

# SUPERINTENDENT'S QUARTERLY REPORT

JULY THROUGH SEPTEMBER, 2016

## Top Stories

### Expedition of Discovery

In August, GFNMS and Office of National Marine Sanctuaries Maritime Heritage staff, in partnership with Ocean Exploration Trust (OET) and NOAA's Ocean Exploration and Research, embarked on an expedition on the (E/V) *Nautilus*. The mission was the first human viewing of the deep sea habitat in the expanded sanctuary as well as of the sunken aircraft carrier *USS Independence*. It brought to the public a virtual immersion of our rich cultural heritage and natural wildlife of the sanctuary. Over 30 "Scientists Ashore" from more than ten partner agencies and scientific institutions participated in the sampling and data collection, either onboard or from shore via live video feeds.

The cruise included multibeam sonar imaging of five shipwrecks, and almost doubled the areas mapped for substrate (sea floor) type and depth via multibeam and sub-bottom profiling. The expedition covered the waters off the San Mateo and Sonoma/Mendocino coasts, targeting little-explored Arena Canyon and the Farallones Escarpment. It also provided unprecedented, intensive education and outreach opportunities. See further details under the [Conservation Science](#), [Education](#) and [Maritime Heritage](#) sections.



Key partnerships such as this provide data and other products for cultural and natural resource protection, zoning, exhibits, web content, and social media content, which engage the public and helps raise awareness of the sanctuary's multi-faceted work.

*Left: Maritime heritage scientists study ROV images  
Photo credit: (c) Ocean Exploration Trust, funded by NOAA."*

### NOAA Awards Bronze Medal to GF Staffer

This summer, Media/Communications Specialist Mary Jane Schramm was named as co-recipient of the NOAA Administrator's Bronze Medal, for her work on the shipwreck *USS Conestoga*. The medal will be awarded November 15 in Silver Spring, MD.

## MANAGEMENT

### **Sanctuaries hold joint Advisory Council Meeting**

Greater Farallones and Cordell Bank Advisory Councils held a joint advisory council meeting in Point Reyes. Agenda items included an update on the sanctuaries activities related to the request from the US Coast Guard to exempt discharge from their vessels as well as discharge from small arms training and search and rescue training exercises. The Coast Guard already has a discharge exemption during an emergency response. Sanctuaries are currently conducting research and writing sections of the environmental analysis. The councils also heard a presentation from Dr. John Largier on hypoxia, de-oxygenation and monitoring oxygen levels in the two sanctuaries.

Joint meetings every other year are an effective way in which councils can address issues of common concern and promote communication between sites.

## CONSERVATION SCIENCE, RESEARCH

### **GFNMS Provides Visuals for Educational Video**

Conservation Science staff provided archived video and still images for the [Discovery of Sound in the Sea \(DOSITS\)](#) Project, hosted by the University of Rhode Island's Graduate School of Oceanography. The images were of marine mammals, and were collected during Beach Watch surveys and deep-sea coral cruises. DOSITS creates educational videos of various topics in underwater acoustics and will focus on marine animal hearing as a resource for the regulatory community.

GFNMS provided underwater imagery of California sea lions. Science data and products are often used for exhibits, web and social media content to engage the public and help raise awareness of the sanctuaries. Conservation science staff mentors many students each year through internships, volunteers, and scholarships.

### *Monitoring To Understand Long-Term Trends*

### *Coastal Monitoring - Beach Watch*

### **New Book Profiles Farallones Research Programs**

In August, [Citizen Scientist: Searching for Heroes and Hope in an Age of Extinction](#) (Mary Ellen Hannibal, The Experiment Publishing) launched to praiseful reviews in

San Francisco. Hannibal singled out the sanctuary's long-term efforts to involve the public in conservation science through its Beach Watch coastal monitoring program, and its ACCESS bird-and-mammal focused research cruises. It recounts the author's personal journey into ecological systems, and praises how citizen science provides a new platform for addressing current and emerging issues, and making meaningful changes. See <http://www.maryellenhannibal.com/2016/07/18/citizen-scientist/>

### **Beach Watch Recruits for Coastal Monitoring**

Conservation Science staff began recruiting new Beach Watch volunteers this summer, with orientations and training in October and November, followed by several weeks of one-on-one training in the field. The recruitment, screening and training process is intensive: Orientations provide prospective volunteers with information about the program, requirements and commitments expected from the volunteers, as well as the benefits of volunteering for this award-winning, citizen science monitoring project. Skills in wildlife identification are assessed. Training class size is limited, and only 20 to 25 top applicants will be selected to attend trainings.

Beach Watch, a sentinel site monitoring project, provides valuable information to sanctuaries and partner agencies on a variety of management issues, including compliance with state and federal laws, climate change, wildlife disturbance, and status and trends of coastal wildlife.

### *Sanctuary Ecosystem Assessment Surveys (SEAS, ACCESS Surveys)*

### **Scientists Document Large Whale Aggregations**

Greater Farallones National Marine Sanctuary (GFNMS) and Cordell Bank National Marine Sanctuary (CBNMS) scientists and collaborators completed three research cruises this year to survey the pelagic and nearshore ecosystem as part of Applied California Current Ecosystem Studies (ACCESS), a joint project of CBNMS, GFNMS, and Point Blue Conservation Science. Scientists collected oceanographic measurements, sampled for prey availability, and recorded bird and mammal observations along predetermined transect lines to determine how the ecosystem responds to oceanographic drivers. The team documented large feeding aggregations of whales, mostly humpbacks, on the Continental Shelf and within a few kilometers of a shipping lane. Sampling indicated krill was present.

The project looks at intra- and inter-annual trends to understand changes in the ocean ecosystem. Data analysis will be completed over the winter but the team noted that whale abundances were higher this year than in 2015, which was an *El Niño* year, and among the higher years of whale abundances in the thirteen year ACCESS data set. At the same time, gelatinous zooplankton remained high in the prey samples, a trend that began in 2013. ACCESS is an important sentinel site monitoring project investigating the status and trends of sanctuary resources, ecosystem health, and response to climate change.

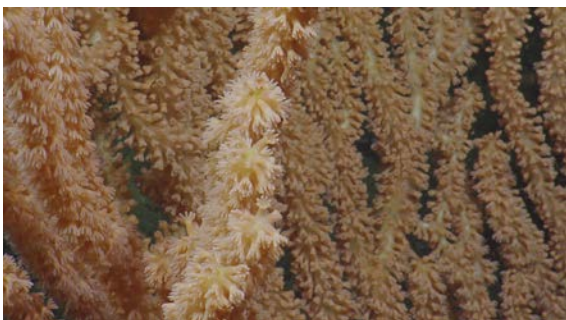
### Media Join ACCESS Research Cruise

In July NBC Nightly News, KQED Radio, and Wired.com sailed aboard the R/V *Fulmar* during an ACCESS survey cruise. NBC focused on sanctuary efforts to reduce whale mortality from ship strikes; the other media covered more general topics. Numerous endangered blue and humpback whales were sighted and recorded by the videographers. See

<http://www.nbcbayarea.com/investigations/Hundreds-of-Endangered-Whales-Likely-Killed-off-California-Coast-Over-Past-Decade--390248931.html>

### E/V *Nautilus* Helps Explore Farallon Escarpment, Arena Canyon, Deep-sea Coral Habitats

In addition to documenting and mapping shipwrecks during the E/V *Nautilus* cruise, sanctuary and visiting biologists also documented marine habitats for fish and invertebrates, including deep sea corals and sponges, living habitats never explored in the deeper reaches of the sanctuary, far west of Point Arena and along the Farallon Escarpment. This will form the basis for planning future habitat characterization, and quantification of corals, sponges and associated fish.



Deepwater bamboo coral, Arena Canyon. Photo: NOAA/OET

## RESOURCE PROTECTION

### Protecting Habitats

#### Collaborating with other NOAA Marine Debris Offices

Since July, 2012 Greater Farallones National Marine Sanctuary, in partnership with NOAA's Marine Debris Program and the Office of Response and Restoration, has participated in the Marine Debris – Monitoring and Assessment Program. The program engages citizen scientists to use NOAA designed protocols for executing monthly surveys at six beach locations. Surveys provide baseline data on the type, abundance, and distribution of debris on sanctuary shores while also protecting habitat through debris clean-up efforts. This represents a unique opportunity for engaging citizens in their sanctuary while educating them about marine debris, and is featured on the Marine Debris Program website. To learn more: <https://marinedebris.noaa.gov/research/citizen-science-marine-debris-monitoring-greater-farallones-national-marine-sanctuary>

Project data can be used to evaluate marine debris impacts along our coastlines and help inform future debris prevention efforts on a local, regional, and national scale. The program also highlights the partnership between the sanctuary, concerned individuals, and local beach managers including state parks, and the National Park Service, as well as our national partners at the Office of Response and Restoration and Marine Debris Program.

### Reducing Impacts from Vessels

#### Vessel Grounding Drill Hones Responders' Skills, Tests Low-Tech Resourcefulness

In August Beach Watch and LIMPETS staff participated in a drill to document damages from a simulated boat/shipping container grounding at Duxbury Reef. Staff practiced performing low cost, rapid damage assessment for sandy beach and rocky shore habitats. The drill included a scenario in which there was no internet connection, relying solely on hard copy forms, references, and locating equipment and gear. Staff also geotagged images collected in the field, which could later be used for evidence of damages for penalties and restoration needs.

Such drills hone the skills of sanctuary staff, many of whom are response and damage assessment experts, with decades of experience in oil spill response, damage assessment and impacts of oil on wildlife. Greater Farallones sanctuary is a leader in recouping restoration costs for damage to sanctuary wildlife, habitats, and lost recreational uses.

### *Protecting Whales and Other Marine Mammals*

#### **Farallones Staff Participate In Entangled Whale Response and Prevention Workshops**

In July and August sanctuary and association staff took part in two "Entangled Whale Response and Prevention Workshops" hosted by Point Blue Conservation Science and California Whale Rescue, with other conservation groups and government agencies. The workshops outlined local and regional causes and impacts of whale entanglements, which can impede the recovery of endangered species such as blue and humpback whales. The trainings were taught by trained responders authorized by NOAA to carry out rescue operations in the North-central California area, and familiarized attendees with the equipment and techniques used in rescues. The trainers illustrated the use of cutting tools specially developed to release whales from fouling gear, GoPro cameras to examine fouled gear connections, and telemetry tags to track whales once located. They also presented a "post-action" review, or case history, of a successful whale rescue. On the water exercises at Romberg Tiburon Center helped demonstrate the challenges of marine life rescue.

Whale entanglement, especially in fishing gear, is an increasingly significant problem among whale populations off California, especially in 2016, which saw an unprecedented number of crab gear entanglements. These compromise a population's recovery from impacts of whale hunting, whose effects are still being felt.



Entangled humpback off Point Reyes, fall 2016  
Photo credit: USCG/CBNMS under NOAA Permit.



Whale rescue/NOAA permit #18786 (from Boston area)

#### **Sanctuary Warns, Don't Encroach On Whales**

As humpback whales persisted near shore throughout the summer, feeding in shallow waters, the sanctuary responded to numerous constituent complaints and media inquiries about humpback whale disturbances along the San Mateo County Coast. An increasing number of paddleboarders, kayakers, motorboats and other small craft users were approaching within yards of feeding humpback whales.

Outreach staff distributed flyers and used social and traditional media to warn against such potentially injurious activities. The Farallones marine sanctuary, which manages the north sector of the Monterey Bay NMS, carried out its role in resource protection by advising that these whales are protected by federal law, and of the dangers to people and the whales by such behavior.

#### **Battle of the Bay Provides Opportunity for Targeted Whale Harassment Outreach**

Farallones communications staff worked with NOAA Fisheries to prevent whale harassment through targeted outreach at the 6th Annual Battle of the Bay in September. This paddleboarding, kite-foiling and windsurfing competition and expo drew crowds of onlookers to Crissy Field near the Golden Gate Bridge. The event overlooked the site where numerous close-approaches and potential disturbance occurred this spring and summer, as humpbacks from the sanctuary entered San Francisco Bay in unprecedented numbers.

With its proximity to San Francisco's population of nearly eight million, wildlife disturbance is a major concern to Farallones sanctuary management. This year a significant number of humpbacks chased anchovy shoals into San Francisco Bay. Many were approached, and some may have been struck, by recreationists eager for a

close encounter. One kite boarder repeatedly closed in on and jumped a whale. Targeted outreach is essential to prevent future such occurrences.

### *Finding Solutions to Climate Change*

#### **Local Counties Benefit from GFNMS Climate Program**

Marin and San Mateo counties are pursuing climate adaptation plans with the help of data and information developed and synthesized by the Greater Farallones National Marine Sanctuary (GFNMS) Ocean Climate Program. Both counties recently completed sea level rise vulnerability assessments using the results of the GFNMS Climate Change Vulnerability Assessment for the North-central California Coast and Ocean, and will continue working with GFNMS in the development of adaptation action plans. For example, Marin County has begun mapping the type and location of natural coastal resources on its coastline potentially susceptible to climate change impacts, using products developed by GFNMS staff and the sanctuary advisory council.

Collaboration across all levels of government is critical for the successful implementation of climate adaptation, and the collaborative efforts along the North-central California coast demonstrate the utility of NOAA data and tools to inform local planning.

#### **Greater Farallones Climate Coordinator Visits Five Sanctuaries to Discuss Adaptations**

The Farallones Ocean Climate Program Coordinator visited a total of five national marine sanctuaries in 2016 to discuss climate adaptation efforts in an attempt to broaden the reach of climate work across the sanctuary system. The goal of these visits was to showcase Greater Farallones climate adaptation work and discuss with other sites' staff how a similar process may be applied at those sanctuaries. Programs included climate vulnerability workshops and staff trainings on climate adaptation planning.

Sites included the Hawaiian Islands Humpback Whale NMS, the National Marine Sanctuary of American Samoa, Channel Islands, Monterey Bay, and Stellwagen Bank national marine sanctuaries. Farallones staff will continue working with the NAFTA Commission for Environmental Cooperation to conduct rapid vulnerability assessments at select Marine Protected Areas (MPAs) throughout North America.

## EDUCATION

### *Increasing Awareness of the Sanctuary*

#### *Outreach*

#### **E/V *Nautilus* Brings Underwater World to Life**

Education was a major focus of the E/V *Nautilus* cruises, and the *Nautilus*' communications technology provided an advanced platform for outreach throughout the cruise. Viewers tuned in from around the world: including Norway, China, Australia, Europe, North and South America. Engaging the public through live streaming video, worldwide, 24-hours-a-day, provided real-time interactions with the science team aboard the ship during the ROV dives and seafloor mapping. In a series of live, satellite-enabled internet broadcasts, more than forty hours of scientific observation, mapping (funded by a grant from the Office of Naval Research) and ongoing interpretation and education reached a global audience that at one stage included 36 different countries as well as a wide following in the United States. Throughout the dive, logged-in followers who wished to ask questions or provide their thoughts totaled more than 2,700 at any given minute.

Live chats with Farallones sanctuary staff were staged from the floors of the Exploratorium and the California Academy of Sciences.

Data collected will be used to create detailed maps and 3-D photo-mosaics of two shipwrecks. Post-mission videos and photographic images will greatly increase our understanding of deep-sea creatures, seabed and shipwrecks and the importance of rocky features and shipwrecks for biological diversity.

#### **Press Tour of E/V *Nautilus* Kicks Off Expedition**

On August 19 reporters from Associated Press, San Francisco Chronicle, KGO-7/ABC TV, KTVU-2/Fox TV, KQED Public Radio and other outlets interviewed scientists aboard Ocean Exploration Trust's ship, E/V *Nautilus*, on the eve of its voyage into Greater Farallones National Marine Sanctuary and adjacent waters. The exposure was designed to can leverage public interest in the sanctuary's biological and cultural resources, and to promote public participation in the many opportunities the expedition afforded for interacting with scientists while the cruises were underway. The coverage also demonstrated how the sanctuary approaches its mandate of natural

resource conservation and maritime heritage preservation through partnerships and multidisciplinary research efforts.

As the expedition was underway, extensive media coverage continued, with a live broadcast of the feed from a dive for over an hour on the Weather Channel, and more than 2,450 news stories with more than 115 million media impressions, including major papers, magazines, television and radio.

### **Shark Dive Naturalists Trained in Sanctuary Issues**

This summer 31 naturalists and crew from commercial white shark cage dive operators took part in a sanctuary sponsored one day training as part of the sanctuary's permit requirement for attracting or approaching white sharks during recreational operations.

## **Events - Public Programs**

### **Sanctuary Explorations Series**

The Sanctuary Explorations Series provides monthly opportunities for the public to connect with and experience our national marine sanctuaries. Building a strong public sanctuary constituency as well as inspiring ocean literacy, conservation ethics and wildlife etiquette through experiential learning are the goals for the series.

### **Explorers Experience Bioluminescence by Kayak**

In August, Greater Farallones sanctuary education staff partnered with Point Reyes Outdoors to lead an evening bioluminescence kayak excursion. Twenty-four Sanctuary Explorers experienced the eerie phenomenon of bioluminescence in the sheltered waters of Tomales Bay. They launched their kayaks and watched waves of cormorants -- large black seabirds -- return to roost on the shores of Hog Island. They watched as tiny plankton, called dinoflagellates, fired their photophores and created their bioluminescent magic. The explorers learned about the history, local animals, and the science behind bioluminescence while also learning basic paddling skills, water safety skills and equally important wildlife viewing etiquette.

Other excursions included a Farallones Nature Cruise, with 38 people aboard, and a naturalist-led habitat restoration day with 12 participants, on Kent Island in Bolinas Lagoon removing non-native plants.

In addition, eighteen corporate volunteers from Genomic Health learned about the sanctuary this quarter.

## **Other Outreach**

### **"Discovering the Coast" at Point Arena**

Over 210 people learned about the marine sanctuaries that now protect the Sonoma and southern Mendocino counties coast at the August 6th Discover the Coast event at Point Arena, CA, sponsored by the Bureau of Land Management. The Greater Farallones sanctuary had displays both in town and along the coastal walk focused on Beach Watch, and spotlighted issues such as wildlife entanglement and disturbance.

Visitors to the downtown display pledged to help the ocean by keeping dogs leashed around seals and seabirds, doing beach cleanups, and other ocean-friendly actions. Pledges were placed into personalized, decorated marine-themed bottles as reminders, to be added to as new ways to protect the ocean come to mind.



*Youngster with her "ocean pledge" messages in a bottle she will keep. Photo: Mary Jane Schramm*

Point Arena represents the new northern limit of the Farallones marine sanctuary, and it is important to clarify the sometimes confusing aspects of sanctuary designation, versus state marine protected areas, some of which include no-take zones - a highly controversial subject. These communities continue to learn the benefits of sanctuary protections, partnership potentials, and the nature and scope of sanctuary efforts in education, research, conservation and management.

### **"Sex on the Breach" Talk: Love among Leviathans**

On July 27 Farallones staff delivered a presentation on cetacean (whales, dolphins, porpoises) reproduction, courtship and life history strategies to approximately 40

attendees at the American Cetacean Society-San Francisco Bay Chapter monthly meeting in Sausalito. The talk focused on local species such as gray, humpback and blue whales, harbor porpoise, and others. It covered reproductive structures and strategies (e.g., combat, display, sperm competition), and parenting patterns, including types of parental investment, alloparenting (a type of fostering), behavioral patterns, and anatomical features that help cetaceans to play the "DNA Game" more successfully. Topics termed, "Who's Hot and Who's Not," "Playing The Mating Game," "In the Mood," etc., created a lighthearted atmosphere, and generated great audience participation during Q&A.

Knowing where, when and how species breed and nurture their young is important in understanding life systems and behavioral patterns, and in effective conservation and management measures. This presentation also presented insights into the value of sanctuary protections to multiple generations of whales and dolphins.

### **Presidio Teacher's Night Reaches Local Educators**

In September Presidio Teacher's Night introduced 80 local science educators to sanctuary programs in September.

### *GFNMS Visitor Center*

The Greater Farallones National Marine Sanctuary Visitor Center educates diverse audiences of the general public along an environmental literacy continuum, including developing awareness, building a knowledge base, changing behavior, and building a stewardship ethic. Drop-in visitors come from the Bay Area and all over the world. School programs include plankton netting for view under the microscope, searching for shore crabs and activities in the Visitor Center to learn about animal adaptations. Students take part in indoor as well as outdoor activities on Crissy Field Beach in the Golden Gate National Recreation Area. Visitor Center field trips served 84 students this quarter.

Farallones sanctuary Visitor Center field trip programs promote ocean literacy and provide standards-based interactive programs inside the center and in the field for kindergarten through high school. Total Visitor Center walk-in attendance for this quarter numbered 6,024.

### *Weekend Family Workshops*

Weekend family workshops are held twice a month at GFNMS facilities at Crissy Field, Presidio. These programs foster connections within the sanctuary community and provide ocean education to children of all ages. This quarter 195 people participated in them.

Topics included salmon, squid, building a Remotely Operated Vehicle (ROV), "building" a white shark, and an ocean-themed birthday party workshop.

The programs engage ocean enthusiasts of all ages, some who have never seen the ocean floor, or who have never taken part in a dissection.



### *At-Your-School (AYS) Programs*

The At Your School (AYS) programs served schools throughout the San Francisco Bay area, primarily during the school term. The AYS program has reached tens of thousands of Bay Area students with programs such as the Crab Cab, Seabird Shuttle and Sharkmobile. AYS is an outreach program of Greater Farallones National Marine Sanctuary designed to promote environmental literacy and increase students' awareness and knowledge of coastal and marine life. It includes standards-based interactive classroom programs for kindergarten through twelfth grade. AYS served 234 students this quarter.

### *AYS/Fisherman in the Classroom*

The Fisherman in the Classroom program brings together sanctuary educators and working fishermen to classrooms, to team-teach students at middle and high school levels. Students learn the challenges, economics and rewards of salmon and Dungeness crab fishing in sanctuary and adjacent waters, and the relationship between the fisherman and sanctuary conservation policies. Sustainable fishing and the importance of healthy watersheds were also discussed. The fishing industry and community is an important partner for Greater Farallones National Marine Sanctuary and National Marine Fisheries Service. Working with schools and fisherman continues to help develop connections between youth, marine sanctuaries and the fishing community. The teaching team typically employs fishing-

related props like an industrial crab trap, fishing lures and hooks, and delivers a presentation on commercial fishing in Central California. In many cases they are able to perform dissections on a hatchery Chinook salmon.

## Sanctuary Explorers & WAVES Camps

### Explorers Camp Offers Ocean Experiences, Stewardship Awareness

This summer, the Farallones Marine Explorers Summer Camp engaged 73 students in week-long experiential outdoor learning programs. Marine Explorers Camp is a collaboration among the Greater Farallones Association, Greater Farallones National Marine Sanctuary, the City of San Francisco's Randall Museum, and the San Francisco Recreation and Park Department, to provide four one-week long programs of outdoor field trips and hands-on activities to immerse students in marine science exploration and experiential outdoor learning. The 40 hour curriculum included sand crab monitoring, coastal watershed restoration, squid dissections, plankton tows, building and operating Remotely Operated Vehicles, ocean kayaking, and excursions to The Marine Mammal Center and Seymour Marine Discovery Center. All activities were designed to inspire a strong marine conservation ethic.

A field based summer camp provides children with direct experiences to connect with their national marine sanctuaries and increase their ocean literacy through exploration and discovery. Collaboration with multiple scientific institutions increased the diversity and richness of each child's experience.

The WAVES camp introduced 36 students to the sanctuary. The Marine Science Institute camp involved 370 students; and 56 students took part in other camps involving sanctuary education staff.

### LiMPETS – Long-term Monitoring Program & Experiential Training for Students

The Long-term Monitoring Program and Experiential Training for Students – LiMPETS – is a statewide national marine sanctuary program that trains teachers and students to get involved in real scientific investigations and become ocean stewards. It reaches over 6,000 students annually, exposing them to California's sanctuaries and engaging them as ocean stewards.

The Farallones LiMPETS team hosts teacher training workshops, thus allowing even more students to experience the program. Teacher workshops expand teacher knowledge and ultimately increase the number of student citizen scientists doing science along our shores. It also introduces new teachers from a diversity of communities to the national marine sanctuary program.

### Publication Shows LiMPETS' Effective Outcomes

Dr. Heidi Ballard et al. from the University of California at Davis published an article in *Biological Conservation* that features the Greater Farallones LiMPETS program. The study affirms the high educational value of the LiMPETS Science Communication Program and demonstrates the impact of citizen science on students. Contributing to real science increased the students' 'environmental science agency;' science learning and science participation establish a foundation for action related to environmental sustainability. Go to the article: [Youth-focused citizen science: Examining the role of environmental science learning and agency for conservation](#)

### LiMPETS Presents Ecological Trends to Non-Profit

LiMPETS has collected ecological data at Fitzgerald Marine Reserve in Half Moon Bay since 2006. Fitzgerald Marine Reserve is a Marine Life Protected Area that lies within the Monterey Bay National Marine Sanctuary, but is managed by Greater Farallones National Marine Sanctuary. The non-profit that supports the reserve, Friends of Fitzgerald, is a vital partner to the LiMPETS program.

On September 14th, the Greater Farallones LiMPETS team presented on their work to Friends of Fitzgerald board members. The board learned about the long-term, ecological trends revealed by LiMPETS student-collected data, as well as the scientific and educational updates to the program.

LiMPETS provides an in-depth STEM program for youth in California's sanctuaries. Long-term, ecological data collected by students are valuable to local organizations and agencies.

## MARITIME HERITAGE



For general information on the E/V *Nautilus* expedition and vessel, see [Top Story](#), Page 1.

During the August E/V *Nautilus* cruise, several shipwrecks were newly examined or more closely documented.

One wreck, the 1886-built, the SS *Ituna*, which sank in 1920, had been previously documented. With the enhanced equipment available aboard *Nautilus*, the team on the ship and ashore captured hundreds of high-resolution images and documented the wreck and its role as marine habitat.

Two “new” wrecks not previously seen or documented were also mapped and surveyed in detail. These include the 1918-built, 1938-sunk SS *Dorothy Wintermote*, a coastal “tramp” steamer in the lumber and general cargo trade.

Of greatest general interest was the World War II veteran aircraft carrier USS *Independence*. Following a distinguished combat career in the Pacific, it was then assigned to the atomic bomb tests at Bikini Atoll in 1946, where it was subjected to two nuclear blasts that badly damaged the carrier and irradiated it. After being towed to San Francisco in 1947, the ship was used as a test platform to train sailors in radiological defense before being scuttled in what is now the northern portion of Monterey Bay NMS in January, 1951. Resting in 2,600 feet of water 30 miles off San Francisco, the carrier is amazingly intact, with its hull and flight deck clearly visible, and what appears to be a plane in the carrier's hangar bay.

*Independence* operated in the central and western Pacific and later was one of more than 90 vessels assembled as a target fleet for the Bikini Atoll atomic bomb tests in 1946. Damaged by shock waves, heat and radiation, *Independence* survived the Bikini Atoll tests and, like dozens of other Operation Crossroads ships, returned to the United States. When examined with the ROVs, *Independence* was found to be substantially intact and largely unchanged after 65 years, with the carrier's name on its stern, test equipment and armaments still on board, and the remains of two aircraft, the fragmented remains of a “Helldiver” dive bomber and a “Hellcat” fighter, were seen.

The carrier also proved to be a diverse and rich habitat for marine life, including an array of sponges. Radiological assessment of a portion of the wreck, done by the University of California scientist on the mission specifically for that purpose, found no measurable residual radiation. The university collected sponges from the wreck for their laboratory analysis.

More information on the wrecks can be found at NOAA's Office of National Marine Sanctuaries Maritime Heritage Program, <http://sanctuaries.noaa.gov/shipwrecks/>

### **Doghole Ports Survey along Redwood Coast Garner Media Attention**

Major San Francisco Bay Area news outlets, the San Francisco Chronicle, KQED Radio, Santa Rosa Press Democrat, other media and 40 members of the public attended a bluff-side opportunity to speak with archaeologists who were investigating, in tandem, submerged and coastal ruins related to the Redwood Coast's lumber industry of the 19th and 20th centuries. James Delgado, ONMS Director of Maritime Heritage, NOAA's principal investigator for the survey effort, and California State Parks (CSP) senior archaeologists spoke to the public and media about their findings to date, and ongoing efforts to locate shipwrecks and other ruins related to the system for transporting lumber via small vessels that could fit into “doghole” sized coves that larger ships could not access. Invited media also sailed aboard the R/V *Fulmar* for a NOAA perspective.

Knowing how past human activities were conducted, and their impacts, is important in resource management. In addition, this work is in furtherance of potential inclusion of some of these remaining structures in the National Register of Historic Places.

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## **2016 Calendar**

### **NOVEMBER**

- 19 Sanctuary “Big Whales Soiree” Cetacean expert Jeremy Goldbogen, Ph.D., Stanford/Hopkins Marine Stn. Topic: Biomechanics of Whales. Live music, arts! Bay Model, Sausalito. Reservations: [sara.heintzeman@noaa.gov](mailto:sara.heintzeman@noaa.gov)

## DECEMBER

1 Beyond the Golden Gate Research Symposium, Romberg Tiburon Center for Environmental Studies; contact [jan.roletto@noaa.gov](mailto:jan.roletto@noaa.gov)

## 2017

**Advisory Council:** Greater Farallones NMS Advisory Council meets four times each year. For specific meeting dates and venues, visit the SAC web page at [http://farallones.noaa.gov/manage/sac\\_meetings.html](http://farallones.noaa.gov/manage/sac_meetings.html)

**NOTE:** Each month the Visitor Center offers Weekend Family Workshops with themes such as squid, salmon and plankton. Contact [Justin.Holl@noaa.gov](mailto:Justin.Holl@noaa.gov) for various weekend's themes and for registration.

## CONTACT INFORMATION

### NOAA/Greater Farallones National Marine Sanctuary

991 Marine Drive, Presidio of San Francisco  
San Francisco, CA 94129 - <http://Farallones.noaa.gov>  
Phone 415/ 561-6622; fax 415/ 561-6616

### Greater Farallones Association (non-profit)

PO Box 29386  
San Francisco, CA 94129  
[www.Farallones.org](http://www.Farallones.org)  
Phone 415/ 561-6625; fax 415/ 561-6616



## GET INVOLVED – AND STAY INFORMED!

Visit the Greater Farallones Association website for updates, details and registration for sanctuary expeditions: [www.farallones.org](http://www.farallones.org), as well as the Association Facebook page. The Farallones sanctuary Facebook is also now up and running at [Facebook.com/the Farallones sanctuary](https://www.facebook.com/theFarallonesSanctuary).

To learn how you can become involved in the sanctuary visit: <http://Farallones.noaa.gov>; or to subscribe to Upwelling, the Farallones Marine Sanctuary Association newsletter: visit <http://www.Farallones.org>.

To learn more about the Sanctuary Advisory Council visit: [http://Farallones.noaa.gov/manage/SanctuaryAdvisory Council.htm](http://Farallones.noaa.gov/manage/SanctuaryAdvisoryCouncil.htm)



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