

SUPERINTENDENT'S QUARTERLY REPORT

APRIL THROUGH JUNE, 2016

Top Story This Quarter

USS Conestoga Shipwreck Achieves Recognition as National Register Significant Site

On June 10, 2016 the federal government officially listed the naval tug shipwreck *USS Conestoga*, which lies in Greater Farallones National Marine Sanctuary, in the National Register, as a site of national significance.

The *USS Conestoga* (SP-1128/AT-54) was an ocean-going tug in the United States Navy. Commissioned in 1917, it disappeared in the Pacific Ocean in 1921. The vessel and its crew had set out for American Samoa, via Hawaii, but contact was lost shortly after she left San Francisco. A broad search across half the Pacific basin was made for the *Conestoga* when it disappeared, to no avail.

Her wreck was discovered in 2009 as an unidentified seafloor feature similar to that of a ship in Greater Farallones National Marine Sanctuary, a few miles east of Southeast Farallon Island, just over 20 miles from the San Francisco coast. In Fall of 2014 using an ROV (remotely operated vehicle), photographic images were obtained that showed that it was indeed a vessel, a "mystery tug," and yielded additional details. These led maritime archaeologists to narrow their search for a tugboat, and to suspect it was the *Conestoga*. In October 2015, NOAA-Greater Farallones and Maritime Heritage Programs, joined with the U.S Navy on a further cruise; this mission confirmed the wreck was the *Conestoga* and on 23 March 2016, 95 years after the ship was lost, a formal announcement was made. See <https://www.youtube.com/watch?v=c1tGNHU5C7A>



Credit: Artist Danijel Frka

MANAGEMENT

Sanctuaries Conduct Scoping Along Sonoma/Mendocino Coast for Discharge Regs

Greater Farallones and Cordell Bank national marine sanctuaries held three scoping meetings to take public comment on proposed actions to allow Coast Guard discharge in the sanctuaries. Discharge would be sewage, graywater and materials associated with small arms fire and search and rescue training. Meetings were held May 10, 11, and 12 in Sausalito, Bodega Bay, and Gualala, respectively. This action was initiated during consultation with the Coast Guard prior to expansion of the two sites. NOAA conducted public scoping to gather information to determine the relevant range of issues and of alternatives to be addressed in the environmental assessment process. Recommendations included issuance of permits, versus a regulatory change.

CONSERVATION SCIENCE, RESEARCH *Monitoring To Understand Long-Term Trends*

Coastal Monitoring - Beach Watch

Farallones report recaps unusual wildlife mortalities, nearly 4k hours monitoring on Park Service beaches. Conservation science staff completed the annual permit report to the National Park Service for 2015 which reflected 3,900+ hours in 2015 of resource monitoring on Park Service beaches. Our findings included an update on the unusual mortality events of Cassin's Auklets, Guadalupe fur seals and Common Murres and volunteer contributions to the parks in 2015. The Beach Watch database is programmed for rapid queries specifically designed for resources within the National Park Service's Golden Gate National Recreation Area (GOGA) and Point Reyes National Seashore (PORE). Data are accessed at <http://www.farallones.org/BeachData/BeachWatchData.php> for all live and dead bird and mammal data sets. In 2015, 21 Beach Watch staff and volunteers provided 1,290 hours to GOGA and 32 staff and volunteers provided 2,547 hours to PORE. Working with partners such as the National Park Service broadens the sanctuary's scientific capabilities, benefits NPS, and opens up opportunities for further collaborations.

Beach Watch is an award winning monitoring and citizen science program and provides valuable information to the sanctuaries and partners on a variety of management issues, including climate change impacts, wildlife disturbance, entanglement, and oil pollution.

Beach Watch Data Figures Significantly in MPA Watch Human Use Studies

The Farallones Beach Watch ecosystem monitoring project continues to strengthen its partnership with the state's MPA (marine protected areas) Watch, a consortium of citizen science organizations monitoring human uses in the state's marine protected areas. Staff attended a two-day meeting in Orange County, CA, to guide development of a data mapping tool, standardize quality control protocols, and develop standardized strategies for counting large crowds. Staff from seven partner organizations, including [California Academy of Sciences](#), [California Ocean Science Trust](#), [Heal the Bay](#), [WILD Coast](#), [Greater Farallones Association](#), [Environmental Action Committee of West Marin \(EAC\)](#), [Santa Barbara Channelkeeper](#) attended the meeting.

Human use data from the border with Mexico up to southern Mendocino County are now available online at <http://www.mpawatch.org/site/mpamap> by clicking on "explore data."

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)

Publication On New Coral Species Discovered on Joint CBNMS, GFNMS Survey Cruise

Scientists published a description of a coral species new to science that was discovered during a remotely-operated vehicle (ROV) cruise in 2014 in Greater Farallones National Marine Sanctuary (GFNMS). Gary Williams, Curator, Department of Invertebrate Zoology and Geology, California Academy of Sciences; and his colleague, Odalisca Breedy, of the University of Costa Rica, published the article and provided the new name, *Swiftia farallonesica*. The 2014 ROV cruise on the sanctuary research vessel *Fulmar*, using the Cordell

Bank National Marine Sanctuary (CBNMS) ROV, was a collaboration between CBNMS, GFNMS, and National Center for Coastal Ocean Sciences (NCCOS) and spent time conducting surveys in both sanctuaries. For more information, contact Danielle.Lipski@noaa.gov.

Citation: Williams, G.C. and O. Breedy. 2016. A new species of whip-like gorgonian coral in the genus *Swiftia* from the Gulf of the Farallones in central California, with a key to eastern Pacific species in California (Cnidaria, Octocorallia, Plexauridae). *Proceedings of the California Academy of Sciences* 63 (1): 1-14. Link to article:

<http://researcharchive.calacademy.org/research/izq/PCAS%20v63%20Apr16%20Online%20150dpiFS%20LRes.pdf>

ACCESS Begins 13th Year Of Monitoring, Encounters Record Highest Whale Density

Greater Farallones National Marine Sanctuary (GFNMS) and Cordell Bank National Marine Sanctuary (CBNMS) scientists and collaborators completed the first of three research cruises 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. The research mission was conducted on board the NOAA ship *Bell M. Shimada*, which was able to withstand the rough sea state encountered. Scientists collected oceanographic measurements, sampled for prey availability, and recorded seabird and marine mammal observations along predetermined transect lines to determine how the ecosystem responds to oceanographic drivers.

Sampling occurred during an upwelling event and observations of phytoplankton and small krill were indicative of early season productivity that may develop into a good year for prey availability. Net tows for prey availability on the shelf captured large amounts of gelatinous zooplankton mixed with very small krill, neither of which are an optimal whale food source. However, significant amounts of large krill were sampled along the shelf break. Predator highlights included the highest density of humpback whales observed during early spring in the history of ACCESS. Uncommon sightings included fin whales and a Hawaiian petrel. Graduate students, photographers and videographers, and a NOAA Teacher-at-Sea joined the team on board. Two other cruises are planned in July and September on the research vessel *Fulmar*, the project's usual platform, to look at the seasonal patterns throughout the oceanographic seasons

and assess how the ecosystem responds to the weakening El Niño.

ACCESS is a collaborative effort of CBNMS, GFNMS, and Point Blue Conservation Science for ongoing data collection to understand status and trends of sanctuary resources, ecosystem health, and response to climate change. This interdisciplinary project contributes to education and outreach, resource protection, and research goals. Education and outreach initiatives include hosting a NOAA Teacher-at-Sea, mentoring graduate students, collecting high quality video and still imagery, developing social media content, and hosting media events. A current resource protection initiative involves tracking the annual trends in endangered whale distribution and abundance to inform the timing of the seasonal vessel speed reduction to reduce ship strike mortality. And, in addition to monitoring ocean ecosystem health, the project works with local universities on targeted research projects such as evaluation of nutrient conditions and assessment of the status of ocean acidification and development of new monitoring tools.

At the conclusion of the cruise network television stations KGO-7 (ABC) and KPIX-5 (CBS) and the San Francisco Chronicle participated in a vessel tour and press availability for scientists returning from the ACCESS research cruise. Scientists demonstrated equipment and techniques used in whale and seabird surveys, in plankton net deployment, and displayed samples in the wet lab.

Media report (CBS): [Scientists Seeing More Whales Than Ever Before In Bay Area Waters](#)
SFGate: [Humpback and blue whales feeding in record numbers off SF coast](#)
Social Media: [ACCESS partnership Facebook page](#)

RESOURCE PROTECTION

Protecting Habitats

Summit Draws Experts to Discuss Ocean Climate Adaptation

Greater Farallones National Marine Sanctuary and Greater Farallones Association, in partnership with numerous regional entities, convened the Fourth Ocean Climate Summit: Resilience through Climate-Smart

Conservation on May 17 in San Francisco. The event drew 141 attendees, including regional managers, scientists and educators, representatives from 7 national marine sanctuaries across the nation, and the Acting Director of ONMS, who gathered to learn about, discuss, and provide input regarding climate impacts and solutions for the North-central California coast and ocean region. Input from the Summit will be used to inform the development of the Greater Farallones NMS Climate Action Plan and to forge new collaborations to directly address climate impacts to coastal natural resources.

The Ocean Climate Summit is the only event that brings together regional scientists, coastal and marine resource managers, decision-makers, and educators to advance the use of climate-smart conservation methods and adaptation strategies to enhance coast and ocean resilience to climate change.

Sanctuary, Partners, Begin Mooring Removal

During the week of May 23, GFNMS staff led an effort to begin removal of 39 moorings on Tomales Bay that records indicated were left abandoned. The Tomales Bay Mooring Program, initiated in August 2015, was done in partnership with NOAA Office of Law Enforcement, NOAA General Counsel, California State Lands Commission, and National Park Service. The goal is to get all moorings in compliance with state and sanctuary regulations and out of sensitive and unsafe habitat in Tomales Bay. Since the initial August 2015 tagging of over 100 non-compliant moorings with over 40 vessels attached, we have assisted owners of 57 moorings to initiate the application process, and have received seven requests from owners to remove their moorings.

This program promotes responsible Tomales Bay boating activities including requiring boaters to have proper insurance as well as prevents mooring in eelgrass and other sensitive habitats. The Tomales Bay estuarine environment will continue to reap the benefits of the strong internal NOAA and external state and federal partnerships we have built.

Reducing Wildlife Disturbance to Whales and Other Marine Mammals

Sanctuary, US Coast Guard Working with Network Television on Ship Strike Story

Communications staff worked with NBC Nightly News and the US Coast Guard on the problem of ship strike-caused mortality among whales. The advisory council for Farallones and Cordell Bank's working group has published a report on various vessel interaction issues, in consultation with agencies, shipping interests and biologists. This, and other information on accomplishments, plans and outreach, was provided and referenced for the news report. The public in general and industry sectors need to be aware of the many conservation issues that arise in a highly urbanized, commercial center such as San Francisco with its busy shipping industry. Effective outreach helps ensure the comprehensiveness and effectiveness of finding solutions to such issues.

Humpbacks Stray from Sanctuary into SF Bay, into Danger; Public Warned

An unprecedented influx of humpback whales into San Francisco Bay triggered special sanctuary emergency outreach efforts. Beginning in April the Farallones sanctuary initiated outreach to media and the public when a significant number of the sanctuary's "summer resident" feeding humpback whales, which normally remain outside the Golden Gate, unexpectedly entered the Golden Gate Straits and San Francisco Bay proper. They had followed shoals of baitfish as far east as Alcatraz, which brought them into the densest part of the shipping routes, and into prime areas used by water recreationists such as windsurfers and kite boarders. These humpbacks are not adept at navigating shallows and narrow straits, and can become disoriented, straying into the labyrinthine river systems leading into the bay, or be startled by recreationists into the path of oncoming vessels.

Media messages focused on correct behavior around wildlife, and the dangers to people and whales from close-approach and other interactions. Additional direct outreach and flyer distribution went to swim clubs and related organizations to stay away from the whale. Working with headquarters, the sanctuary created the Farallones version of the "Don't Be That Guy" social media campaign to prevent whale harassment.

<http://www.sfgate.com/bayarea/article/Humpback-whale-sightings-in-San-Francisco-Bay-7463063.php>



ONMS Social Media Campaign Photo: Lawrence Gay

Reducing Disturbance to Seabirds

Farallones Urges Pilots, Boaters: Avoid Stress To Seabirds!

After a significant seabird dieoff occurred the previous year (2014-15 breeding and post-breeding season), and with seabird nesting underway, sanctuary media/communications staff issued a press release urging pilots, visitors, boaters, paddlers and unmanned aerial vehicle (drone) operators to avoid disturbing nesting seabirds in and around the sanctuary. These normally food-rich waters sustain the Farallon Islands breeding colony, the largest in the contiguous United States, and several mainland rookeries, including the Point Reyes and Marin headlands, Devil's Slide Rock and Sonoma County's rocky coast. Data from 2014-15 from the sanctuary's seabird monitoring revealed a spike in seabird deaths 320 times higher than normal among Cassin's Auklets, a small seabird that breeds in the sanctuary. This was attributed to food scarcity resulting from persistently warm ocean waters.

The scenic locations near San Francisco are popular places for boating, flightseeing tours, wildlife viewing and other potentially disruptive activities, the majority of which are inadvertent. Seabird colonies may consist of several hundred thousand birds, but still be only a fraction of their size prior to human impacts. Human disturbance further stresses them, so preventing this factor removes yet one more challenge to seabird survival and potential recovery to previous numbers.

Targeting Airshows to Reduce Seabird Disturbance

Seabird Protection Network staff conducted targeted outreach to pilots at the Pacific Coast Dream Machines

air show at Half Moon Bay Airport, near Pacifica, CA. Historically, low-flying aircraft at this event have caused disturbances to a nearby breeding colony of Common Murres. In 2016, the program reached a milestone by limiting disturbance from low-flying aircraft to zero disturbance incidents. Through a partnership with the manager of the Half Moon Bay Airport, staff worked with pilots to inform them of the need to fly above 1,000 feet elevation over areas containing sensitive wildlife.

The nearby common murre colony on Devil's Slide rock was restored in the 1990s and 2000s following extirpation in 1986 due to gill-net fishing, oil spills, and other factors. Today, the colony is recovering but its proximity to Half Moon Bay airport makes it vulnerable to disturbances by low-flying aircraft. Conducting outreach at this event has proven an excellent opportunity to educate pilots about seabirds, disturbance, the history of the colony on Devil's Slide Rock, and the need for wildlife-friendly flying practices.

Sailors and Seabirds: Reaching Out To The Boating Community

Farallones Seabird Protection Network (Network) staff presented at the annual Strictly Sail Pacific Boat Show on April, 9, 2016. The Network aims to ensure the continued recovery and conservation of central California's seabirds by reducing human-caused disturbance events at seabird colonies. The presentation focused on teaching boaters about Marine Protected Areas and wildlife-friendly boating practices that prevent disturbances.

EDUCATION

Increasing Awareness of the Sanctuary

Exhibits

New Pt. Reyes Open Ocean Exploration Center Opens

On June 8th, staff from Greater Farallones and Cordell Bank NMS joined Point Reyes National Seashore gathered to celebrate the completion and official opening of the expanded visitor space at the Point Reyes Lighthouse Visitor Center, at Point Reyes National Seashore. Approximately 70 to 90 people from the public, staff, association board members, contracted artists and designers attended the "ribbon cutting" ceremony which was part of the Park Services Centennial celebration. Staffers from local Congressman Jared Huffman and Senator Mike McGuire's office attended. The renovated

Point Reyes Lighthouse Visitor Center space is an expansion and renovation of the prior space and opens up views to the ocean, provides a place to get out of frequent inclement weather and observe the ocean from a safe space, provides a new space to offer ocean interpretation programs and provides interpretation about the ecosystems and protections offered by NOAA's National Marine Sanctuaries. The park receives over a million visitors a year, and between 250,000-500,000 visitors a year to the Point Reyes headlands. The space will be staffed and maintained by Point Reyes National Seashore.

Media Coverage: (Marin IJ) [Marin's underwater realm stars in Point Reyes exhibit](#)



Interior exhibit space: Photo: Jennifer Stock

Events - Public Programs

Sea Otter Soirée - Another Sold-Out Success!

Over 200 people enjoyed an evening celebrating the smallest furry marine mammal in the region as Greater Farallones National Marine Sanctuary and San Francisco Zoo education teams joined forces to deliver an innovative, integrated evening of science and art to celebrate sea otters. An overflow crowd (some had to be turned away at the door) learned about these furry sea creatures in an intriguing and thought-provoking presentation by sea otter biologist Tim Tinker, Ph.D. of the U.S. Geological Survey. Tinker demonstrated how sea otters restore the health of coastal ecosystems in unexpected ways, and the Question/Answer period showed the high level of audience interest in the otters' trophic (food web) roles and relationships. The evening also featured hands-on participation in multiple art forms such as printing, viewing film and being immersed in a sea otter exhibit in a simulated kelp forest habitat. Attendees were encouraged to get involved or amplify their efforts to protect marine life and coastal ecosystems.

OTHER EVENTS

Sanctuaries Bring Ocean Film Festival to North Coast

On Saturday, April 9, the Greater Farallones and Cordell Bank national marine sanctuaries, Greater Farallones Association, San Francisco International Ocean Film Festival and local groups launched the Arena Theater Ocean Film Festival in Point Arena, California. It featured independent films from around the world, and reached out to over 210 residents of the recently expanded areas of the sanctuaries.



Photo credit: Ana Blanco

Some of the films in the selection tackled issues such as declining small-scale fisheries, ocean noise, harmful toxins in seafood, and wildlife disturbance. Other films celebrated the sea's magnificence and resiliency, and presented potential solutions for conservation. Question & Answer sessions with filmmakers and ocean experts followed each viewing session.

At the nearby Point Arena Library, Cordell Bank staff hosted free ocean-related children's activities including showing live plankton on the big screen, plankton design challenge, the whale jenga® quiz, and various craft and art activities.

Film festivals illustrate ocean life and coastal cultures to people who may never have experienced them, bringing together filmmakers and others with an interest in and who feel a connection with the many aspects of the ocean. These festivals provide forums for discussions and debate, and often present solutions that can serve as models elsewhere.

Public Radio Applauds Films to Stimulate Environmental Dialogue

In April Cy Musiker, Arts and Entertainment Editor for KOED, the local National Public Radio station,

interviewed sanctuary and association staff on the Arena Theater Ocean Film Festival, presented by the Greater Farallones Association, and the Greater Farallones and Cordell Bank national marine sanctuaries. The broadcast focuses on the power of art, and film in particular, as ways in which to reach out to people and stimulate dialogue on environmental and other issues.

***Get Into Your Sanctuary* Event Involves Nearly 500**

"I never knew gulls were *so* interesting!" exclaimed a participant on the sanctuary's Seabirds of Alcatraz excursion. A Public Beach Watch Survey offered the chance to become citizen scientists for the day; and Crab Workshops where families caught, examined and released live crabs. Sanctuary partners joined in the event, offering special *Get Into Your Sanctuary* day trips. The Oceanic Society and SF Whale Tours led whale watch trips, and Watertreks Eco Tours and Point Reyes Outdoors led kayak trips. Four hundred ninety-nine participants 'got into' their local marine sanctuary.



Gull chicks learn fish dissection techniques.



Kids learn the parts of a live crab at the Crab Family Workshop.
Photo credits: Peter Winch, Courtney Buel, Alyssa Bellamy

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Tide Pool Talk for Lighthouse Lecture Series

Forty-two people came to the Point Arena Lighthouse Lecture Series for an Exploring Tide pools lecture to learn about anemones, sea stars, sea urchins, sea slugs, chitons, octopuses and other creatures that call the rocky intertidal areas of the Mendocino coast home. Through

beautiful imagery and marine life artifacts, sanctuary staff presented new research, and discussed how algae and marine invertebrates compete for food, evade predators and adapt to sometimes brutal and ever-changing sea conditions to survive.

Ocean education across the lifelong learning spectrum is critical for linking science knowledge to sustainable actions.

Sanctuary Introduces Yachters to Opportunities for Involvement in Conservation

Farallones communications staff spoke to a standing-room-only, enthusiastic crowd of around 65 to 70 members of the Sausalito Yacht Club Wednesday, June 15th. The focus was to introduce the sailing community to the sanctuary, explain its mission (the prohibition against oil drilling drew robust applause), discuss issues both current and emerging; and invite their involvement in the sanctuary's work in marine conservation. Boaters, divers, surfers, underwater videographers, and other ocean enthusiasts comprised the audience, many eager to learn and do more. Some members signed up for upcoming Farallones Explorations, and for Entangled Whale Response Network training (NOAA Fisheries-sponsored).

Sailors have an intimate relationship with the sea, know its power, its challenges, and the pleasures that can be derived from it. Some are already well aware of its vulnerability to anthropogenic impacts like pollution, fisheries interactions, and noise; others are just now learning the extent of these problems, and look to the sanctuary as a means to help them become part of the solution.

Farallones Celebrates World Ocean Day at Zoo

On Saturday, June 11, the Farallones sanctuary participated in the San Francisco Zoo's celebration of World Ocean Day. The topic was "Healthy Ocean, Healthy Planet. The zoo event was outstanding because of the mixed demographics that this venue attracts: a good proportion of the 120 visitors were bilingual, and multi-generational. The sanctuary provided a glimpse of the amazing marine life that lives near and just beyond our shore. Marine life artifacts, a variety of beautiful images, and models were used to impart the hazards of plastics to marine animals. Visitors of all ages took part in hands-on activities, including the challenge of disentangling a rubber band-entangled hand without using the other hand to grasp it (try it sometime!).

This was not a “preaching to the choir” audience; the zoo draws many visitors from broad geographic areas and demographic groups. Through a shared love of animals, people of the watershed learn to regard the ocean and its creatures in a new light, and comprehend that what they do inland affects the ocean.

Plankton Discovery Part of Junior Ranger Jamboree

In support and celebration of the National Park Service's Centennial, the sanctuary hosted a plankton discovery station at the Junior Ranger Jamboree on May 7th. Over 200 visitors, including many new audiences to sanctuary programs made their own plankton slides for view in microscopes at the sanctuary activity station. Part of the "Every Kid in a Park" campaign, the jamboree brought hundreds of 4th graders and their families into their park to experience nature, culture, entertainment and hands-on science.

Participating in key partner outreach events deepens sanctuary partnerships with the National Park Service and The Parks Conservancy. Through participation in this event, the sanctuary reached new urban audiences from San Francisco neighborhoods that rarely visit San Francisco's Presidio. Also, new partnerships were forged with the National Japanese American Historical Society and the Presidio YMCA.

Sanctuary Explorations Series

The Sanctuary Exploration 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.

Whales and wildflowers excursion complement Arena Theater Ocean Film Festival

The virtual and the actual came together with the Farallones Whales and Wildflowers Walk at Salt Point in Sonoma County, complementing the celluloid cetaceans encountered during the Arena Theater Ocean Film Festival. Greater Farallones sanctuary education staff and a California State Park Environmental Scientist guided 19 Sanctuary Explorations participants on a four mile coastal wildflower and whale walk. Participants explored Salt Point State Park while learning about bluff,

coastal prairie, and near shore coastal ecology. Sanctuary Explorers discovered how State Parks are protecting and restoring these unique habitats. Participants enjoyed the wide array of blooming wildflowers and were lucky enough to spot three groups of migrating gray whales traveling very close to the coast.

Cruising with the Mighty Gray Whale Migration

In May Greater Farallones National Marine Sanctuary education staff partnered with the Oceanic Society to provide an opportunity to watch the gray whale migration. Forty-one participants from the Sanctuary Explorations program encountered three calf-cow pairs of gray whales on their northward migration just outside the Pillar Point Harbor. Many seabirds, including Common Murres, cormorants, and Brown Pelicans were seen, along with some sea lions sunning themselves on the harbor buoys. Participants not only learned about the natural history of gray whales and the conservation efforts to protect this amazing species, but they also learned about good whale watching practices and etiquette.



Gray whale L. Francis/NOAA

GFNMS Visitor Center

Visitor Center: The Farallones 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 3,616 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 4,866.

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.

Underwater Robots and Squid Family Workshops

This April, the Greater Farallones Association held two weekend family workshops. On April 23rd, we launched our brand-new Remotely Operated Vehicle (ROV) workshop which hosted 32 attendees. Participants learned about underwater exploration while operating ROV's off the GFNMS pier. On April 24th, the Squid Dissection workshop hosted 21 attendees. Participants learned about the Cephalopod family, used blunt-nosed scissors to dissect their own market squid, and created their own Humboldt squid prints to take as souvenirs.

This month's programs were particularly engaging for young and curious ocean enthusiasts 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.

Educators Bring Marine Science to Sanctuary's Newly Protected Coast

On May 2nd-5th 2016, GFNMS educators traveled to the northern expansion area where they delivered 14 At Your School Programs to five coastal elementary schools in Sonoma and Mendocino counties. A total of 271 students, from Pre-K through 8th grade, learned about the ecology and conservation of sharks, crabs and seabirds that live in the GFNMS, through the Crab Cab, Sharkmobile and Seabird Shuttle programs. Students also learned about and celebrated the inclusion of Sonoma and Mendocino coastal waters into the Greater Farallones National Marine Sanctuary and the significance of national marine sanctuary status. Educators taught programs at the following schools: Kashia Elementary (a Native American school on tribal land in Sonoma CA); Horicon Elementary, Annapolis, Stewarts Point, CA; Manchester Elementary, Manchester, CA; Fort Ross Elementary, Fort Ross, CA; Arena Elementary, Point Arena, CA.

Ocean literacy, education and outreach initiatives in the new GFNMS Expansion area bring marine biology, ecology and habitat conservation information to remote, rural coastal communities.



Photo: Peter Winch, Rietta Hohman/GFNMS

Students Build ROV for Science and Exploration

On May 18th and 19th 2016, GFNMS education staff visited Farallone View Elementary in San Mateo county for the school's Annual Oceans Week and taught seven programs for 3rd and 4th grade. A total of 192 students experienced the new At Your School program Build and Explore with Remotely Operated Vehicles (ROVs). Students learned about the deep sea coral communities off of the California coast and the technology scientists

use to study deep ocean habitats. The students also built frames for SeaMATE Pufferfish ROVs with PVC pipe and operated mini ROVs in small aquariums.

The Build and Explore ROVs outreach program engages students in engineering practices, problem solving, ingenuity and teamwork in the classroom.

Fisherman in the Classroom

The Fisherman in the Classroom (FIC) 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.

Fisherman in the Classroom is partially funded this year with a grant from Aquarium of The Bay to serve elementary and middle school students who are enrolled in the California Department of Fish and Game program "Trout in The Classroom". This program was featured in the ONMS Earth is Blue video: [Fine Cut Fisherman in the Classroom.mp4](#)

Fishermen, Educators Teach Students, Young Offenders

From February 29th to March 14th, Greater Farallones National Marine Sanctuary education staff and local fishermen delivered 12 Fishermen in the Classroom programs to 226 students at seven San Francisco schools. The schools included the Chinese American International School, Mercy High School for Girls and the City of San Francisco Juvenile Detention Facility.

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.

By hosting teacher training workshops the Greater Farallones LiMPETS team increased their network of teachers, 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.

Teachers Workshop for Hands-on Science

On Saturday, March 26 the Greater Farallones LiMPETS team hosted a Sandy Beach Monitoring Workshop for 16 middle and high school teachers. The workshop prepared teachers to participate in LiMPETS, through which their students will become coastal citizen scientists! Participants receive an in-depth curriculum, learn data analysis using the LiMPETS database, look for parasites during crab dissections, and practice the protocols necessary to survey the distribution and abundance of the Pacific mole crab on California beaches.



Farallones LiMPETS Workshop, Credit: Monica Krach/GFA

White House Mandates Youth-Based Citizen Science Meets Needs of National Marine Sanctuaries

All three main partners of the LiMPETS network—Pacific Grove Museum of Natural History, Greater Farallones Association and NOAA National Marine Sanctuaries—

met to continue down the path of ensuring data being collected by youth is good quality and meets the science needs of national marine sanctuaries. Led by an outside facilitator, the LiMPETS team went through a strategic planning process to define the direction of the next 5-10 years. The working vision for the LiMPETS network is to inspire the next generation to understand, value and participate in science. Network partners also agreed to implementation standards for rocky intertidal and sandy beach monitoring, as well as reviewed the final draft of the Quality Assurance Project Plan, including the quality assurances and quality controls that will be put into place based on scientific peer-review.

Citizen science is of special interest to the White House, so it is important to ensure that monitoring programs go through a periodic peer review to verify that the data being collected addresses the scientific question being asked, refining monitoring protocols as needed and aligning with quality assurance and quality control measures.

2016 Calendar

OCTOBER

- 7 & 15 Kent Island Restoration Volunteer Project, contact Kate.bimrose@farallones.org
- 15 SharktoberFest! Environmental fair 11 a.m. to 4 p.m. at GFNMS Campus. SF Presidio.

NOVEMBER

- 19 Sanctuary Soiree featuring Jeremy Goldbogen, Ph.D./Stanford Hopkins Marine Laboratories. "Blues Got the Moves: Biomechanics of Whales." San Francisco Bay Model, Sausalito. Contact sara.heintzelman@noaa.gov

DECEMBER

- 1 Beyond the Golden Gate Research Symposium, Romberg Tiburon Center for Environmental Studies; contact jan.roletto@noaa.gov

NOTE: Each month the Visitor Center offers Weekend Family Workshops with themes such as squid, salmon

and plankton. Contact Justin.Holl@noaa.gov for various weekend's themes and for registration.

CONTACT INFORMATION

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991 Marine Drive, Presidio of San Francisco
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Phone 415/ 561-6622; fax 415/ 561-6616
Greater Farallones Association (non-profit)
PO Box 29386
San Francisco CA 94129
www.Farallones.org
Phone 415/ 561-6625; fax 415/ 561-6616

GET INVOLVED – AND STAY INFORMED!

Visit the Farallones Association website for updates, details and registration: www.farallones.org, as well as 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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NOAA / GREATER FARALLONES NATIONAL

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