

# GULF OF THE FARALLONES NATIONAL MARINE SANCTUARY SUPERINTENDENT'S REPORT JANUARY THROUGH JUNE 2010



## **NOAA Administrator Tours Farallones Sanctuary**

On June 26 NOAA Administrator Dr. Jane Lubchenco joined sanctuary and association staff, PRBO Conservation Science, Oikonos Ecosystem Knowledge, and the U.S. Fish and Wildlife Service aboard the NOAA *R/V Fulmar* for a familiarization cruise into the Farallones marine sanctuary and to visit the Farallon Islands National Wildlife Refuge. Prior to departing port, Cordell sanctuary and regional staff briefed the administrator on the just-returned deep sea corals research cruise, and members of the scientific team from the Applied California Current Ecosystem Studies (ACCESS) discussed that project's objectives and research activities. Dr. Lubchenco, the sanctuary superintendent and others landed on Southeast Farallon Island to tour the research facility and learn about the various scientific and outreach partnerships in which the sanctuary participates to build more effective collaborations in science and ocean literacy.

## ***HEALTH OF THE SANCTUARY***

### **Ocean Acidification Threatens Tomales Bay Shellfish**

National Science Foundation, "On 'Earth Week,' World Is No Longer Our Oyster. Acidifying oceans dramatically stunt growth of already threatened shellfish ... From East Coast to West and around the world, global warming and its effects have descended upon shellfish reefs, particularly those formed by the Olympia oyster. ... Brian Gaylord is investigating the consequences of this increasing ocean acidity on the growth of larval and juvenile Olympia oysters native to the U.S. West Coast. ... Gaylord conducted experiments on larvae and juveniles produced by adult oysters in Tomales Bay, California. Adults were collected in the bay, then held at the Bodega Marine Laboratory until they released larvae. ... By a week later, the effects were dramatically magnified. The bottom-dwelling juveniles in the 970 ppm treatment had grown 41 percent less than juveniles under control conditions ..." See more at

[http://www.nsf.gov/news/news\\_summ.jsp?cntn\\_id=116767&org=NSF&from=news](http://www.nsf.gov/news/news_summ.jsp?cntn_id=116767&org=NSF&from=news)



*Tomales Bay, Kai McConnell, NSF*



## RESEARCH

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

#### *SEAS – Rocky Intertidal*

##### **Rocky Intertidal Study At Farallon Islands Reveals Newly Documented Species for Site**

In March, science staff accompanied by experts on plants and animals that inhabit the intertidal zone, carried out intertidal monitoring at the South Farallon Islands. The Sanctuary has been conducting surveys of the South Farallon Islands' intertidal zone every year since 1992. This long-term monitoring provides valuable baseline information on species composition and richness in a relatively pristine area. The intertidal crew includes biologists from the California Academy of Sciences, and Tenera. They inventoried invertebrates, take photographs for archives, and document algae cover in permanent plots at 6 sites on Southeast Farallon Island and West End. Surveys are conducted three times per year, weather permitting.

This year five new species were documented. Moreover, a black abalone (*Haliotis cracherodii*) was sighted here for the first time since 2000. Black abalone, once the most abundant species of abalone in California, is now perilously close to extinction due to past overfishing. It is currently federally protected under the Endangered Species Act. The South Farallon Islands are at the northern extent of its range.

##### **Expanded and Enhanced Coast and Offshore Monitoring on Farallones Site Schedule**

The Farallones and Cordell Bank sanctuaries has formed a research and monitoring partnership with the Farallones Marine Sanctuary Association, and PRBO Conservation Science to conduct coastal and offshore regional monitoring in the sanctuaries. The Applied California Current Ecosystem Assessment Studies (SEAS-ACCESS) is now integrated with the monitoring programs at GFNMS, Sanctuary Ecosystem Assessment Surveys. It has evolved over the past two years and will now conduct coordinated surveys on the *R/V Fulmar*, starting this spring. It is designed to serve multiple management and resource protection needs, including monitoring ocean acidification, variability in upwelling and productivity, assessment of status and trends of seabirds, marine mammals, sea turtles, and their prey within the sanctuaries, and assessment of notable pressures such as vessel traffic, marine trash, and overlaps of key foraging areas, pressures and resources at risk. This project will provide data and information on habitats and species of the sanctuaries most vulnerable to anthropogenic pressures and development of adaptive management actions. Data can be used to provide baseline information on productivity in the event of an oil spill, to determine the fate of dispersants, and mismatched prey availability due to climate change. Daily blogs for this project can be followed by linking to the PRBO Conservation Science web site at <http://www.prbo.org/cms/561>. <mailto:Jan.Roletto@noaa.gov>

##### **Sanctuary Citizen Science Programs Funded for North-Central Coast MPA Program**

The Farallones Marine Sanctuary Association, project lead for two of eleven projects for initial monitoring of the recently designated North Central Coast marine protected areas (MPAs) was awarded three years of funding. This funding will support analysis of citizen-science data from rocky shores and sandy beaches, collected by the Sanctuary's LiMPETS (Long-term Monitoring Program and Experiential Training for Students) and Beach Watch Programs. The results will help to lay a foundation for future assessments of the effectiveness of the MPAs in meeting the state's policy goals. Broader trends identified from LiMPETS and Beach Watch data analysis will also be evaluated to help the sanctuary identify long-term status and trends in intertidal regions, detect emerging issues, and inform resource management decisions. Further information on each of the projects is available on the California Sea Grant website at [www.csgc.ucsd.edu](http://www.csgc.ucsd.edu)

## *Sanctuary Ecosystem Assessment Surveys (SEA Surveys)*

### **Scientists Carry Out Deep Sea Corals Expedition**

This summer sanctuary and other scientists took part in an expedition along the West Coast to explore for deep-sea corals and sponges in four of the west coast sanctuaries aboard the *McArthur II*. Leg 1 of the first cruise was completed in Olympic Coast sanctuary, and Leg 2 took place in the Cordell Bank and Gulf of the Farallones. Conservation science staff from all five West Coast sanctuaries, NOAA Fisheries' west coast Science Centers and Coral Reef Conservation Program, and NOAA's National Centers for Coastal Ocean Science (NCCOS) recently completed a new project web page on the SIMoN science web site (Sanctuary Integrated Monitoring Network) for NOAA's Deep-Sea Coral 2010 Assessment for the U.S. West Coast, see <http://www.sanctuariesimon.org/>. A project description, sample plan and maps of the proposed target areas appear on the project page. Images taken during the cruise appear on the web site. The team documented six coral species, two of which were previously unknown in the Cordell Bank sanctuary. Primnoids, crinoids and deep sea sponges were among the sea life found at depth.

Planning and cruise findings helped to develop criteria for selecting and prioritizing habitats vulnerable to anthropogenic pressures, and identify: potential deep-sea coral communities most at risk from ocean acidification, potential sources of pollution from sunken vessels, and identify sensitive species and habitats most vulnerable to anthropogenic pressures and development of adaptive management actions.

## *SEAS—Beach Watch*

### **California Ecology and Geology Book to Feature Farallones Beach Watch Data**

Beach Watch beached bird data now appears in the new publication, *A Coast to Explore: The Coastal Geology and Ecology of Central California*. The book reviews the California coastline geology, plate tectonics, effects from El Nino/Southern Oscillation (ENSO) storm events, and other interesting features. The book is co-authored by Miles Hayes and Jacqueline Michel, who have been mapping and categorizing the sensitive of coastal shoreline habitats and have worked with NOAA staff on many hazardous spills throughout the world.

### **Farallones Sanctuary, National Ocean Data Center Funded to Digitize Photo Data**

The Farallones marine sanctuary and National Ocean Data Center (NODC) were awarded \$75,000 through the NOAA Climate Data Modernization Program (CDMP) program to preserve and digitize photographic data slides. This project has been ongoing since 2005 and has completed the historic preservation of slides from the California Kelp Resources Project's collection of kelp canopy slides. The project is in the process of preserving the data slides from the Beach Watch program, both beached organisms and beach profiles used to qualitatively assess beach erosion and beach deposition over decades, and to preserve the seabird colony slides collected through the Common Murre Restoration Project, U.S. Fish and Wildlife Service.

This project will provide long-term information on beach erosion and deposition patterns, and the ability to track these changes with increased storms events that will develop with climate change. Data can also be used to track shifts in mortality patterns that will emerge with changes in phenology and mis-matched prey availability due to climate change.

## CONSERVATION

### *Minimizing Risk from Oil/Sewage Spills and Vessel Impacts*

#### **Farallones Science Staff Consult on Deepwater Horizon Spill Volunteer Training Program**

Farallones sanctuary and association science staff were consulted to help develop a "Train the Trainer" program to handle the high numbers of emerging volunteers in the Deepwater Horizon, Gulf of Mexico oil spill. Modeling the program on the Farallones' congressionally-commended Beach Watch coastal monitoring program, staff are working with oil spill response staff and consultants to determine how best to collect and record shoreline-oiling information from the public in a consistent, useful format, and safely. This effort is in anticipation of large amounts of oil coming ashore and thousands of people wanting to participate in spill response and clean up efforts. Sanctuary and partner Farallones Marine Sanctuary Association staff were asked to develop Beach Watch-style, pre-spill survey protocols, and provide training packages and tools to Gulf Coast NGO's and their members within the five Gulf Coast states.

### *Enforcement*

#### **Aerial Enforcement Exercise, Public Broadcasters Take to the Air Over Marine Sanctuary Waters**

Producers for KQED Quest, the major public broadcast station in Northern California, went aloft in the NOAA Twin Otter plane on Thursday, April 22, to gather material for a new webcast series, Science on the Spot, as well as for a regular radio report. The reports profile how the Farallones marine sanctuary is assisting the State of California by supporting the state's own efforts in enforcement of the newest series of Marine Protected Areas in Central and Northern California, which went into effect in May, 2010.

#### **Enforcement Agencies Join Familiarization Cruise in Farallones Sanctuary**

The NOAA Office of Law Enforcement and Gulf of the Farallones National Marine Sanctuary co-hosted a collaborative enforcement cruise on Friday, June 25 aboard the *R/V Fulmar*. The cruise was for federal, state and local enforcement personnel from NOAA, the Department of Interior, U.S. Coast Guard, and California Department of Fish and Game including the attorneys who prosecute marine resources cases from NOAA General Counsel, Department of Justice, and local District Attorneys. Cruise participants were informed about the laws and regulations that apply in Sanctuary waters, including protected areas designated through Sanctuary and Essential Fish Habitat regulations, as well as the newly established California Marine Protected Areas.

### *Reducing Wildlife Disturbance*

#### **Giant Mavericks Surf Inundates Spectators, Spurs Public Criticism**

On February 22 staff attended a post-contest closed debriefing of agencies involved in the 2010 Mavericks Surf Contest to discuss lessons learned and make plans for future improvements. This year's contest gained international attention because 'rogue' waves injured on-beach spectators. A subset of local media and community have been outraged that better public safety was not practiced, have criticized the agencies issuing permits for various aspects of the contest, and had been demanding to attend the debriefing. As part of implementing the management plans and regulatory changes following the Joint Management Plan Review, the sanctuary issued a permit to Mavericks Surf Ventures, the contest organizers, for use of jet-skis during the 2009-2010 season contest. The sanctuary has no authority over public safety, and the permits issued had no bearing on the incident.

## *Protecting Breeding Seabird Colonies*

### **Farallones Sanctuary Helps Giant AMGen Cycle Tour be 'Seabird Friendly'**

Sanctuary communications staff, at the request of the US Fish and Wildlife Service, issued an alert to media and other pilots covering the annual AMGen Tour of California bicycle race to avoid wildlife disturbance, especially to seabirds. The race draws millions of spectators each year, and is one of America's largest annual sporting events. On May 18<sup>th</sup> Leg 3 took riders from San Francisco south along the San Mateo County coast, past Devil's Slide Rock's seabird rookeries. They had been abandoned and were recolonized through the multi-agency Common Murre Restoration Project for which NOAA was co-trustee. Aircraft and other means of covering or viewing the race may disturb seabirds engaged in courtship on hillsides and offshore rocks, cause seabird mortality, and possible nest or breeding colony abandonment. U.S. Fish and Wildlife Service staff reported no low overflights or seabird disturbance from aircraft during the event.

### **Seabird Protection Network Presents at Long Beach Meeting**

The Seabird Protection Network which uses outreach tools to educate the public on minimizing disturbances to seabirds, attended the Pacific Seabird Group Annual Meeting in Long Beach, in February. A poster about the network, its accomplishments and future actions was presented during the poster session. A talk was presented to about 100 conference attendees on the role of the SPN in the implementation of Special Closures of California's new Marine Protected Areas which was implemented April 1, 2010.

### **Seabird Protection Network Releases Guidebook to Implementing New Chapters**

During the annual Pacific Seabird Group meeting in February, the Seabird Protection Network debuted the "Seabird Protection Network: A Guide to Implementing New Chapters!" This document provides a framework for additional chapter development with the intention that each new chapter would be managed and implemented on a local level. The Farallones Sanctuary will continue to manage the Network's Central Coast Chapter and will facilitate program expansion, incorporating additional chapters throughout California as they develop. Over the four-day meeting, 13 guidebooks were distributed to meeting attendees interested in developing similar seabird protection efforts in their local area.

### **Seabird Network Works With Agencies for No Disturbance Air Show**

The Seabird Protection Network and Gulf of the Farallones National Marine Sanctuary joined forces with United States Fish and Wildlife Service enforcement, and the NOAA Twin Otter to model a "No-Disturbance" air show on Sunday, April 25 at the Half Moon Bay Pacific Coast Dream Machines Event.

The network worked with event organizers, including the Federal Aviation Administration, requesting pilots fly above 1,000 ft. along the coast to minimize disturbances to nesting seabirds. SPN received media attention prior to the event, posted an Automated Weather Observing System (AWOS) for pilots upon arrival to the Half Moon Bay airport, and distributed information to tour operators prior to the event. The SPN Team and the NOAA Twin Otter set up side-by-side at the event. Attendees had the opportunity to view the inside of aircraft. Over 500 people visited the booth and spoke with NOAA staff.

### **Seabird Protection Network Increases Pilot Awareness**

The Seabird Protection Network sent pilot mailings containing information on current over flight regulations, maps of over-flight restriction areas and seabird colonies to hundreds of pilots and flight schools in California. This annual mailing is part of the outreach program to pilots to reduce disturbances to sensitive seabirds along the California coast and to educate pilots about measures to reduce disturbances to nesting seabirds. Flight schools have been willing collaborators in information sharing. Other outreach strategies include social media <http://www.facebook.com/pages/Seabird-Protection-Network/221897718037>. Low flying planes are one of the

main disturbances to nesting seabirds along California's coast and the pilot mailing, along with presentations and other outreach materials are used to connect with and educate pilots about seabirds and how to minimize their impact on coastal breeding sites.

### **Vessel Traffic Lane Changes, Emission Regulations, May Bring Ships Closer to Seabird Habitats**

On January 14 Farallones staff met with the San Francisco Bay Region Harbor Safety Committee. Topics included a study by the US Coast Guard to consider vessel traffic lane changes related to changes in vessel emission regulations potentially impacting the Gulf of the Farallones, Cordell Bank, and Monterey Bay national marine sanctuaries. The Committee encouraged sanctuary input into the changes. Additionally, data compiled by the US Coast Guard for the period of August-December 2009 indicates that new California Air Board regulations requiring barges and tankers to switch to low sulfur fuels when within 24 nautical miles of the coast have resulted in barges switching from mostly southern approach lanes into San Francisco Bay to using the western lanes. This is bringing more large-sized vessels into sanctuary waters near the Farallon Islands, with resulting higher risk of wildlife mortality from spills, and more potential for ship strikes in this ecologically sensitive area. Continued close sanctuary involvement in vessel traffic issues is essential.

### *Protecting White Sharks*

#### **Farallones Staff Present on White Shark Stewardship at International Conference**

On February 7-10 Farallones Sanctuary staff presented a paper at the International White Shark Symposium in Honolulu, Hawaii. The topic of the sanctuary presentation was the new White Shark Stewardship Project and lessons learned from the first year of implementation. Symposium topics focused on white shark research from around the globe, including in the Farallones and Monterey Bay Sanctuaries and included group discussion sessions on research tagging ethics, white shark eco-tourism ethics, and addressing public reaction after shark attacks of people. The 100 symposium attendees were mainly scientists, managers, and tourism operators. This symposium was an important opportunity for sanctuary staff to learn more about the state of the science of white shark tagging and to meet managers addressing similar issues of white shark-human interactions. Sharks are declining worldwide, and this species is listed on the IUCN Red List, as a species of concern.

#### **White Shark Stewardship Project**

Sanctuary staff are in the process of: 1) reviewing and analyzing monitoring data from the 2009 white shark season in order to inform management for 2010 permits and identify future needed monitoring; 2) organizing a naturalist training mandatory for tourism operations permitted for white shark educational activities; and 3) coordinating with staff from NOAA Fisheries for an expert review of 2009 tagging activities by Michael Domeier of Marine Conservation Science Institute that resulted in a shark being hooked in the esophagus.

### *Restoring Sanctuary Habitat*

#### **Farallones Bolinas Project Process Profiled As Model for Habitat Restoration in Korea**

Producers for Korea Broadcasting Service traveled to San Francisco to film Bolinas Lagoon and document the restoration project, which evolved over nearly a decade and involved many agencies and stakeholders, to restore this Ramsar site, or Wetlands of International Importance. They interviewed the sanctuary superintendent on the restoration project itself, and on the community-agency coalition that worked together to build consensus on the project components and phased manner in which the future restoration will be carried out. The documentary is scheduled to air in the summer.

## *Developing Solutions to Respond to Climate Change*

### **Experts Release Ocean Climate Change Impacts Report For Farallones, Cordell Sanctuaries**

On June 3rd a sanctuary advisory working group released "Climate Change Impacts: Gulf of the Farallones and Cordell Bank national marine sanctuaries" in San Francisco, Gulf of the Farallones, with the San Francisco Bay National Estuarine Research Reserve and California Academy of Sciences. Later, the Farallones and Cordell sites, with the California Academy of Sciences and San Francisco Bay National Estuarine Research Reserve, held the "2nd Biennial Ocean Climate Summit: Moving from Knowledge to Action." Sixty-five local scientists, educators, media specialists, and marine resource managers participated in discussion groups: Public Outreach, Science and Information, and Adaptation and Innovation. The goals were to address climate change impacts within the San Francisco Bay Area's coast and ocean environment through 1) communication of these impacts to the public; 2) better communication among scientists, natural resource managers, and communities, and 3) strategies to move management from planning for today to planning for the future. To download the Climate Change Impacts Report visit: <http://farallones.noaa.gov/eco/climate/climate.html#report>.

## **EDUCATION & OUTREACH**

### *Increasing Awareness of the Sanctuary*

#### **Farallones Names Eighth Grader Young Marine Scientist of the Year**

Eighth grader Julie Avetisyan won the Farallones sanctuary's Young Marine Scientist of the Year Award for her biological sciences project, "Effects of an Oil Spill on Aquatic Plantlife" for her systematic observations of plant structure and growth rate of the water-weed *Elodea*. She exposed five groups of eight plants each to heating oil in varying degrees. After formulating her hypothesis that oil might affect normal plant growth, she obtained her study subjects, demonstrated her procedures, processed the raw data, and formed her conclusion: The leaves, and cross-sections of the stems, showed that plants with maximum oil exposure showed significant changes in cell structure, and didn't grow, compared with non-oiled or minimally-oiled plants.

#### **Sanctuary and City Partner for Marine Science Summer Camp**

The Gulf of the Farallones National Marine Sanctuary (GFNMS) partnered with the Randall Museum (San Francisco Recreation and Park Department) to offer a marine science camp at Randall Museum this summer. The camp ran for two weeks, was taught by sanctuary education staff, and involved 32 children between the ages of eight and twelve years old. Hands-on activities, craft projects, games and discussion were used to explore many marine topics including marine mammals, oceanography, sea birds, watersheds, oceanography, turtles, sharks, and other marine invertebrates. The camp culminated in a tide pool field trip to Fitzgerald Marine Reserve in San Mateo where the campers were able to see in their habitat, many of the organisms they had studied. As campers increased their awareness and knowledge of coastal and marine life, they also investigated some of the ways scientists learn about the ocean, its life and challenges.

### *Offsite Outreach*

#### **SF Ocean Film Festival Brings Sanctuaries, Sea Life to Thousands**

This year over 3,700 people learned about increased their ocean literacy and learned about marine sanctuaries at the Seventh Annual San Francisco Ocean Film Festival in February. The Farallones sanctuary is a founding partner, and enjoyed a high profile at the event. Films ranged from ocean adventure, to conservation, sports, and ocean cultures. Shown were KQED Quest's "Farallon Islands, California's Galapagos," "Tragedies in the Mist"

(Thunder Bay), and “Lost on a Reef“ (Papahānaumokuākea) plus three short films created by international students in the Ocean For Life program this past summer ‘made the cut.’ Two were featured in the main program, and the third in the special Youth Program which will draw up to 1,100 middle- and high-school students from 23 schools. One, “Symbiosis Mashup,” won a coveted slot in the same session in which the Academy Award-winning film “The Cove” was shown. Several other films feature the Farallones sanctuary or regional marine protected areas.

### *Exhibits*

#### **Major Sanctuary Signage To Debut at Fitzgerald Marine Reserve**

Fifteen new Farallones/Monterey marine sanctuary interpretive signs have now been completed and are soon to be installed at Fitzgerald Marine Reserve south of San Francisco, which receives 90,000 visitors annually. A tribute to a major public-private and interagency collaboration, the signs will be strategically situated at trailheads, on cliffs overlooking the sea, and along marsh trails. They feature the sanctuary's nearshore biological diversity and abundance, the “perfect waves” of world-famous Mavericks near Pillar Point Harbor, our maritime heritage, coastal geology, zones of intertidal life, nearshore marine mammals, the tides, the sanctuary watershed, and coastal terrestrial flora and fauna.

#### **New Docents Trained for Farallones/Science Academy Rocky Shore Partnership**

Farallones education staff conducted a three hour field course for 30 existing California Academy of Sciences docents who work at the Gulf of the Farallones National Marine Sanctuary exhibit at the academy. In addition, the sanctuary started a new rocky shore partnership volunteer class for an additional 30 people, which included a field trip to Duxbury Reef, the largest shale reef in North America. These latter docents represent a specialized cadre of volunteers who can interpret intertidal marine life, and inform visitors how to enjoy rocky intertidal areas with minimum impact.

Sixty people have now received formal training in helping to increase ocean literacy through sanctuary/academy exhibits and in the field at Duxbury Reef, which receives heavy visitation since it lies adjacent to the heavily populated San Francisco Bay Area. This project will help to advance public awareness of the marine sanctuaries.

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

#### **LiMPETS Model for Regional and International Student Programs**

The LiMPETS program trains middle school, high school, and other young groups to monitor the rocky intertidal, sandy shore and offshore areas of the five west coast National Marine Sanctuaries. The LiMPETS network is one way in which three sanctuaries in California are working together to engage teachers, students and the community to conduct real science and become ocean stewards.

Farallones Marine Sanctuary Association staff trained educators and teachers in workshops to participate in LiMPETS Programs. All workshops aim to increase teachers' awareness of the sanctuaries and sanctuary programs - and aim to increase the amount of time teachers spend teaching the ocean sciences in the classroom. See [www.limpetsmonitoring.org](http://www.limpetsmonitoring.org)

Professors and other educators from Australia, Hawaii and California have commended the LiMPETS program as a great resource and model program. For example, in the Channel Islands National Marine Sanctuary region, students from Marina del Rey Middle School Marine Science Academy won the QuikScience Challenge by using the LiMPETS protocol as the basis of their project. In another example, inner city students spent three

months studying mole crab populations at local beaches, included a final day of monitoring. A teacher reported that it was a huge success. "This trip has changed lives. I work in a rough school, and many bonds were formed. I have a lot of inter-racial groups, gang members, at risk students, and this trip brought them all together with team work. Friendships were made, gang ties were diminished, and students got to do some real scientific research."

### **Teacher Workshops**

High school teachers were the focus of the LiMPETS Teacher Workshop: Life and Drama in the Intertidal" in the Presidio. Educators learned about the fascinating predator-prey interactions and reproductive strategies of invertebrates that live along our local rocky shores, and listened to local biologist Dr. Tom Niesen. This workshop is one in a series of professional development opportunities offered by the Farallones Marine Sanctuary Association which aims to enhance teachers knowledge of relevant and current ocean science, connect them with local scientists and their sanctuaries, and inspire teachers to cultivate a new generation of ocean stewards.

Fourteen middle, high school and college level teachers participated in a Teacher Workshop this year, led by Association staff. The Workshop introduced teachers to programs, provided curricula, and gave teachers the opportunity to practice monitoring techniques and activities. All teachers plan to incorporate a new LiMPETS program into their classes during the 2010-2011 school year.

### **Teachers Workshop Explores Watery World of Plankton**

Plankton, once an unknown or underappreciated subject of study, is now hot-hot-hot! Twenty enthusiastic teachers from seven Bay Area counties attended a Plankton Workshop at the Sanctuary on Saturday, February 20th. Guest scientist Dr. Lindsay Sullivan (Romberg Tiburon Center, San Francisco State University) taught the teachers about why plankton matters and how to connect their students with the wonderful world of plankton. The Association offers a series of teacher workshops throughout the year that connect teachers with the sanctuary and gives them the knowledge and resources to teach their students about the ocean.

### **Students Scientists Document Mole Crab "Baby Boom" on Sanctuary Beaches**

For the first time since 2003, tiny mole crabs, called recruits, are settling onto Sanctuary beaches in large numbers. Students from middle and high schools throughout the Bay Area have investigated mole crab populations on Farallones and northern Monterey Bay marine sanctuary beaches as part of the LiMPETS (Long-term Monitoring Program and Experiential Training for Students). Students are recording the extent of this unusual recruitment event and data is being archived in the LiMPETS long-term database.

### **LiMPETS Data used To Teach GIS to Teachers Nationwide Via Coastlines Project**

The Coastlines Project has been working with staff at the Farallones Marine Sanctuary Association to access appropriate LiMPETS sandy beach data for use in their GIS training for teachers. From this collaboration, they have developed a LiMPETS Sand Crab GIS activity for their program, available on the Coastlines website, <http://www.coastlines.ws>. CoastLines is a three-year Comprehensive Project for Students and Teachers (nationwide) that introduces fundamental concepts about information technologies (IT) to grade 7-12 schools. The project will accomplish this goal by involving teachers and students in using geographic information systems (GIS) and global positioning system (GPS) technology to conduct scientific studies of coastal ecosystems.

### **Students Collect Baseline Data for MPAs through LiMPETS Program**

Two of the LiMPETS monitoring sites along the San Mateo Coast, Pillar Point and Fitzgerald Marine Reserve, were monitored this week by high school students from Alameda and San Francisco counties. Data that the

students collected will be used to help establish a baseline condition for the new state reserve at Fitzgerald, as well as the adjacent rocky shore that remains unprotected, Pillar Point. Other sites that LiMPETS monitors as part of this effort, include Montara State Beach, Salmon Creek Beach, and Duxbury Reef.

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

#### **At Your School Programs Reach Out to Students and Educators**

This school year has been a busy time for At Your School (AYS) programs at the Gulf of the Farallones National Marine Sanctuary. Education staff visited schools throughout the San Francisco Bay Area. Since January a total of 1,245 students and their teachers were served by the Crab Cab, Webs Under Waves, Sharkmobile, Fisherman in the Classroom, and Science at Sea programs that AYS staff presented. 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.

#### *Crab Cab*

The Crab Cab (Kindergarten through 3<sup>rd</sup> grade) program is presented to students and teachers in schools throughout the Bay Area. These budding marine science students work with live crabs (later returned to their habitats), and enjoy the opportunity to learn the tools of scientific observation, even at their young age. They determine if crabs are males or females, what kinds they are, and learn about adaptations to their rocky intertidal habitats and environmental conditions. Five hundred fifty-six students and teachers took part in Crab Cab programs.

#### *Sharkmobile*

The Sharkmobile is a classroom program on the biology, natural history and conservation of sharks. The Sharkmobile reached out to students and teachers in classes grades 4 through 6 and taught students about sharks, and their cousins the skates and rays. Topics include evolution, adaptations to the marine environment, specialized functions of various organs, and addressed common shark myths that have led to their becoming "the fish you love to hate." Students are surprised to learn that very few sharks pose any real threat to humans, and to discover that although an average of 10 people a year die from interactions with sharks, roughly 10 million sharks are killed each year by humans. Sharks are also important elements in the health of the marine ecosystem. Four hundred forty-two students and teachers participated in the Sharkmobile program since January.

#### *Webs under Waves*

What does it take to be a successful seabird? How do they survive in such a harsh environment? In this one-hour classroom program, third through fifth-grader students and teachers in three classes learned about local seabirds, their adaptations and how seabirds fit into the coastal marine food web. Students also discuss ways that they can have a positive effect on the ocean and its ecosystems. Two hundred twenty-eight students and teachers were involved in the Webs Under Waves class activities.

## *Science at Sea*

Science at Sea is designed for 7th-12th Grade students. In it, students glimpse a marine scientist's life at sea, charting and planning the journey, data collection and analysis, and how it all comes together to better inform ocean policy. Nineteen students and teachers took part in Science at Sea activities this semester.

## *Fisherman in the Classroom*

### **Fisherman in the Classroom Brings Lives of Fishing Community to Students**

Fisherman in the Classroom reaches middle and high school students and teachers. The program highlights the maritime heritage in the San Francisco and Pillar Point fishing communities. Local fishing folk participated in the development of curriculum, and deliver the programs, providing firsthand perspectives on the cultural, biological and economic importance of our local fishing community. Two hundred seventy-seven students and teachers took part in this program this year.

## *Visitor Centers*

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 stewardship. School programs include netting plankton for view under the microscope, searching for shore crabs and activities in the Visitor Center to learn about animal adaptations. Children take part in indoor as well as outdoor activities on Crissy Field Beach.

### **Farallones Sanctuary Completes Half Moon Bay Visitor Center Conceptual Plan**

This spring the Farallones sanctuary completed the Half Moon Bay Visitor Center conceptual plan posted on the Gulf of the Farallones website. The visitor center conceptual plan included sanctuary collaboration with a 17-member community panel who contributed to the visitor center's concept development. Members included the fishing community, agency representatives, educators, restaurateurs, kayakers, surfers, and others. This visitor center will help us reach out more effectively to people south of San Francisco, along the coast and inland.

## *Crissy Field Visitor Center*

Due to its popular location at Crissy Field, the main Farallones sanctuary visitor center attracts people from all over the world, deepening their awareness of the sanctuary and increasing their ocean literacy. In early March this year, over 1,000 people stopped in for a peek or a program in a single week.

Crissy Field Visitor Center: 11,448 drop-in visitors from the Bay Area and all over the world came to the sanctuary's visitor center in the Presidio since January.

Bay Area students took part in various hands-on visitor center activities and programs. Examples include "Sensing the Sanctuary," "Intertidal Table Manners," "Pass the Plankton," "Growing Up Underwater," and "Seabirds of the Sanctuary" in partnership with PRBO Conservation Science. Students dissected cormorant pellets, discovering fish ear bones, fish eye lenses, and squid beaks. Creature Features continue to attract interest. Students also used binoculars to conduct foraging studies of seabirds and shorebirds at Crissy Field Beach. The sanctuary Visitor Center provides standards-based interactive programs inside the center and in the field for kindergarten through eighth grades.

Visitor Center Family Programs: At the main Crissy Field Visitor Center since January, 1,834 students took part in structured education programs adapted to their learning levels and age groups. For example, kindergartners participate in hands-on activities to learn about “Animal Life Cycles” and “How Marine Animals Sense the Ocean.” The first graders learn about the food chains and what things eat, who eats food, and watch the aquarium creatures being fed. Second graders compare life cycles from various kinds of marine organisms. Fourth and Fifth graders participate in inquiry-based activities such as searching for sand crabs along the sandy shore, discovering shore crabs in the rocky intertidal, and hands-on activities to learn about “Animal Adaptations” and “Crab Habitats in the Sanctuary.”

### **Visitor Center Family Programs**

Visitor Center Public Programs invite members of the public to participate in workshops entitled “Cephalopooza: a Squid Spectacular.” The program – designed to increase ocean literacy and sanctuary program awareness – included cephalopod films, a Humboldt squid dissection, and Humboldt squid printing with paint and real squid ink. This program combines original film footage taken by the sanctuary Visitor Center Naturalist, printing techniques by squid printing collaborator Julie Whitcomb, and support from the Squid4Kids program including NOAA scientist Ken Baltz of Southwest Fisheries Science Center. The public program was developed after sanctuary educators participated in a Humboldt squid research cruise on the R/V Fulmar with West Coast Regional Director William Douros and researchers from NOAA and Stanford University's Hopkins Marine Station (Gilly Lab.) Three hundred fifty-five people took part in squid programs since January.

Plankton and Pastries Programs were offered throughout the year. The weekend “Plankton & Pastries” public program offers a hands-on where participants net their own plankton for study in the tide station pier house. The program begins with coffee, juice and pastries and a tour of the sanctuary visitor center emphasizing upwelling, plankton life cycles, and the national marine sanctuary program. Following the introduction, 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. Two hundred twenty-five people took part in plankton programs during 2010.

### **Delving into the Past: Farallones Sanctuary's Maritime Heritage**

Staff has secured funding for a maritime heritage project, and has begun to contact sources such as the United States Coast Guard Archives to locate photos, drawings and other images of the historic Fort Point Lifesaving Station which is now the headquarters for Gulf of the Farallones National Marine Sanctuary. The project will also feature the input of a former “Coastie” who was active at this station during the 1950's to provide an oral history of his time here, and to better describe the buildings' earlier interior layout and use prior to conversion to office and visitor center space. This information will help in the development of exhibits for the future sanctuary visitor center expansion and redesign. In the nearer future, the sanctuary will be implementing a Guide by Cell system so that visitors can learn about maritime heritage and architecture of the campus's several buildings. The sanctuary will also feature exhibits on a number of the sanctuary's many shipwrecks.

## **OPERATIONS**

### *Building Capacity*

#### **Historic USCG Commandant's Residence Renovation Underway**

In January the National Park Service issued a notice to proceed with rehabilitation construction of the Residence building, an historic 1890's-era building that was part of the former Fort Point Life Boat Station of the U.S. Life-Saving Service – predecessor to the current U.S. Coast Guard. It was the original Keeper's Quarters that

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housed all station personnel, including the Commander-in-Chief. Construction is anticipated to run through summer, followed by final inspection, furniture and IT installation, and ultimately a permit for occupancy. The nearly century-old historic Lifeboat Station and Boathouse are being rehabilitated as part of the long-range Facilities Master Plan. The Plan is designed to develop the buildings, located on San Francisco Bay in the Presidio of San Francisco, into a larger NOAA campus, an icon for ocean literacy and complex for ocean climate change studies. An early fall move-in is cautiously anticipated.

### GULF OF THE FARALLONES SANCTUARY CALENDAR OF EVENTS

#### AUG 2010

08/11 RELEASE OF WEB AND HARD COPY CONDITION REPORT  
8/12 SAC MEETING, BODEGA MARINE LAB

#### SEP

TBA CONTRA COSTA SCIENCE/MATH TEACHER RESOURCE FAIR, CONTRA COSTA  
09/07-09/10 CALIFORNIA & WORLD OCEAN CONFERENCE, SAN FRANCISCO  
09/07-09/11 WORLD SEABIRD CONFERENCE, VICTORIA, BC  
09/27 CAL ACADEMY VIDEO PREMIER, SAN FRANCISCO

#### OCT

10/14 SHARKTOBERFEST EVENT AT CALIFORNIA ACADEMY OF SCIENCES "NIGHT LIFE"  
10/23 SHARKTOBERFEST, PRESIDIO VISITOR CENTER PROGRAMS  
10/1 PRESIDIO TEACHERS NIGHT, SAN FRANCISCO  
10/3 FMSA SANCTUARY ECOSYSTEM TRIP  
10/9 FMSA HOSTS WHALE WATCH

#### NOV

11/02-11/06 SEAS ROCKY INTERIDAL SURVEY, SOUTH FARALLONES  
11/15 PIGEON POINT LIGHTHOUSE LIGHTING, PESCADERO  
11/20-21/10 FEATHERED FRIENDS, MONTEREY BAY AQUARIUM

#### DEC

12/9 SANCTUARY ADVISORY COUNCIL MEETING, SAN FRANCISCO

#### FEB 2011

2/25 OPEN HOUSE VOLUNTEER RECOGNITION, SANCTUARY HEADQUARTERS  
2/26 OPEN HOUSE, SANCTUARY HEADQUARTERS

### NOAA/GULF OF THE FARALLONES NATIONAL MARINE SANCTUARY STAFF

Maria Brown, Superintendent: [maria.brown@noaa.gov](mailto:maria.brown@noaa.gov)  
Brian Johnson, Deputy Superintendent: [brian.johnson@noaa.gov](mailto:brian.johnson@noaa.gov)  
Adam Contreras, IT Coordinator: [adam.contreras@noaa.gov](mailto:adam.contreras@noaa.gov)  
Angela Minnameyer, Administrative Assistant: [angela.middlemeyer@noaa.gov](mailto:angela.middlemeyer@noaa.gov)  
Brad Damitz, Ecosystem Protection Specialist: [brad.damitz@noaa.gov](mailto:brad.damitz@noaa.gov)  
Carol Preston, Education & Outreach Coordinator: [carol.a.preston@noaa.gov](mailto:carol.a.preston@noaa.gov)  
Christy Walker, Education Specialist: [christy.walker@noaa.gov](mailto:christy.walker@noaa.gov)

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Irina Kogan, Resource Protection Specialist: [irina.kogan@noaa.gov](mailto:irina.kogan@noaa.gov)  
Jan Roletto, Research Coordinator: [jan.roletto@noaa.gov](mailto:jan.roletto@noaa.gov)  
Justin Holl, Visitor Center Manager: [justin.holl@noaa.gov](mailto:justin.holl@noaa.gov)  
Karen Reyna, Acting Resource Protection Coordinator: [karen.reyna@noaa.gov](mailto:karen.reyna@noaa.gov)  
Kelley Higgason, Ocean Climate Initiative and Advisory Council Coordinator: [kelley.higgason@noaa.gov](mailto:kelley.higgason@noaa.gov)  
Mai Maheigan, Seabird Protection Network Outreach Specialist: [mai.maheigan@noaa.gov](mailto:mai.maheigan@noaa.gov)  
Mary Jane Schramm, Media & Public Outreach Specialist: [maryjane.schramm@noaa.gov](mailto:maryjane.schramm@noaa.gov)  
Sage Tezak, Seabird Protection Network Program Specialist: [sage.tezak@noaa.gov](mailto:sage.tezak@noaa.gov)  
Tim Reed, GIS Specialist: [tim.reed@noaa.gov](mailto:tim.reed@noaa.gov)

## 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>. To learn more about the Sanctuary Advisory Council please visit: <http://farallones.noaa.gov/manage/sac.html>

## CONTACT INFORMATION

Gulf of the Farallones National Marine Sanctuary  
San Francisco Office  
The Presidio, 991 Marine Drive  
San Francisco, CA 94129  
Phone: (415) 561-6622  
Fax: (415) 561-6616  
[www.farallones](http://www.farallones)

Half Moon Bay Office  
625 Miramontes St. Suite 106.  
Half Moon Bay CA 94019  
(No general phone)  
– Christy Walker: 650/ 712-8948  
– Irina Kogan: 650/ 712-8791

*2<sup>nd</sup> & 3<sup>rd</sup> Quarterly FY2010 Media & Press Coverage, attached.*