

QUARTERLY SUPERINTENDENT'S REPORT

3RD QUARTER FY 2013 APRIL THROUGH JUNE, 2013



In June the ocean lost a champion for conservation with the passing of Bob Breen, Education Chair of our Sanctuary Advisory Council.

Since the 1970s Bob was among the first proponents of setting aside ecologically important areas for special protection. He realized the unique qualities of the Gulf of the Farallones region as a keystone upon which to establish contiguous sanctuaries in the area, in Monterey Bay and Cordell Bank.



Since the inception of the Farallones Sanctuary Advisory Council in 2002, until his unexpected death, Bob served as Education Chair. He contributed to regional stakeholder groups that helped map out the Farallones and Monterey Bay national marine sanctuaries and the entire system of marine protected areas along California's north-central coast— an exhaustive, often controversial process. He also helped develop a long-term university monitoring program to track their success. Bob spent over four decades as ranger and naturalist at Fitzgerald Marine Reserve near San Francisco, protecting nearshore waters and intertidal habitats, and documented an accelerated decline in numbers and diversity of marine life in the region. A “master naturalist,” Bob was a proponent of “education informing action,” establishing the Fitzgerald Junior Rangers and Naturalist Program and the marine science program at Half Moon Bay High School. As contributor to the sanctuaries' Climate Change Impacts Report, Bob helped identify an extensive suite of potential impacts to the region's unique coastal zones.

In September Bob will be among the first to be honored in NOAA's new Office of Marine Sanctuaries Memorial Garden in Florida for his role in the history of the National Marine Sanctuary System.

“The tide rises, the tide falls; the twilight darkens, the curlew calls ...”

- Henry Wadsworth Longfellow



MANAGEMENT

Expanding Sanctuary Boundaries

Student Project Completes Exclusion Zone Analysis

Graduate students at the Bren School of Environmental Science and Management/University of California at Santa Barbara just completed an independent year-long thesis project which analyzes the suitability of incorporating the San Francisco-Pacific Exclusion Zone, or “Doughnut Hole,” into the national marine sanctuary (NMS) system. They completed their paper in March 2013 and presented their findings to the GFNMS Sanctuary Advisory Council on May 22. As part of their analysis they conducted research to evaluate whether the originally cited reasons for exclusion have changed and whether the characteristics of the area fulfill the sanctuary designation criteria in the National Marine Sanctuaries Act (NMSA), specifically whether the Exclusion Area’s characteristics can be considered “of special national significance” under the National Marine Sanctuaries Act. The GFNMS’ staff involvement in working with these graduate students on their thesis project represents valuable outreach to the world of academia and helps raise awareness about the role and value of the sanctuary system for the next generation of emerging environmental scientists and managers.

RESEARCH

Monitoring To Understand Long-Term Trends

Sanctuary Ecosystem Assessment Surveys (SEAS, ACCESS Surveys)

SEAS—Pelagic

Deep Sea Corals Cruise Shed New Light on Gorgonian Taxonomy

This spring, new taxonomic findings continue to be released on the taxonomy of sponges and corals collected during the deep-sea coral and sponge research cruise, October 2012. Most recently the red branching gorgonian coral previously thought to be part of the *Euplexaura* generic designation has been renamed to a new genus, *Chromoplexaura*. The species commonly thought to be *Euplexaura marki* is now renamed as *Chromoplexaura marki*, based on specimens from the October research cruise. A review of the taxonomy appears in the publication “Zoo Keys” along with photos and specimens collected during the cruise. This work is carried out by Farallones sanctuary and staff from the National Centers for Coastal and Ocean Science, and the California Academy of Sciences.

Sanctuaries Join Research Group For Start of 2013 Field Season

The Applied California Current Ecosystem Studies (ACCESS) Partnership completed their first surveys for 2013 on the *R/V Fulmar*. Rough sea conditions and foggy days are good indicators of upwelling, but produce poor observation conditions for sighting birds and marine mammals. Though considered early in the season, krill was abundant. Cassin’s Auklets started rearing chicks and blue whales have arrived early in the Gulf of the Farallones region. Common Murres were seen carrying fish to their chicks on the nest at the Farallon Islands, indicating a “good” year for them, too. ACCESS, in partnership with University of California, has begun sampling for ocean acidification, comparing surface and deep water and looking at how changes in ocean chemistry will affect shell-bearing invertebrates. ACCESS is a collaborative ecosystem monitoring partnership formed by PRBO Conservation

Science (now “Point Blue Conservation Science”), Cordell Bank and the Farallones sanctuaries. Integrated data collection assesses the health of the marine ecosystem and provides information to resource managers, such as the abundance and distribution of baleen whales in relation to shipping lanes to reduce potential vessel strikes to whales.

SEAS—Beach Watch

Beach Watch Provides Long-Term Monitoring Data to State of California

In support of the State of California's North Central Coast MPA Baseline Assessment Project, Beach Watch provided state agencies with analyses of the long-term data set collected by dedicated adult citizen-science volunteers. Beach Watch findings use 18 years of baseline data to identify important areas for pinnipeds, cetaceans, and birds throughout the survey region; areas of greater impact from human use activities; and long-term trends of species of particular interest identified by the state. Though the report focuses on ecological status and long-term trends along beaches within the North Central Coast region, it also provides recommendations for long-term monitoring of MPAs, including the potential roles and benefits of using citizen science programs for monitoring and long-term assessment of these protected areas. California's marine protected areas are the largest network of ecologically-based marine areas across the globe. Beach Watch helps to build a foundation of knowledge through identifying a broader understanding of long-term trends in relation to the establishment of the baseline/benchmark when these MPAs were implemented.

North California Coastal Sites Assessed for Potential Beach Watch Monitoring

In April Conservation Science staff performed coastline assessment for beaches that may be included as future Beach Watch monitoring sites along the Sonoma County coast. Since 1993 the Farallones marine sanctuary has conducted Beach Watch coastal monitoring in the Farallones and northern Monterey Bay sanctuaries, as well as at sites outside the sanctuaries. Criteria for adding Beach Watch segments include a shoreline where current monitoring is already focused and in need of coordination, the potential to provide current information on little known areas north of the Farallones sanctuary, beaches with potential for live birds and mammals, breeding areas, potential for deposition of dead birds and mammals, and areas that may be in need of additional observation for heightened protection. Staff met with several potential volunteers and conservation groups' representatives. Additional meetings with locals will be needed as we develop preferred alternatives to the proposed expansion boundaries and regulations.

CONSERVATION

Vessel Spills

Sanctuaries Participate in Oil Spill Response Exercise

On June 12th and 13th, staff from Gulf of the Farallones National Marine Sanctuary and Cordell Bank National Marine Sanctuary participated in an oil spill response exercise sponsored by SeaRiver Maritime Inc., a subsidiary of Exxon Mobile. The scenario was a collision of an oil tanker and a cargo vessel just south of the Farallon Islands. Industry, local, state and federal agencies were well represented for the two day drill that was centered around the Gulf of the Farallones National Marine Sanctuary. Sanctuary management and resources were the focus of many discussions that occurred during development of response strategies. Such drills are essential for building relationships that will enhance response effectiveness in an actual spill.

Farallones Hosts Coast Guard Strike Team for Hazwoper 24 Training

This spring the sanctuary hosted the U.S. Coast Guard's (USCG) Pacific Strike Team for a Hazwoper 24 two-day training course, developed by OSHA. USCG instructed members of the GFNMS resource protection staff and Beach Watch volunteers as to how to identify and understand potential threats from hazardous materials and wastes that they might encounter within the Sanctuary during an oil spill or emergency incident. In addition, the course covered OSHA and other state and federal regulations regarding hazardous materials and prepared the attendees with an understanding of how to take possible precautions and protective measures to protect themselves and which are the appropriate responder agencies to notify in the event that they encounter hazardous materials or waste. These trainings provided sanctuary staff and beach watch volunteers an opportunity to learn about responding to hazardous materials. In addition, the training allowed both the sanctuary and USCG to develop a better working knowledge of each organization's capabilities and to continue to strengthen a close working relationship for emergency response.

Vessel Grounding Response

Farallones Sanctuary Responds to Vessel Grounding

On March 13 the 50 ft. recreational sailing vessel *Serenade II* grounded on Francis State Beach in Half Moon Bay in the northern part of Monterey Bay National Marine Sanctuary administered by the Farallones sanctuary. Due to the failure of the uninsured responsible party to remove the vessel, which began breaking up within 24 hours of grounding, the Farallones sanctuary acted immediately to minimize the damage to sensitive environments. The beach is an active nesting area for Western Snowy Plovers, a listed species, which were observed on-site during the time of the incident. GFNMS successfully coordinated efforts between sanctuary headquarters and the NOAA contracts office to expedite clean-up efforts. The vessel was removed and disposed of by Parker Diving Services. Additionally, GFNMS coordinated with State Parks to conduct beach clean-up of smaller debris before the salvage occurred and over the weekend. The S/V *Serenade II* was comprised of chemical-laden wood, a concrete-lined hull, and plastic and the removal of the vessel prevented it from further breaking up and producing marine debris and damage to sanctuary resources.

Reducing Wildlife Disturbance

Whales and Other Marine Mammals

Sanctuary Participates in Whale Entanglement Team Rescue Attempt

On April 18th Farallones sanctuary communications staff, a Northern California Whale Entanglement Team (WET) Level 4 responder, received a request to alert ferries, tour boats, land-based and other observers to relay sightings of an entangled whale calf, reported on the WET Hotline (1-877-SOS-WHAlE) off Land's End in San Francisco. The on-water team searched for the whale, and where it had been reported, retrieved a freshly frayed and cut mass of crabbing gear: around 100 feet of line and buoy. A strong flood tide had apparently washed the whale into sharp rocks at the Golden Gate entrance, which likely severed the line and freed the whale without WET intervention. This was a joint effort among the NMFS Office of Protected Resources, the Farallones marine sanctuary, Coast Guard, Marine Mammal Center, and California Dept. of Fish & Wildlife - a quickly deployed, fully authorized, pre-planned and measured response, involving key personnel and equipment. Whales often can free themselves, but having the WET system prepared and practiced helps assure the success of future interventional rescue efforts.

Likely Humpback Shipstrike Fatality Receives Discreet Handling

This spring communications staff issued a generalized Superintendent's Statement to media to avoid prohibited close approach by media (including flight ceilings) to protected wildlife and sensitive habitats. A young humpback whale washed up dead from the Farallones sanctuary, stranding on a remote beach in the Point Reyes National Seashore (PRNS). Staff maintained media silence of the specific incident to ensure that the on-beach necropsy team, and nearby seal and seabird rookeries, were undisturbed by press helicopters or vessels while the cause of death was investigated. Further examination indicated that ship strike mortality was the likely cause of death, so the sanctuary coordinated with other NOAA offices, the National Park Service, and several non-governmental groups involved in the response effort on presenting the story to the press. Despite recent implementation of changes in shipping lanes to prevent the co-location of whales and large vessels and resulting publicity, additional messaging and strategic media outreach may be needed to further decrease the likelihood of such incidents.

Sanctuaries Working Group Present Vessel Impacts Update

On May 28th, Gulf of the Farallones and Cordell Bank sanctuaries presented a panel discussion on ship strikes and acoustics for the American Cetacean Society (ACS). The panelists were key members of the Joint Working Group on Ship Strikes and Acoustic Impacts, a group that provided recommendations to protect endangered whales in the sanctuaries to the Central California sanctuary advisory councils. These recommendations were unanimously adopted by both councils and forwarded to sanctuary superintendents. The panel discussed the highly successful multi-stakeholder process that led to the consensus recommendations, and also praised the sanctuaries for their progress on implementing the recommendations. At the end of the panel, the ACS rewarded sanctuary staff with a grant to support their half-day workshop on citizen science and whale monitoring at a Biology of Marine Mammal Conference in December 2013. The ACS event provided an opportunity for the public to learn more about sanctuary work and to get involved in science projects. Education and outreach to our communities can support our campaign of engagement.

San Francisco Area Boaters Warned: Watch for Whales in the Bay

To prevent potential disturbance of whales by watercraft, this April communications staff issued its annual springtime press release to alert boaters to the presence of gray whales in San Francisco Bay and other estuarine and nearshore outer coast waters. Each spring while migrating between Mexican breeding grounds and Arctic feeding grounds, grays wander into these areas, to the surprise, delight and curiosity of boaters and other water recreationists. Whales can be disturbed by too-close approach, with possible resulting separation of females from their dependent calves. Small boat operators, kite-surfers or paddle boarders unaware of their presence could also be at risk if they were to collide with a 50-foot, 40-ton whale surfacing unexpectedly in front of them. Grays are the most coastal of all the great whale species in the Eastern North Pacific. Due to reduced food supply in the Arctic and other factors, they have begun exploiting non-traditional prey in high human-use and vessel traffic areas. Although Eastern Pacific grays were delisted from Threatened status in 1994, in 1999-2000 a third of their population died off. Avoidable stressors must be minimized to aid their recovery.

Sanctuaries Use Media, Agency Partners, to Warn Vessels of Whale Shipstrike Threat

Later this spring Farallones communications staff issued a Superintendent's Statement to Bay Area media regarding significant numbers of endangered whales feeding in and near major shipping lanes off San Francisco's Golden Gate, at risk from shipstrike. NOAA, with the U.S. Coast Guard, advised mariners "to keep a sharp lookout for large whales and reduce speed around the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries ... NOAA strongly recommends that vessels 300 gross registered tons or larger transiting the Traffic Separation Scheme at the entrance to San Francisco Bay do so at speeds not in excess of 10 knots." Point Blue Conservation Science biologists on the Farallon Islands and whale watch naturalists reported large numbers of blue and humpback whales in the area. Sanctuary and Coast Guard staff conducted an overflight to verify whale density. Boaters are requested to report collisions with whales or injured or dead whales to NOAA at 877-SOS-WHALE (877-767-9425) or to the U.S. Coast Guard. Whale conservation requires the cooperation of many agencies and other groups for maximum outreach and effectiveness.

Protecting Breeding Seabird Colonies

Seabird Protection Network: The Seabird Protection Network is a program of Gulf of the Farallones National Marine Sanctuary that works to reduce human disturbance to sensitive seabird breeding colonies along the central California coast through outreach and education. Presentations both inform pilots and open a dialogue with sanctuary staff, often resulting in partnerships or future collaborations with the Seabird Protection Network.

Seabird Protection Network (SPN) Presents Seminar at Major Boat Show

On April 14th, Farallones Seabird Protection Network staff presented a seminar at Strictly Sail Pacific, the West Coast's largest all-sail boat show, held in Oakland. Ten boating enthusiasts attended the seminar and gave high evaluation ratings. The Seabird Protection Network informed the group on the impact of disturbance to seabird colonies along the coast. Video clips of Brown Pelican disturbances to Common Murre colonies and our first Sensational Seabirds video featuring West Coast cormorants enhanced the presentation. Attendees received tide books with seabird protection tips and Seabird Aware brochures. This is the first time SPN has spoken at this event, and the only seminar of 110 with an environmental/conservation subject. The opportunity to focus on North Central California Marine Protected Areas, especially Special Closures, to this prime boating audience is unprecedented. These presentations raise the issue of potential boater impacts on sensitive seabird breeding colonies. With increased knowledge, they can incorporate seabird awareness and exercise greater stewardship. Next year we hope to increase attendance through social media marketing.

Seabird Network Advises Pilots About West Coast Overflight Regulations

The Seabird Protection Network emailed information on west coast National Marine Sanctuary overflight prohibition zones to 460 traditional and experimental aircraft pilots this quarter, in Petaluma, Novato, via email and in spoken presentations. Pilots received information about these zones, including links to the regulations (<http://sanctuaries.noaa.gov/flight/welcome.html>), to the Federal Register notice and to maps. West Coast National Marine Sanctuary overflight prohibitions have been in place for more than 20 years but only appeared on FAA charts beginning in 2012. Additional outreach is still needed raise pilot awareness of these important areas.

Community Leaders Raise Their Seabird Awareness

Community service leaders are often called upon to make local decisions impacting wildlife, so the Seabird Protection Network staff spoke to 25 members of the Millbrae Rotary Service Club - prominent local businesses and politicians, including the Mayor. Staff shared a presentation about the local sanctuaries, seabirds and history of seabird breeding populations; Members learned about the negative impact on seabird population success caused by both human and predator disturbances. Presentations to service organizations raise awareness of wildlife issues close to home.

Developing Solutions to Respond to Climate Change

Ocean Climate Change Summit Report Released

In March the summary report for the Third Biennial Ocean Climate Summit, held February 20, in San Francisco was released through the [summit website home page](#). The report includes: summit goal, objectives and structure; presentation and discussion summaries; suggestions for the Fourth Biennial Summit summarized from the post-summit evaluation; and appendices with the agenda, poster abstracts, and participant list. Over 130 managers, planners, scientists, and educators involved in climate change and ocean acidification efforts in the greater Gulf of the Farallones National Marine Sanctuary region attended the summit. The goal of the summit was to connect

information, resources, and people across disciplines to collaboratively sustain North-central coast and ocean ecosystem health through fostering awareness, promoting action, and advocating climate smart conservation

Farallones Facilitates, Participates in Discussion on Sea Level Rise Impacts, Management Tools

Our Coast—Our Future (OCOF) held two training webinars on the North-central California coast decision support tools for sea level rise and storms on March 26th and April 23rd, with 100 attendees total. The April webinar was hosted through the EBM Tools Network and had attendees from 23 different states and 11 different countries. The team is scheduling directed trainings for stakeholders needing more information on how to apply the tool to their agency's specific planning process, as well as working with stakeholders to help shape the San Francisco Bay tools, which will be available in summer 2014. The OCOF online decision support tools are developed with a diverse project team and continuous end user input, and are directly tailored to the management needs of the San Francisco Bay Area region. OCOF also presented at the San Francisco South Bay Workshop, hosted by the Federal Emergency Management Agency (FEMA) and BakerAECOM, on April 25th in San Jose. Sanctuary staff provided a project overview and demonstration of the currently North-central California coast decision support tools for sea level rise and storms. The US Geological Survey gave an overview of the Coastal Storm Modeling System (CoSMoS) used to develop a combination of 40 different sea level rise and storm scenarios. This stakeholder-defined project provides regionally scaled models and online decision support tools for proactive planning efforts throughout the nine-county San Francisco Bay Area.

MARITIME HERITAGE

Farallones Sanctuary Assists Coast Guard Locate Historic Images, Artifacts

At the request of the US Coast Guard Station Golden Gate Station, communications staff provided access to historic images and information sources for an historic exhibit on USCG activities in the area. The Farallones campus encompasses former US Coast Guard Lifesaving Service buildings, some dating to 1890. Currently, Station Golden Gate is one of the Coast Guard's nineteen designated "surf" stations and the busiest search and rescue station on the West Coast. Its heyday began during the Gold Rush Era when vessels and crews unsuited and unprepared for the Gate's treacherous reefs and fog met with mishaps, through wars and brisk commercial shipping. The current station now averages over 600 search & rescue cases each year. In addition it conducts security and enforcement activities. The Farallones sanctuary is rich in maritime history. Exceptionally challenging sea conditions have posed dangers to vessels of all types. Fostering partnerships with agencies which share missions of preservation and conservation lays the groundwork for future cooperative endeavors.

EDUCATION

Increasing Awareness of the Sanctuary

Exhibits

Farallones Sanctuary Develops New Exhibit for SF Zoo on Gray Whale Journey

The Farallones education staff produced a component of a new exhibit at the San Francisco Zoo, "Travesia: Journey of the Gray Whale," which opened on World Ocean Day. Travesia follows the coastal migrations of gray whales in a bilingual, multi-media exhibition that explores their path along Canada, the U.S. and Mexico. Mexico's El Vizcaino Biosphere Reserve and the three north-central coast marine sanctuaries off San Francisco. These are highlighted as integral parts of this species' habitat. The Farallones sanctuary education team designed and fabricated this exhibit component, which includes the migration map and Whale Entanglement Hotline information. Visitors experience the world of gray whales through artifacts, photos, graphics and original artwork. The San Francisco Zoo is the exclusive U.S. venue for this exhibition, sponsored by Mexico's National Council for Culture and the Arts and the Foreign Affairs Secretariat. Three countries cooperate to promote nature conservation through the arts and the compelling story of the gray whale migration. In just over three months at the San Francisco Zoo, the exhibit is expected to attract over 400,000 visitors.

Sanctuary Sea Lion Skeleton Exhibit Resumes "Migration"

A fully articulated sea lion skeleton exhibit with sanctuary interpretive messages has "migrated" to the Randall Museum in San Francisco. The Randall is the City of San Francisco's Children's Museum and attracts over 250,000 visitors a year. Sanctuary messages include sea lion natural history and marine life viewing "etiquette" tips. The Sanctuary Sea Lion Exhibit is part of a larger permanent 15,000 square foot exhibition on local Bay Area wildlife, which includes live animals, models and inter-actives. The Sanctuary Sea Lion skeleton has also hauled-out at the Pacifica Chamber of Commerce, San Francisco Zoo, and Marine Mammal Center in Sausalito. Strategic use of sanctuary educational materials exponentially increases the reach of sanctuary messaging. To date the traveling Sanctuary Sea Lion Skeleton exhibit has been "migrating" for over ten years and been viewed by over half a million people.

Events

Public Programs

Sanctuary Explorations Series: This program provides the public with a deep experiential visit to the natural and maritime treasures within the Gulf of the Farallones National Marine Sanctuary. These expert-led programs increase sanctuary awareness and increase ocean literacy while cultivating a broader constituency for the sanctuary program. Excursions included a whale watch trip and walk to sea egret heronry, for 30 participants.

Crissy Field Visitor Center Special Programs: These include – Plankton and Pastries: Visitor Center staff offer this hands-on public program to promote ocean literacy where participants net their own plankton for study in the tide station pier house. Participants collect their own samples and create their own slides of phytoplankton and zooplankton for a hands-on microscopic exploration of the weird and wonderful world of plankton. In Planktronical! participants enjoyed an evening exploring the prolific world of plankton amid a relaxed ambiance at the stunning sanctuary Pier Classroom perched above San Francisco Bay. They learned about diatoms, dinoflagellates and copepods, and discovered bizarre larvae from barnacles, crabs, and mussels. Attendees learned to use microscopes and do print-making with plankton. There were 35 participants.

Marine Explorers Camp

A yearly partnership with the Randall Museum, the Marine Explorers Camp engages children ages 8-12 in hands-on outdoor education. Campers experience being young scientists as they perform squid dissections, plankton tows, microscope observations, first hand studies of ocean animal adaptations, coastal watershed restoration, numerous beach explorations, and kayaking. Field trips are made to higher education and scientific institutions such as The Marine Mammal Center and Bodega Marine Lab. In Q3 the Marine Explorers Camp engaged 56 students in 40 hours of marine science education totaling 2,240 hours of instructional time with a ratio of one instructor per nine students.

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. This past quarter the visitor center served 4,916 individuals for all programs, both scheduled and drop-in.

This quarter 902 students participated in the sanctuary Visitor Center field trip programs. The program promotes ocean literacy and provides standards-based interactive programs inside the center and in the field for kindergarten through high school. Some examples for the past quarter:

Oceans After School: - 74 participants.

Using the endless appeal of our local marine wildlife and habitats, the Sanctuary Education Team offers 16 hours of fun, hands-on, lively marine science programs for after-school programs on topics such as sharks, salmon, seabirds, whales, squid, and plankton. These enrichment programs are dynamic, interactive, and integrated into state standards. Our marine science educators deliver the programs during an 8-12 week window and primarily serve low-income under-served students.

At-Your-School (AYS) Programs

At Your School: 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 the Gulf of the 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 grades. During the quarter, students and their teachers from several Bay Area schools participated in At Your School Programs. AYS staff travel throughout the area to bring ocean education to schools in Alameda, Contra Costa, San Mateo, Marin, Santa Clara and San Francisco counties. Programs include the Sharkmobile, Crab Cab, Seabird Shuttle, and Ocean Acidification. In total, the programs served 1,402 students and 48 teachers.

Fisherman in the Classroom: Gulf of the Farallones National Marine Sanctuary education staff teamed up with local fishermen to deliver programs to 20 students. The teaching team brought fishing gear, video, stories, recipes and activities to highlight the rich maritime fishing culture of the Central California Coast. Connecting our youth with their local commercial fishing community and sanctuary staff provided a unique firsthand experience for the

students to hear multiple perspectives on marine protected areas, sustainable fisheries and the importance of buying and eating fresh locally caught seafood.

Teacher Professional Development Workshops

Sanctuary Completes Teacher Workshop Series with Inner City Youth Agency

In April forty-two science teachers participated in one of three professional development workshops lead by the sanctuary in collaboration with Seven Tepees Youth Program, an agency that improves the lives of promising inner-city youth. The partnership—Watershed Advocacy Via Environmental Studies (WAVES)—offers marine science programs for students, science career counseling inside urban San Francisco high schools, and professional development for teachers. The series kicked off last October with a hands-on oceans acidification workshop featuring Jill Bible of UC Davis Bodega Bay Marine Laboratory. In February, sanctuary educators coordinated a Salmon Fishing and Watersheds workshop featuring salmon dissections and a presentation by commercial fisherman Mike Hudson on salmon fishing in the Central California sanctuaries. In April, the workshop series culminated in a kayaking exploration of the Mission Creek Watershed, a local and accessible urban creek in San Francisco. The WAVES partnership promotes ocean and climate literacy in local schools and brings science programming to inner-city youth. By training teachers, the sanctuary can have an exponential reach while building strong community partnerships.

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. 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.

Lucky Number Seven: Seven Years of Growth for LiMPETS Program

Pythagoras called seven a perfect number, making it the basis for "Music of the Spheres," and it suits the Long-term Monitoring Program and Experiential Training for Students – LiMPETS - to perfection. Since the 2005-2006 school year, LiMPETS has grown in just about every way possible: new website, online data entry and graphing capabilities, in-depth curriculum, increased credibility of program in the education, citizen science and scientific communities, broader depth of impact on students, and broader reach of the program across and within communities. In seven years, much has been accomplished. A full analysis of programmatic growth and student impact will be conducted this summer. In total, the Farallones LiMPETS staff has coordinated and engaged almost 2,000 students this school year, a 300% increase from 2005.

Holy Moley! Sanctuary's Largest Sand Crab "Baby Boom" in 10+ years

Mole (sand) crabs are among the most important and abundant invertebrates on beaches in North-central California. They can exceed 100,000 individuals m⁻¹ on regional beaches. Mole crabs are also a vital link in the sandy beach food web. Despite their significance, no long-term data set exists for this species - except for the Sanctuary's LiMPETS sandy beach data set. This March, beaches throughout the Gulf of the Farallones and northern Monterey Bay National Marine Sanctuary regions have been experiencing unusually high numbers of crabs recruiting to the swash zones of our beaches. In particular, El Camino High School collected (and counted) 5,000 mole crabs (within 100 core samples) on Pacific State Beach in late March. Since 2001, this may be the largest recruitment event in the Sanctuary on record! Monitoring sandy beach areas is critical to evaluating the health

of these coastal systems. With regional monitoring programs like LiMPETS, we are able to assess the continued status of our sandy beaches and address current and future impacts better.

LiMPETS Teachers Learn Scientific Importance of Their Data Collection Efforts

Teachers attended workshops and geared up for the next school year. On Wednesday, June 26th Farallones Marine Sanctuary staff held a teacher workshop for our long-term teacher 'volunteers' who participate in LiMPETS (Long-term Monitoring Program and Experiential Training for Students). Our goal was to update them on new resources, including our new, re-designed [website](#) and graphing tools. LiMPETS teaches and students have helped to build a foundation of knowledge through identifying long-term trends when the state marine protected areas were implemented. Therefore, we also presented the trends and results from our recent long-term analyses to help them understand how their data has contributed to the ocean conservation efforts of the state. Communicating the value and scientific importance of data collection efforts by our dedicated citizen scientists is an essential component of maintaining a strong, committed network of citizen scientists. The total participation in the LiMPETS program this quarter was 638 students.

Media/News Reports will be posted to the website at a later date.

Farallones Sanctuary Future Events 2013 Calendar

September

- 9/19 Premier documentary, "State of Bolinas Lagoon" and town hall meeting, Stinson Beach Community Center
- 9/20 Kent Island/Bolinas Lagoon Restoration volunteer opportunity*
- 9/20-25 ACCESS Research Cruises
- 9/29 Plankton & Pastries - ***

October

- 10/3 SharktoberFest at California Academy of Sciences Nightlife
- 10/5 SharktoberFest at GFNMS Headquarters
- 10/19 Sanctuary Explorations Farallones Cruise - **
- 10/27 FMSA Fundraiser Farallones Whale Watch - ****

November

- 11/16 Sanctuary Soiree: Elephant Seals with Dr. Burney Leboeuf - ***
- 11/20 GF Sanctuary Advisory Council meeting, Point Reyes

* Visit the Farallones Marine Sanctuary website for details and registration: www.farallones.org.

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GET INVOLVED – AND STAY INFORMED!

Sign up for the GFNMS listserv to receive email notices about upcoming sanctuary events and public meetings. To learn how to get 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/SanctuaryAdvisoryCouncil.html>

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