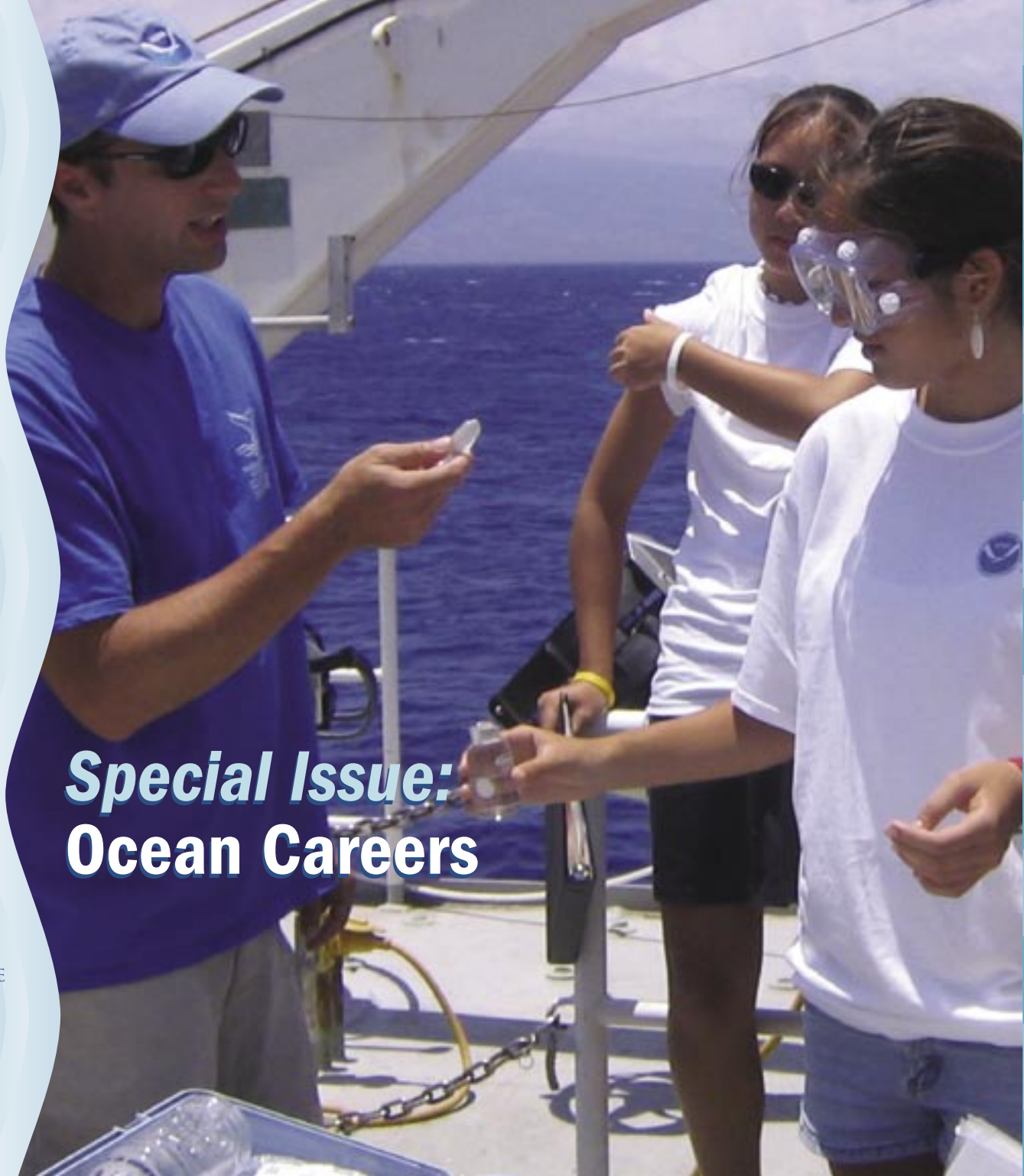


# SANCTUARY WATCH



## *Special Issue:* **Ocean Careers**



NATIONAL MARINE  
SANCTUARIES



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Photo: David Hall/NOAA



# Letter from the Director

We often emphasize in this publication how important it is for everyone to learn more about the oceans and become good stewards of the marine environment. Few know that better than the people profiled in this issue of *Sanctuary Watch*. They love the sea so much that they have made a career of exploring, protecting and working on or beneath the waves.

But, as you will discover, each person profiled in the following pages is making a contribution in a different way, and took a different path to get where they are today. Each has a different skill set. Each is working towards stewardship in his or her own way. Together they and others are like members of an orchestra, each with a different instrument but trying to blend together for effect. Ultimately, what counts is the symphony they play and how well they play it.

The symphony that is necessary to ensure all Americans become good stewards cannot be played unless the orchestra includes many talented people playing many different instruments.

Indeed, efforts to expand our knowledge of the oceans and manage marine resources wisely would falter without the contributions of accountants, artists, computer specialists, cartographers, photographers, geographers, economists, educators, engineers, historians, librarians, pilots, policy analysts... I could go on. I, for one, began my career as an engineer in the aerospace industry, but was drawn to more earthly matters and transitioned into an oceans career.

So, I'll let you in on a secret: You don't have to be a Ph.D. marine biologist to have an oceans-related career. Of course, it doesn't hurt, but it is by no means essential. If you don't believe me, just keep reading. And, no, a degree in English or art history will not prevent you from landing a good oceans-related job. Only a lack of creativity will.

One of the themes echoed in director Frank Capra's immortal film *It's a Wonderful Life* is that everyone, regardless of what work they do, can make a difference. This issue of *Sanctuary Watch* highlights some of the people who are making a difference in our ocean world.

Sincerely,

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

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Cover: Students in Hawai'i learn about oceanography aboard the NOAA Ship *H'i'ialakai*.  
Photo: Patty Miller/HIHWNMS

## Film Crews Visit Flower Gardens Banks Sanctuary

Each year, on the eighth or ninth night after the August full moon, billions of pellet-sized gametes erupt from coral polyps at Flower Garden Banks National Marine Sanctuary and soar to the surface during a mass coral spawning in the Gulf of Mexico. This year, Jean-Michel Cousteau's Ocean Futures Society was on location at the sanctuary to document the phenomenon for a PBS film about the National Marine Sanctuary System. Filmmakers Howard and Michelle Hall were also on site to obtain footage for an upcoming 3D IMAX movie tentatively titled *Denizens of the Deep*.



NOAA National Marine Sanctuary System Director Daniel J. Basta and Aldo Cosentino, director of Italy's natural resource protection agency, sign a partnership agreement. Photo: Elizabeth Moore/NOAA

## Sanctuary System Signs Partnership Agreement with Italian Agency

The National Marine Sanctuary System signed an agreement on Sept. 26 with Italy's Ministry of Environment and Land Protection. Under the agreement, the U.S. and Italy will focus on building marine protected area management capacity for both nations and planning the

next steps in the partnership. Future projects include developing "sister sanctuaries," and learning how Italians involve recreational users and businesses in site activities. Italy has one of the largest marine protected area networks in Europe. The new partnership is similar to ones already in place with Australia and South Korea.

## NOAA Opens New Maritime Heritage Center

NOAA opened the Great Lakes Maritime Heritage Center in Alpena, Mich. on Sept 17. The 20,000-square-foot facility features shipwreck exhibits, a 90-seat auditorium and an archaeological conservation lab. The center serves as the new headquarters for

Thunder Bay National Marine Sanctuary, and will be a major resource for educators and researchers throughout the region. The grand opening of the center coincided with a celebration

of the sanctuary's fifth anniversary sponsored by the National Marine Sanctuary Foundation. For more information about the center, including hours of operation, call (989) 356-8805 or visit [thunderbay.noaa.gov](http://thunderbay.noaa.gov)

## Two New Conservation Reports Available

The National Marine Sanctuary System recently published two marine conservation series reports. The first documents the results of a workshop on a Channel Islands deep water monitoring plan; the second summarizes the health and abundance of black grouper and yellowtail in Florida Keys National Marine Sanctuary. Both species are heavily exploited in the region. The Marine Sanctuaries Conservation Series provides a forum for publication and discussion of the complex issues faced by the sanctuary system. The reports are available at [www.sanctuaries.noaa.gov/special/special.html#series](http://www.sanctuaries.noaa.gov/special/special.html#series)

## New Species of Coral Discovered in Channel Islands Sanctuary

NOAA and University of California Santa Barbara researchers have discovered a new species of black coral off southern California, including in Channel Islands National Marine Sanctuary. The discovery came during dives in the Delta submersible. The new species, found at depths of approximately 300 to



Christmas Tree Coral (*Antipathes dendrochristos*)  
Photo: Mark Amend

725 feet, was reported in the online scientific journal *Zootaxa*. UCSB researcher Milton Love named the new species "Christmas tree coral" (*dendrochristos* in Greek), because it grows to a height greater than two meters and resembles pink, white and red flocked Christmas trees. For more information, visit [www.ia.ucsb.edu/pa/display.aspx?pkey=1242](http://www.ia.ucsb.edu/pa/display.aspx?pkey=1242)



Thunder Bay National Marine Sanctuary opened the doors to its new home, the Great Lakes Maritime Heritage Center, in Alpena, Mich., in September 2005. Photo: Adam Jurkowski/STC Images

## Spotlight On: Ocean Careers

*The sea is everything. It covers seven tenths of the terrestrial globe. Its breath is pure and healthy. It is an immense desert, where man is never lonely, for he feels life stirring on all sides.*

—Jules Verne

For centuries, the ocean has drawn people to its domain. From Phoenician sailors to modern-day commercial fishermen to biologists studying tiny limpets in tide pools, people have made a living on or near the sea.

The salvage diver worker for the U.S. Navy. The young kid who dreams of some day finding the next significant shipwreck—and does! The artist who becomes a marine-mammal-observing pilot. All share one thing in common - a passion for the ocean.

And for many, that passion can become a career. Just about any land-oriented job can be translated into an oceans-related one. A student in a high school biology class can become an oceanographer. A law student can become a maritime lawyer. Even a world-class chef can present his culinary creations to ocean-going travelers.

The ocean world is vast, and today there is no end to how an individual can turn his or her talents seaward.



Photo: Glenn Allen



Photo: U.S. Navy

Commercial and Navy divers go to places most humans don't. Their world is that of tight spaces and near zero visibility in an inhospitable and rapidly changing environment. In any given week, these divers might be asked to demolish underwater concrete, restore the flow of a pipeline, perform a salvage operation, or weld a rusted beam under a bridge.

But for the few brave ones who love this type of work, the rewards are exhilarating.

Navy diver Capt. Barbara "Bobbie" Scholley is one of those people. Her journey to the deep began before she joined the Navy and was inspired, in part, by an adventure writer.

"Though most divers would never admit to this for themselves, reading Clive Cussler's novels helped point me to the sea," Bobbie said. "The adventures described in some of his books really got me interested. Not that his tall tales were the only motivation but they played a part. The tight-knit camaraderie and challenges within the Navy's diving community did the rest."

Armed with her Cussler books, and a degree in biology from Illinois State University, she was commissioned in 1981 through officer candidate school in Newport, Rhode Island. In 1983, she graduated from the Basic Diving Officer School in Panama City Beach, Fla.

It wasn't long after her graduation from dive school that she began to distinguish herself. In 1990, she became the fourth woman to have command of a U.S. Navy ship. A few years later, she became the first Navy female to command a mobile diving salvage unit. In 1997, she became the Navy's first female supervisor of diving, a position she held for two years.

One of her greatest accomplishments, she says, was leading the salvage team on two expeditions to the wreck of the Civil War ironclad USS *Monitor*, protected as a national marine sanctuary.

"In 2001 we recovered her 20-ton steam engine, and in 2002 we brought up the vessel's 180-ton revolving gun turret," she said.

During the two summers and after 19 dives of her own, while working at a depth of 245 feet for no more

Bobbie Scholley helps remove silt from the USS *Monitor*'s partially buried steam engine to free it for its salvage lift. Photo: U.S. Navy



Background Photo: The Monitor Collection/NOAA

than 35 minutes per dive, Bobbie and her team did the necessary salvage work, which included manually fastening the cables that hoisted the engine and gun turret.

“Being part of history, especially naval history, is really something you can’t put into words,” she said. “It was great to be part of that team and to have had the opportunity to add to the National Marine Sanctuary Program’s long list of accomplishments. The *Monitor* expeditions, and working with the wonderful people that were involved, was the highlight of my 24-year naval career.”

Now retired, Bobbie is a member of the Women Divers Hall of Fame. “This is a terrific organization that gets the word out to female divers about the exciting opportunities available to them. The hall of fame also provides educational assistance, mentorship, and multiple scholarships that offer financial aid to individuals of all ages, particularly those who are preparing for professional careers that involve scuba diving.”



Bob has no control over his fast-moving and often shy subjects. While shooting on the surface, Bob’s subjects and boat are in constant motion, and the direction and quality of light are continuously changing. Of course, filming underwater presents its own host of problems. All of which explains why he will often spend weeks or months at sea waiting for all of these elements to come together.

But photographing stunning images is only a part of his ocean role. Bob is active on a national and international scale raising ocean awareness. He is on the board of governors for Oceana and on the board of the National Marine Sanctuary Foundation. He also collaborates with Jean-Michel Cousteau on Ocean Futures projects.

“Bob Talbot’s qualifications, passion and knowledge to communicate ocean stewardship are without challenge,” said John Englander, chief executive officer of the International SeaKeepers Society.

*Bob believes that a sense of ownership is key in moving ocean conservation forward. “People need to become stewards of their local environment, even if they live far from the coast. Everything we put in or on or land and waterways, ultimately ends up in the sea.”*

With his reputation growing each day, Bob has taken an active message to those interested in pursuing an ocean career.

“I’ve always believed that it would take a global effort to effect significant change in the sea,” he said. “But I have come to understand that, while ideal, globally coordinated action is a daunting challenge. If, however, we can motivate people to take care of their own little corner of the planet, we have a shot at restoring the health of the sea. Whatever ocean career you choose, fight for the region, the bay or even the tide-pool you can affect.”



Bob Talbot films orcas in Alaska. Photo: © 2005 Bob Talbot



From the first time he ventured into the water with a snorkel at age eight, Bob Talbot has been fascinated by the sea and the animals that inhabit it. Since then, he has made it his life’s work to foster a respect for animals and to fight to protect their habitat.

For more than 25 years,

Talbot’s whale and dolphin photographs have inspired wonder in people around the world, gaining him an international reputation as one of the best in his field.

Talbot is also a renowned filmmaker with several impressive credits under his belt that include the wildlife sequences for Warner Bros.’s *Free Willy* series, and Universal Pictures’ *Flipper*. Most recently, he directed and photographed the IMAX film *Ocean Men*, highlighting world champion free divers Pipin Ferreras and Umberto Pelizzari.

Growing up in southern California, Bob originally wanted to study marine sciences.

“I was in junior high school when I first started taking photographs,” he said. “At the time, I was set on studying marine sciences, believing that would be the most direct way to promote marine protection. But I soon realized the power of images to effect change and decided to concentrate my efforts in that area.”

Capturing marine life on film presents a range of challenges.



It's immediately clear to anyone who meets Barbara Emley that this California fisherman—yes, that's fisherman—embodies the spirit of those who make a living from the ocean. She's passionate about her work, the sea and her community. A person of many talents—she was

once a cabinet maker—Barbara puts

her passion to work, both on and off the water, for the benefit of her fellow fishermen and the marine resources on which we all depend.

As chair of the Gulf of Farallones National Marine Sanctuary Advisory Council, she works with various groups to promote sustainable fisheries and a thriving fishing industry. “I am sort of a mouthpiece for constituent groups.”

Her inclusive approach to problem-solving, and strong working relationships with both the fishing community and the sanctuary, have won her the respect and admiration of her peers.

“Chief among Barbara’s contributions to the sanctuary is an ability to effectively network within the fishing community, and act as liaison between the fishermen, sanctuary management and other agencies,” said Mary Jane Schramm of the Gulf of Farallones Sanctuary. “During the *Reduce Night Lights* campaign, she led the effort to encourage vessel operators to avoid aiming their lights at sensitive seabird habitats, which eliminated the need for regulatory action.”

*“I like it when we can work things out amongst the various parties without regulatory intervention,” Barbara said. “Having the knowledge and trust of the fishing community helps ease the process to determine the best course of action for fishing issues.”*

Barbara points out that fishermen spend a lot of time on the sea, giving them first-hand knowledge of the marine environment that can help the scientific community. Fishing for salmon and Dungeness crab keeps her on the water year-round, and sensitive to changes from season to season, and year to year. “We are



Barbara counts her catch of the day from a typical fishing trip. Photo: Bryan Eckert

cognizant of what happens in the food chain, and our information is passed on to biologists,” she said.

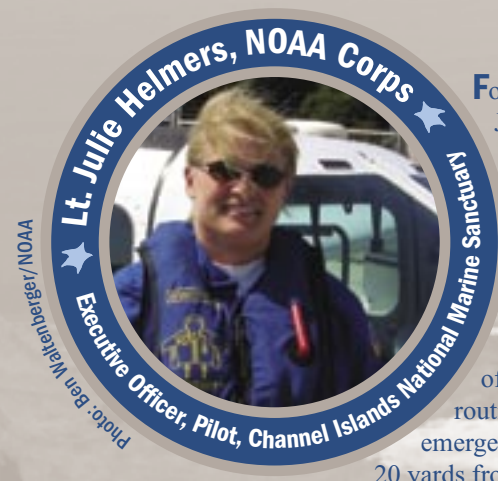
“Barbara brings a unique perspective of a person who spends much of her time on the water, derives her livelihood from it, and thereby becomes intimate with the sanctuary and its nuances,” said Zeke Grader, executive director of the Pacific Coast Federation of Fishermen’s Association, a nonprofit advocacy group.

“Her relationship with our association goes back a decade,” Grader added. “Barbara has been an ex-officio board member, and brings a unique female perspective and a calming influence to the board.”

In reflecting on her life, Barbara speaks affectionately of her fishing community. “The people are tight and the life can be wonderfully rewarding,” she said. “But we need to get the young ones back. The average age today of a fishboat captain is 57.”



Background Photo: GFNMS



For NOAA Corps pilot Lt. Julie Helmers, it was a typical workday—flying a helicopter low over the Pacific Ocean under clear, blue skies. In this instance, Julie was on a NOAA mission to observe dolphins south of San Diego. It was a routine flight until a huge shape emerged near the surface about 20 yards from her chopper. She circled

back for a closer look.

“It was big, though not a whale,” she said. On closer look, a giant manta ray suddenly exploded out of the water, did a back flip, and came crashing down. “I didn’t know they could do that!”

Seeing the manta ray’s acrobatics on that mission three years ago was yet another item on Julie’s list of thrilling and uncommon occurrences that have made her life the stuff of adventure novels.

When Julie first thought about what to do with her life, she never dreamed that a career in the U.S. Navy, and later the NOAA Corps, awaited. Born and raised in the San Francisco Bay Area, she always had a love of the ocean, but also a passion for the arts.

“My parents were wonderful in giving my brother and me an appreciation for music and art,” Julie said. They took us to galleries, musicals, exhibits, and arts and crafts fairs. At six, I started playing the clarinet and later the piano and bass clarinet.”

Along the way, she developed a talent for painting and sculpting, and had some of her work exhibited in local galleries and published in magazines. But something was missing from her life: adventure.

She began thinking about joining the Navy. She applied and was selected to the United States Naval Academy in 1983, where she became a member of the academy’s sailing team.

Soon after graduation, Julie found herself flying a Navy Sea Knight helicopter over hostile waters in the Persian Gulf during Operation Desert Storm. During one reconnaissance mission, her chopper appeared in the cross-hairs of an Iranian warship. “We received one warning. I threw all aircraft protocol out the window and high-tailed it out of there!”

More hair-raising experiences would follow.

After her tour in the Persian Gulf, she became the first female pilot stationed aboard an amphibious assault ship, and later commanded the flight deck on the USNS *Comfort* during Operation Uphold Democracy off the coast of Haiti.


But after many accomplishments and accolades, winning a slew of medals and commendations, Julie decided she had gone

as far as she could in the Navy.

In 1999 she separated from the Navy and was commissioned in the NOAA Corps, one of the seven uniformed services of the United States. During her first tour, she flew observation missions over the Everglades and coastal mapping projects off the NOAA Ship *David Starr Jordan*.

In 2003, Julie was assigned to Channel Islands National Marine Sanctuary, where she is the executive officer. She flies marine mammal and emergency oil spill response surveys, and participates in homeland security operations with the U.S. Coast Guard and Naval Criminal Investigative Service.

The NOAA Corps has opened up a whole new world for her. On any given overflight of the sanctuary, Julie will spot humpbacks breaching, enormous blue whales migrating and dolphins playing.

*“When I think back on all that I have done,” Julie said, “the words of Laurence Sterne from his A Sentimental Journey say it all: ‘What a large volume of adventures may be grasped within this span of life by him who interests his heart in everything.’”* 

Background Photo: Jan Rolento



Photo: CINMS



Photo: NOAA

On a typical dive, Tane Casserley wears four tanks – two on his back filled with trimix and one under each arm that are filled with decompression gases. He also carries two dive computers, two bottom timers, and backup

decompression tables in case he loses all of his electronics. The whole rig weighs about 180 pounds. After performing his safety checks, he shuffles to the edge of a boat, and attempts to gracefully enter the water without falling flat on his face.

Such is the world of the technical decompression diver.

Deep wreck diving is arguably one of the most dangerous types of diving a person can do. These divers go far beyond the range of recreational diving, which is typically 130 feet. For the deep divers, and for Tane, their domain is in the 230- to 260-foot regions of the ocean.

So what makes a person like Tane dedicate his life to marine archaeology, which will, at times, include deep diving?

From swimming to snorkeling to scuba diving, Tane was drawn to the water at an early age while growing up in Hawaii. The 33-year-old, marine archaeologist for the National Marine Sanctuary System knew early on that he would find his way to a maritime career.

“Having a Polynesian background also helps. My mother is a Maori from New Zealand and we have close ties to the sea.”

His childhood wanderlust with the ocean later became a serious career pursuit when he graduated from the University of Hawaii and then in 2005, earned a masters degree from the program in maritime studies at East Carolina University.

Before coming to the sanctuary program in 2002, one of his first projects was as a research specialist for the NOAA Fisheries Service in Hawai’i in 1997, assisting in pelagic fish research and the care of endangered marine mammals. That led to other work, including documenting the wreck of the steamer SS *Kauai* off Mahukona, Hawai’i; a survey of the submerged colonial town of Woodstock, N.C.; and documenting the wreck of the *Winfield Scott*, a side-wheel passenger cargo steamer that sank in 1853 off Anacapa Island in what is now California’s Channel Islands National Marine Sanctuary.


“I was fascinated by the sense of discovery,” he said. “I was drawn to shipwrecks, particularly the deep ones. From a personal sense of gratification, the deep sites are great because often you can be the first or one of the first divers to see these treasures. To be the first to see an historical wreck undisturbed is a thrilling moment.”

But Tane did not become a technical decompression diver merely for personal gratification. He is driven by a desire to bring archaeological discoveries to the public, particularly to raise awareness within local communities that have these resources in their backyards.

“These wrecks are links to our past,” Tane said. “I like sharing that information with the public. We are bringing history to the people. Think of my job as part historian, part photographer and part detective.”

Chief among Tane’s responsibilities with the sanctuary system is to lead underwater archaeology projects as the principle investigator or to lend technical assistance. Based in Newport News, Va., he has worked on projects in the Florida Keys, *Monitor*, Channel Islands, Stellwagen Bank and Thunder Bay sanctuaries, among others. One highlight of his NOAA career was leading a team that documented Canada’s first naval warship CGS *Canada*, later re-named the *Queen of Nassau*, which sank off Key Largo.

Playing detective is another thrilling aspect of Tane’s work. “After we find an unidentified wreck, the detective work begins to unravel its secrets – what’s the ship’s name, its origin, and in some cases, its type. Were there survivors? Why did it sink? Was it because of a storm, was the ship under attack, and so on.”

Next up for Tane—yet another project where he straps on nearly 200 pounds of gear, checks the dive tables one last time, and prepares to enter the water in search of a shipwreck whose secrets have slipped through history’s cracks. 



With colleague, Tane (right) maps artifacts from the *Pearl* and *Hermes* sites in the Northwestern Hawaiian Islands.

Photo: Robert Schwemmer/NOAA

Background Photo: Robert Schwemmer/NOAA





Photo: Doug Miller

Susan Farady's love for the sea began with a 4th grade science project. "I knew then I was hooked." So did her father, John Farady. "I remember when she saw the ocean for the first time, something in her just clicked," he said. "I could sense then that my daughter might end up doing something related to the ocean."

From a 4th grade science project to a degree in biology from the University of Colorado, then four years working on tall ships and yachts in every capacity, to finally landing at the Vermont Law School, the Colorado native has taken a circuitous road to her current post with the Ocean Conservancy's New England Regional office in Portland, Maine.

"I speak out for ocean conservation by speaking at public meetings, writing reports and other documents, and informing Ocean Conservancy members and the public about how they can get involved in ocean issues," Susan said. "I'm also a member of different committees where I represent conservation interests."

One of her responsibilities as the project manager on marine ecosystem protection issues for the nonprofit Ocean Conservancy is to represent marine conservation interests on the Stellwagen Bank National Marine Sanctuary Advisory Council.

"When I reflect on how we are managing our ocean and coastal resources today, I sometimes see it as the last great land grab," she said. "Many varying interests increasingly want a piece of the ocean. Here at Stellwagen, like in other sanctuaries and protected marine areas, the challenge is how to fulfill the sanctuary's mandate to protect resources while demands on ocean resources are on the rise."

She added, "By protection, though, I don't mean just one piece of the puzzle. The key is that the entire ecosystem needs to remain intact because it is all connected."

In a recent article published in the Ocean Conservancy's *Blue Planet*, Susan suggests that using sound science and public input to create "zones" for different purposes within the sanctuary could help conserve important resources, provide important scientific control sites, and be part of comprehensive ocean management.

She also noted other management actions that could help protect sanctuary resources. "For example, adopting regulations that would reduce whale entanglements, ship strikes and

noise disturbance could enhance marine mammal protection. Monitoring and limiting vessel discharges could help improve water quality."

*"Everyone has their own personal relationship with the ocean," Susan said. "The fisherman needs it for his livelihood. The photographer brings beautiful images to the public. Energy companies want more and more from the ocean. The kayaker finds quiet enjoyment. And all want to make it their own. The challenge is to ensure that we sustain a healthy marine environment amidst all the demands for access. It is a daunting task that needs to be addressed now before the ocean's health is irreversibly damaged."*

While studying biology in college, Susan fell in love with the marine sciences, but found herself interested in impacting management decisions and policies. By turning to law, and specifically environmental law, she felt she could make more of a difference in ocean-related concerns.

"It's time to re-examine our relationship with the ocean and how we treat it," she adds, "to resolve current conflicts as well as preserve our ocean heritage for generations to come."



Photo: NOAA Fisheries  
MMPA/ESA  
Permit #782-1438



As a young girl, Michiko Martin wanted to do something that related to the water.

So she begged her parents to buy her an aquarium, which they readily agreed to do. Little did they know that their daughter's fascination with things aquatic would later translate to successful careers as a U.S. Navy oceanographer and meteorologist, and now as the

national education coordinator for the National Marine Sanctuary System.

Chief among her goals is to increase understanding, awareness and appreciation of the ocean, and especially the national marine sanctuaries. Michiko works with a network of teachers and ocean education leaders from around the nation to enhance ocean literacy, educational partnerships, and educational offerings for children, teachers and adult learners.

"Many people, young and old, have a strong emotional connection to the ocean," said Michiko. "My challenge is to translate that enthusiasm to good stewardship. A popular misconception is that the ocean is large and infinite and thus can take care of itself. As an ocean educator, I show individuals how their personal choices and actions directly affect the ocean—the ocean on which their very lives depend."

Michiko's first memory of the ocean was learning how to swim. Living on Okinawa, a young Michiko learned to swim in the salty, tropical waters and catch fish that later found their way into her aquarium.

Years later, she entered the U.S. Naval Academy with an eye towards an English major. "An ocean career was not my first choice," Michiko said. "But in my junior year at the academy, I discovered that the Navy offered more employment opportunities for graduates with science and engineering backgrounds. So I changed my major to oceanography and fully embraced studying the wonders of the ocean world."

During her 12 years in the Navy, where she attained the rank of lieutenant commander, Michiko directed the daily operations of an office providing environmental support to naval forces operating from Okinawa, Japan; assisted in the operation of global atmospheric and oceanic models at the Fleet Numerical Meteorology and Oceanography Center in Monterey, California; and taught undergraduate oceanography and meteorology courses to midshipmen at the United States Naval Academy.

Today, in addition to a bachelor of science degree in physical oceanography from the Naval Academy, the 36-year-old Maryland resident holds a masters of science in educational leadership from Troy State University, and a masters of science in oceanographic

engineering jointly awarded from the Massachusetts Institute of Technology and Woods Hole Oceanographic Institute.

"We are at a critical time for ocean education. Superficial knowledge inadequately prepares individuals for making informed decisions about complex ocean issues," Michiko noted. "To even begin to address balancing conservation and use in ocean ecosystems, people must understand the importance of the ocean to their daily lives and appreciate the impact of their decisions on ocean health."

With success comes great satisfaction. Michiko never feels that her job is a grind. "When you really love what you do, it's not work. And to those considering a career in the ocean world, go after your dream – do something you really love, and personal and professional rewards will follow."



*"The future of the world depends on water...you have the responsibility."*  
—Jacques Cousteau

No story about ocean careers is complete without some mention of Jacques Cousteau. Specifically, his invention, with partner Emile Gagnan, of a self-contained system that made it possible to breathe for long periods of time underwater.

By inventing the "aqualung" in 1943, Cousteau changed forever how underwater exploration and work would be carried out. His invention set divers free to explore to depths of 100 feet and beyond. Before Cousteau, the only options available for undersea exploration were the diving bell and the helmeted diving suit, which severely restricted an explorer's movements.

He opened up more of the Earth's surface to human kind than any other explorer in history. Through his books, films, and undersea explorations, the French explorer, inventor, photographer and filmmaker brought the oceans and all their life into the world's living rooms.

"We all owe a debt to Cousteau," said Susan Farady of the Ocean Conservancy. "He inspired generations of marine biologists, teachers, explorers, divers and others who turned to the sea for a career."

To many people, he is a modern day guru who brought the undersea world to the public. His films inspired and educated generations, but none of that could have been possible without the invention that allowed divers to work freely underwater.

Today, his legacy is carried on by his son, Jean-Michel Cousteau, and by prominent ocean explorers like Robert Ballard and Sylvia Earle, and by many others who are working every day to promote a brighter future for our oceans.



Photo courtesy Aquarium of the Pacific



# Sanctuary Voices

The Ocean Should Be Part of Everyone's Career

J. R. Schubel, President  
Aquarium of the Pacific

The ocean makes Earth habitable, and it is where life on Earth began. Our major influences on the world ocean result from activities on land. As the population increases and moves towards the margins, and as more of the world is driven by consumption often using environmentally unfriendly energy sources and technologies, all of us must be thinking about the ocean and our coasts and what kind of future we want to create for them.

This will become the century of the environment; the century in which the environment in all its dimensions takes center stage. Because the ocean covers 71 percent of the planet and dominates life on Earth, it will become the century of the world ocean. It is the century in which humans will discover their place in nature and the leadership roles they need to play. It is the century in which the range and number of environmental careers will explode. This will be particularly true for careers that have ocean and coastal foci.

Too often we think of opportunities for ocean careers only in terms of science and management, but they extend across the full spectrum from science to management, policy, business, law, journalism, art, literature, agriculture, medicine, veterinary medicine and even to working in an aquarium. We need an ocean literate public—one that understands basic oceanic properties, processes and phenomena; one that understands how the ocean affects them and how they affect the ocean no matter what they do or where they live; and one that acts upon that understanding. Our personal and professional portfolios must contain within them an appropriate allocation of investment in futures with an emphasis on water. It is very clear. We must all become ocean literate.

In order to achieve the goal of an ocean literate public, careers in ocean education will be more important than ever. These can range from K-12 teachers and university professors to a variety of positions in informal science institutions like the Aquarium of the Pacific. At the aquarium, there are many different positions with diverse responsibilities. Aquarists are responsible for caring for our fish and invertebrates, aviculturists are responsible for our birds, and mammalogists are in charge of caring for our seals, sea lions and otters. Other positions include water quality technicians and veterinarians.

Our educators teach classes to school groups on and offsite and to the general public in courses for toddlers to adults. Our presenters discuss exhibits and conservation issues with the public in formal presentations and our volunteers engage

our guests one-on-one. There are communicators and writers who focus on creating articles and developing content for our publications and Web site, researchers who gather data for exhibits and special projects, and exhibit designers and graphic artists who develop ways to educate and engage the public on topics from watersheds to whales.

As we begin to fully understand how the ocean affects us and we affect it, we will need ocean professionals from diverse backgrounds that will help us learn about and make the best decisions for our planet.



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

## Ocean Career Resources

*Numerous government, private and nonprofit organizations offer excellent opportunities for those seeking marine-related careers. Check out these Web sites for more information:*

**Center for Ocean Sciences Education Excellence**  
[www.oceancareers.com](http://www.oceancareers.com)

**OceanLink.com**  
[oceanlink.island.net/career/career2.html](http://oceanlink.island.net/career/career2.html)

**Federal Government Jobs**  
[www.usajobs.gov](http://www.usajobs.gov)

**OceanAGE**  
[www.oceanexplorer.noaa.gov/edu/oceanage/welcome](http://www.oceanexplorer.noaa.gov/edu/oceanage/welcome)

**Ocean Science Careers**  
[www.vims.edu/bridge/career.html](http://www.vims.edu/bridge/career.html)

Background Photo: Claire Johnson/NOAA



NATIONAL MARINE  
SANCTUARIES

The National Marine Sanctuary  
System is part of NOAA's  
National Ocean Service

1305 East-West Highway  
Silver Spring MD 20910  
301-713-3125  
<http://sanctuaries.noaa.gov>



SANCTUARY  
WATOH

### 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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## National Marine Sanctuary System



The National Marine Sanctuary System includes 14 marine protected areas that together encompass more than 150,000 square miles of ocean and Great Lakes waters. The system is managed by the National Oceanic and Atmospheric Administration in partnership with federal, state and local agencies, and with input from the public. For more information about the National Marine Sanctuary System, visit [sanctuaries.noaa.gov](http://sanctuaries.noaa.gov)