breadth
Max weight: 22 lbs (10 kg)
Max lifespan: at least 50 years
Distribution: North Pacific Ocean
Diet: fish, fish eggs, squid
Status: Population declining, Endangered (International Union for the Conservation of Nature based on projected future decline of more than 60 percent over the next three generations.)
Threats: Ingestion of plastics, long-line fisheries, non-native trees on nesting islands, PCBs

Sanctuary Voices

Education: The Key to Preserving Our Nation's Oceans


Photo: CORE

Rear Admiral Richard D. West, USN (Ret.)
President and CEO
Consortium for Oceanographic Research and Education (CORE)

Few Americans grasp how closely life on this planet is tied to its oceans.

The oceans make up 95 percent of the life-sustaining sphere of our planet and play a critical role in regulating our weather and climate, replenishing and maintaining the quality of the air we breathe, housing extraordinarily diverse forms of life, and shaping the ever-changing appearance of our coastlines.

As a career naval officer and a former Oceanographer of the Navy, I find it unimaginable to think of life without healthy oceans.

On April 20, 2004, after more than two years of public discussion and debate, the U.S. Commission on Ocean Policy released a sweeping report on the state of our nation's oceans and coasts. The commission's bottom line: "Oceans around the world are in trouble and the problems do not begin or end at the water's edge."

Unbeknownst to most Americans, humans have contributed to this worsening condition by releasing untreated sewage directly into coastal waters, allowing chemicals, contaminants and trash to be washed into streams and estuaries, and ignoring the consequences of harvesting the bounty of fish.

If we are to sustain life from this vital natural resource, the ocean community must take on the urgent and immediate task of cultivating interest in, and fostering stewardship of, our oceans.

CORE and its 77 members representing the nation's universities, aquaria, non-profit research institutes and laboratories, along with other partners in the ocean community, recognize that in order to improve the condition of our oceans, we must have a society that understands and cares about our oceans. To do this, we must work hard to increase Americans' awareness of ocean issues.

For this reason, CORE supports the commission's recommendation that the government establish a proactive coordinating body to expand agency collaboration and increase federal support for formal and informal ocean education programs for students at all levels, as well as teacher professional education and public outreach.

A well-coordinated commitment to ocean education in all its forms will create public awareness of critical ocean issues, as well as train the workforce required to study and solve the significant challenges that lie ahead for our planet.

As both a consortium and a not-for-profit organization, CORE works with ocean science educators, federal agencies and Congress. We collaborate with the National Oceanic and Atmospheric Administration and other federal agencies with oceans-related missions through the National Oceanographic Partnership Program.

We recognize the value of the nation's national marine sanctuaries in promoting research and education on marine and coastal resources.

Our education department also administers the National Ocean Sciences Bowl (NOSB®). Each year, the NOSB® engages over 2,500 high school students and 400 schools in regional and national competitions. All of these activities are designed to expand interest in and knowledge of the oceans.

CORE also serves as the central coordinating office for the Centers for Ocean Sciences Education Excellence network of research scientists, classroom teachers and informal educators funded primarily by the National Science Foundation. In addition, CORE provides program support for the Census of Marine Life, an international program that describes and explains species living in the ocean.

CORE member institutions are heavily committed to maintaining the scope and quality of ocean sciences graduate and undergraduate education and public outreach programs in the United States.

So in keeping with my personal goal to help increase this nation's level of knowledge and concern for our oceans, I'd like to issue a call to action: Let us all work together to promote lifelong ocean education. Both the U.S. Commission on Ocean Policy and the privately-funded Pew Oceans Commission have determined it to be an essential element for preserving the oceans on our unique water planet.

The opinions expressed by columnists in "Sanctuary Voices" do not imply endorsement by NOAA's National Marine Sanctuary Program of any particular product, service, organization, company or policy.

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SANCTUARY WATCH

NATIONAL MARINE SANCTUARIES

The National Marine Sanctuary Program is managed by NOAA's National Ocean Service

vision

People value marine sanctuaries as treasured places protected for future generations.

mission

To serve as the trustee for the nation's system of marine protected areas to conserve, protect and enhance their biodiversity, ecological integrity, and cultural legacy.

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The National Marine Sanctuary Program serves as the trustee for a system of 14 marine protected areas, encompassing more than 150,000 square miles of marine and Great Lakes waters. The system includes 13 national marine sanctuaries and the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, which is being considered for sanctuary status. The sanctuary program is part of the National Oceanic and Atmospheric Administration (NOAA), which manages sanctuaries by working cooperatively with the public to protect sanctuaries while maintaining compatible recreational and commercial activities. The program works to enhance public awareness of our marine resources and maritime heritage through scientific research, monitoring, exploration, educational programs, and outreach.