

# Superintendent's Quarterly Report

## April through June, 2020

### FEAST OF THE BIG BLUES

On June 13 a herd of over 47 endangered blue whales descended *en masse* on our sanctuary, within sight of the Farallon Islands. They were doing what blue whales do best: eating vast quantities of food – over four tons of it per whale, per day. Despite their huge size (local blues can reach over 87 feet) they are the pickiest of eaters, tiny shrimplike krill being their near-exclusive prey. That day the ocean was a thick bouillabaisse of krill and the many other creatures that had joined the krill-fest. A Point Blue Conservation Research biologist on the islands reported, “Suddenly the whole ocean was blows from blue whales.” A local fisherman winkingly bemoaned that his lines and gear were fouled with the pink goo, knowing this was why his catch was so good.

NOAA's most recent stock assessment indicates, “... no evidence of a population size increase in this blue whale population since the early 1990s.” Further, it states that only 1.23 human-related deaths per year in U.S. waters can occur without significantly affecting this population. Increasing threats to their survival, foremost among them vessel collision, entanglement in fishing gear, vessel collision, and potential ocean climate changes.



Blue whale surfacing. Photo: NOAA

Few marine ecosystems can sustain multiple apex predators such as these blue whales and the several other large whale species that feed here and white sharks that also claim top honors. It's a testament to the health and productivity of this ecosystem, which we defend and work to enhance.

This quarterly report outlines some of the steps we and our colleagues have recently taken, with links to partial media coverage that this rare visitation generated. Read, watch, enjoy – and imagine you are that biologist, gazing out at that phenomenal panorama of the ocean's bounty; and marvel at the wonder of it all.

## MANAGEMENT

### *Sanctuary Advisory Council*

#### **Greater Farallones Sanctuary Advisory Council and sanctuary management confer**

The Greater Farallones National Marine Sanctuary (GFNMS) Advisory Council (SAC) held its first virtual meeting on May 21 via Google Meet. Feedback was overwhelmingly positive and lessons learned were shared with other sanctuaries. Three new members were sworn in for the conservation and youth seats. The SAC received an update from the Greater Farallones superintendent on program activities, enforcement cases, permits, and moving forward during the coronavirus; they were also provided updates from Cordell Bank and Monterey Bay national marine sanctuary superintendents. SAC members provided reports from their respective fields and communities. They also heard a presentation on incorporation of SAC comments on recreation and tourism promotion, and discussed further recommendations related to promoting tourism in the sanctuary. Lastly, the SAC received a presentation on the sanctuary's response to their 2019 Tomales Bay native oyster restoration recommendations.

The Sanctuary Advisory Council advises the sanctuary superintendent, working with various experts and community representatives to provide recommendations for management strategies.



GFNMS councilors in their natural habitats during May meeting. Photo: Alayne Chappell/GFA

#### **Advisory Council Forms Diversity & Inclusion Subcommittee**

The Greater Farallones National Marine Sanctuary Advisory Council held a special 2.5-hour *ad hoc* meeting on June 15 via Google Meet. At the beginning of the meeting, the SAC formed a Subcommittee on Diversity and Inclusion to provide guidance to the sanctuary on how best to set and achieve goals to address diversity and inclusion for the sanctuary and SAC. Next, the council heard from Superintendent G.P. Schmahl on the details of the Flower Garden Banks National Marine Sanctuary's proposed expansion, and voted to submit a public comment in support of the expansion. They also heard a presentation from West Coast Region Policy Coordinator Lisa Wooninck on the Chumash Heritage National Marine Sanctuary nomination five-year review, and voted to submit a public comment expressing support for the extension of the nomination.

## CONSERVATION SCIENCE

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

#### *Beach Watch*

Beach Watch is a premiere citizen-science program that provides quality and legally defensible data for multiple management uses and enhances stewardship and understanding of the sanctuaries. Sharing skills and expertise among federal management agencies and other stakeholders builds trust and cooperation to collaboratively address resource management actions and restore and maintain a healthy coastal environment.

#### **Congressionally-recognized Beach Watch profiled at national workshop**

Greater Farallones Conservation Science staff attended the three-day virtual NOAA Citizen Science Workshop. The goals were to showcase many prominent volunteer programs across NOAA. The Greater Farallones Association

Beach Watch Coordinator was a panelist, discussing what works well, and the challenges of recruiting and retaining volunteers. One day was devoted to reviewing and contributing edits to the draft NOAA Citizen Science Strategy, aligning the draft strategies with the [Crowdsourcing and Citizen Science Act of 2016](#). For its role in rapid response to the T/V *Cape Mohican* oil spill in 1996, Congress recognized Beach Watch as a significant volunteer program of the U.S Department of Commerce. Subsequently, the program has won recognition from NOAA and other agencies for several additional achievements.

### Beach Watch coastal monitors hone survey skills during COVID hiatus

Conservation Science staff keep their highly trained Beach Watch volunteers engaged and their survey skill sets in top condition while survey efforts are paused for COVID-19. Volunteers partake in a virtual training series, “Beach Watch Tune-Ups,” which are short, instructional videos to refresh, review, and practice Beach Watch protocols while sheltering in place. They receive a series of “visits” to each of the 60 Beach Watch segments, highlighting unique features of each. Each Beach-a-Day highlight includes links covering wildlife webcams, marine science, coastal geology and geography, ancestral native and industrial history, and arts and cultures of the region. Trainings provide surveyors with professional development in data and other technical skills, plus reinforce team cohesiveness. The teams are eager to safely resume their “beach” surveys.



New virtual training sessions for Beach Watch Volunteers.

## Sanctuary Ecosystem Assessment Surveys (SEAS)

### Examining options, laying groundwork for deep-water seafloor explorations

Conservation science staff participated in ROV cruise planning for an E/V *Nautilus* cruise later this year, and provided new story map presentations to the Ocean Science Trust Science Communication Fellows (SCF) who ordinarily participate in the *Nautilus* cruise. Highlights included animated maps and videos that enhanced the training of the SCFs. Many research cruises across NOAA are likely to be delayed, rescheduled, or cancelled this year due to COVID-19 and “social distancing” guidelines. Cruise planning has been complicated this year, requiring that multiple alternative plans be developed.

Characterization of sanctuary seafloor habitat is critical for effective management of resources in regards to ocean acidification, resources at risk from trawling, anthropogenic siltation, fishing gear entanglements, and for identifying areas in need of additional protections.

### Ocean exploration in sanctuaries highlighted in *Oceanography*

An article was published in the journal *Oceanography* supplement, “New Frontiers in Ocean Exploration: The E/V *Nautilus*, NOAA Ship *Okeanos Explorer*, and R/V *Falkor* 2019 Field Season,” highlighting our 2019 remotely operated vehicle (ROV) research cruise. This was a joint cruise with Cordell Bank National Marine Sanctuary, on board the E/V *Nautilus*. The supplement also highlights mapping that was performed earlier in the year, which was crucial to the success of our mission, as well as a predatory sponge.

The predatory sponge is possibly a new species of *Asbestopluma* sp. nov., or perhaps it will be reclassified as a new genus. Taxonomists are working out the classification.



Predatory sponge, *Asbestopluma* sp. nov. Note prey captured on the surface of the sponge and invertebrates already absorbed in the tissue of the sponge (depth 322 meters). Photo: NOAA/OET



Gotcha! ROV is used to collect predatory sponge, *Asbestopluma* sp. nov. Several similar sponges occurred throughout this area in Point Arena South Essential Fish Habitat. Photo: NOAA/OET

## Applied California Current Ecosystem Studies - ACCESS

ACCESS is a long-term partnership project between CBNMS, GFNMS, and Point Blue Conservation Science for ecosystem monitoring in the sanctuaries. The 16-year ACCESS data set helps sanctuaries understand the status and trends of ecosystem conditions and informs management issues such as ship strike reduction, entanglement, changes from climate impacts, and ocean acidification.

## Greater Farallones and Cordell Bank release report on combined long term climate indicators data

The Conservation Science teams from Cordell Bank and Greater Farallones national marine sanctuaries, with partner Point Blue Conservation Science, completed a review of climate indicators throughout the region. Data used in this report, "Ocean Climate Indicators Status Report, 2019" are from several long-term monitoring projects, including the 16-year data set from the Applied California Current Ecosystem Studies (ACCESS) and data from the Farallon Islands. The report documents 41 parameters measured and analyzed as part of ACCESS and Point Blue's Farallon Islands monitoring to illustrate status and trends of climate indicator parameters identified in several [sanctuary](#) and [NOAA](#) climate monitoring reports. Overall, physical conditions in the sanctuaries in 2019 were average to poor. This was reflected in mostly average to poor conditions for seabirds. However, average to good conditions for krill supported typical abundances of blue whales and above average abundances of humpback whales. The report is available at [accessoceans.org](https://accessoceans.org).



Krill from plankton tow in Greater Farallones and Cordell Bank sanctuaries. Photo: ACCESS/NOAA

## Spring vessel-based field survey canceled due to COVID-19

The planned May cruise for the Applied California Current Ecosystem Surveys

(ACCESS) project has been canceled due to the COVID-19 response. Cordell Bank and Greater Farallones national marine sanctuaries along with partner Point Blue Conservation Science made the decision, with site and regional leadership support, to cancel the cruise based on NOAA, ONMS, OMAO, and state and local guidelines on essential operations and stay-at-home orders. The next cruise is scheduled for July, pending lifting of restrictions on operations. ACCESS, now in its 17<sup>th</sup> year, 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.

## RESOURCE PROTECTION

### *Adapting to a Changing Climate*

#### **Greater Farallones hosts virtual meeting of marine protected area network**

On February 25, 2020, Greater Farallones National Marine Sanctuary hosted one of 14 virtual "hubs" for the North American Marine Protected Area Network (NAMPAN). Coordinated by the U.N. Environment Programme North America Office, NAMPAN serves as an independent forum to coordinate activities among Canada, Mexico, and the United States. This meeting was convened across 14 sites in the United States as a forum for key stakeholders from marine and coastal protected areas to develop strategic priorities and share ideas and best practices for collaboration. The Farallones hub had 13 participants that spanned local, state, federal entities, and NGO representatives.

NAMPAN aims to increase collaboration across the United States, Mexico, and Canada, and this virtual meeting was an opportunity to influence NAMPAN's priority activities.

#### **Farallones staff help deliver climate learning exchange for ONMS**

Earlier this year, Farallones staff helped deliver the second offering of the "Climate Learning Exchange" for ONMS. This interactive web-

course provided participants an overview of the climate change adaptation and management planning process, tools for incorporating climate change considerations into your work, and examples of how others in ONMS are working to understand and address climate impacts. Three Farallones sanctuary staff participated in delivering course material for both offerings, and over the two trainings, 22% of all ONMS staff participated.

Climate change will impact all aspects of our work at ONMS; this learning exchange was a first-of-its-kind forum for ONMS staff to learn about and discuss the implications of these impacts.

### *Protecting Natural Habitats*

#### **Greater Farallones responds to vessel grounding off Half Moon Bay**

On June 7, 2020, a 25-foot Bayliner recreational vessel grounded on Francis State Beach in Half Moon Bay, in the northern portion of Monterey Bay National Marine Sanctuary managed by Greater Farallones. Two persons on board were rescued and taken to the hospital. Greater Farallones National Marine Sanctuary worked quickly with California State Parks staff to develop a salvage plan and the two agencies cost-shared the removal of the vessel to prevent the craft from breaking up and scattering significant debris. The removal was completed by Parker Diving Services on June 9, and GFNMS further coordinated with state parks staff to monitor for listed snowy plovers (none were spotted) and other wildlife on the beach during salvage operations. Contracting officers at NOAA Western Acquisition Division in Boulder, Colorado acted quickly to assist with releasing NOAA funds for the salvage, even over a weekend.

Vessel groundings can damage habitats through immediate impacts and subsequent release of toxic elements into the marine environment. This vessel is comprised of plastic and wood, with a fuel tank on board. This response was a great success story for agency partnership.

## Protecting Marine Mammals

### Greater Farallones and Cordell Bank respond to blue whales in shipping lanes

On June 13, scientists sighted at least 47 blue whales during a one-hour period near the Farallon Islands, located about 27 miles off San Francisco. Numerous humpback whales were present as well. Greater Farallones and Cordell Bank national marine sanctuaries, working with the U.S. Coast Guard, issued a warning to large vessel traffic to avoid the sudden aggregation of endangered blue whales feeding in the krill-rich waters of Greater Farallones sanctuary, in and around the shipping lanes. Also, through a public statement from GFNMS Superintendent Maria Brown, all class vessel operators were advised to watch for whales, keep a maximum possible distance, and reduce speed to prevent lethal ship strikes or disturbance.

This outreach yielded over 100 stories in media outlets nationally and internationally; coverage included KPIX TV-5:

<https://sanfrancisco.cbslocal.com/2020/06/16/feeding-blue-whales-gathering-off-san-francisco-maritime-officials-issue-warning-to-freighter-captains/>; Bay Nature Magazine, <https://baynature.org/2020/06/16/a-possible-record-number-of-blue-whales-visit-the-farallones/>; and KRON TV4: <https://www.kron4.com/news/blue-whale-numbers-boom-off-san-francisco-coast/>



One of the 47+ blue whales that converged on GFNMS in June 2020. Photo: Sean Gee/Pt. Blue/USFWS

### Annual West Coast vessel speed reduction requests sent to shipping industry to protect endangered whales

To reduce the threat of fatal ship strikes on whales, NOAA annually implements a seasonal Voluntary Vessel Speed Reduction (VSR) program that requests that ships transit at 10 knots or less near and through California national marine sanctuaries (Channel Islands, Cordell Bank, Greater Farallones, and Monterey Bay). This April, NOAA sent letters signed by the Office of National Marine Sanctuaries, National Marine Fisheries Service, and U.S. Coast Guard, to more than 125 shipping companies outlining their cooperation level with 2019 NOAA VSR requests, and announcing the 2020 NOAA VSR season.



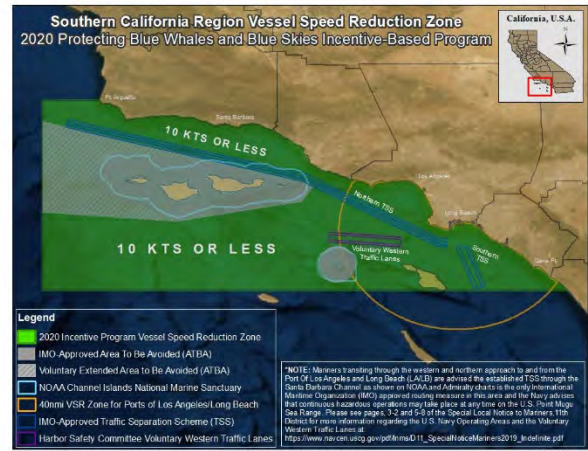
Blue whale surfaces in path of oncoming cargo vessel. Photo: John Calambokidis/Cascadia Research Collective

### Sanctuaries acknowledge shippers who reduced speed to save whales in 2019

On May 20, Greater Farallones joined Cordell Bank and Channel Islands national marine sanctuaries, several air quality control districts, the Volgeneau Foundation, National Marine Sanctuary Foundation, and other partners in announcing the top 15 shipping firms that achieved a high level of cooperation with NOAA's west coast sanctuaries' Vessel Speed Reduction (VSR) program to prevent lethal collisions with endangered whales. Scores were based on percentage of distance traveled at 10 kts. or less in special zones where blue, fin, and humpback whales feed near the ports of Los Angeles/Long Beach and San Francisco Bay's several major ports.
















The percentage of ship transit at the slower speed increased from 45% in 2017-18 to 58% in 2019. Monetary incentives were offered by other (non-NOAA) partners, e.g., air quality control districts in Central and Northern California, the Volgeneau Foundation, and others. The slower speeds also reduce pollutants and improve air quality for people in surrounding communities, and other creatures.

NOAA has prioritized reducing the threat of whale deaths from anthropogenic causes such as ship strike and whale entanglement.



Channel Islands area voluntary and incentivized speed reduction zones as of 2020.

2019 Protecting Blue Whales and Blue Skies Incentive Program Results

Sapphire Award (75%+)	
 MEDITERRANEAN SHIPPING COMPANY	 Hapag-Lloyd
	
Gold Award (50%+)	
	
	
	
	
Silver Award (25%+)	
	
Bronze Award (10%+)	
	

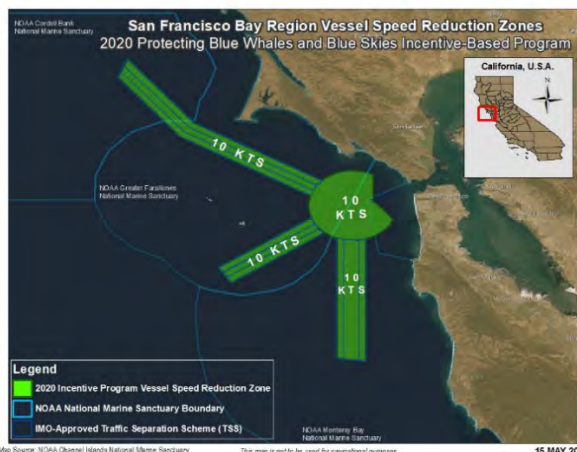
Tiers of cooperation levels among shipping industry participants in the Vessel Speed Reduction program.

## Protecting Seabird Colonies

**Greater Farallones, with aviation authorities, trains pilots to avoid wildlife**  
Greater Farallones National Marine Sanctuary's Seabird Protection Network (SPN) gave an online interactive presentation to a record-breaking 223 pilots, exhibiting how pilots can fly high to avoid disturbing wildlife, focusing on NOAA Regulated Overflight Zones.

Seabird Protection Network collaborated with the San Carlos Flight Center, the San Francisco Bay Area's largest flight school, and the FAA Safety Team, resulting in the largest audience in the flight school's history. Pilots widely praised the presentation; one stated it was "one of the best I have seen in my 17 years of flying in the Bay Area." Staff created an engaging presentation using compelling animations, videos, and photos; speaking to pilots' interests (safety); and audience interactions during the presentation via questions, and afterwards, with an online survey.

Partnering with FAA Safety Team and the San Carlos Flight Center amplifies the sanctuary's efforts to protect sensitive wildlife and increases the likelihood of compliance with NOAA Regulated Overflight Zones.



Bay Area 2020 seasonal voluntary speed reduction zones.



SPN outreach efforts include virtual venues and benefit from partnerships with aviation clubs and airports.

## EDUCATION

### Inspiring an Ocean Conservation Ethic

#### Despite COVID, Greater Farallones ramps up to meet new challenges

In response to the Covid-19 Shelter in Place, the Greater Farallones education team launched multiple distance-learning programs. Through IT platform research and needs assessment surveys involving partners, teachers, families, and individuals, the sanctuary developed several remote programs.

The Farallones Family Workshops Series, At Your School, Sanctuary Naturalist Trainings, and summer camps evolved from existing cutting-edge, hands-on programs into online learning. Several pilot programs include a real time salmon dissection, plankton investigations for university students, and a fish-and-seabird class for naturalists. Educators are working with the City and County of San Francisco's Recreation and Parks Department on the summer camp series. Instead of weeklong "circuit-ride" science blitzes to rural expansion area schools, the sanctuary conducted inquiry-based virtual programs to remote coastal schools, north to Pt. Arena.

Despite pandemics, wildfires, and other obstacles to traditional field and classroom education, the Greater Farallones education team continues to meet new challenges by developing exciting and fun online interactive programs that go beyond videos and PowerPoint presentations.

### Get into Your Sanctuary: Recreation and Tourism

NOAA's Office of National Marine Sanctuaries (ONMS) Recreation and Tourism Strategy directs sites to "enhance visibility of responsible recreation opportunities in national marine sanctuaries" as a driver for coastal economies.

#### Sanctuary Exploration Series

*On hiatus.* Sanctuary Exploration Series programs are monthly opportunities to explore habitats and experience wildlife; they will resume when COVID-19 restrictions are no longer in effect. The exception is the naturalist-led Get into Your Sanctuary Farallones Virtual Cruise August 1 and 2, 2020.

#### Sanctuary Naturalist Training

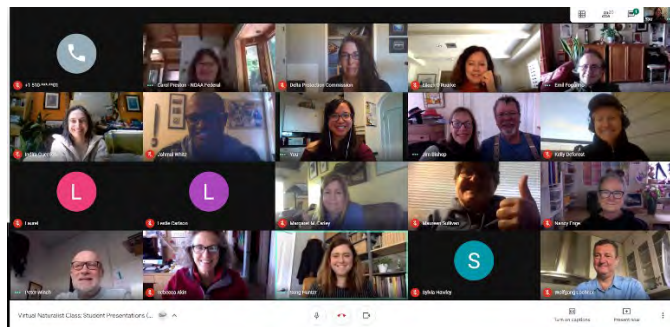
##### Farallones naturalists-in-training undeterred by COVID challenge

Twenty-three educators, naturalists, and ocean advocates in Greater Farallones National Marine Sanctuary Naturalist Course completed their nine-class training series on May 9, making a smooth transition mid-course from in-person to distance learning workshops. The 30-hour intensive incorporated field explorations, citizen science initiatives and opportunities, and briefings on the latest in marine research. The first six parts of the integrative curriculum delved into oceanography and food webs, explored habitats from seafloor to surface and rocky shores, and featured marine mammals and invertebrates. The final three classes, conducted as webinars, opened with a fish module presented by sanctuary educators, with a presentation by



noted white shark expert Dr. Sal Jorgensen of the Monterey Bay Aquarium. The Seabird & Shorebird class included a talk by Seabird Protection Network staff. The course culminated in student presentations of their capstone projects, earning them course completion certificates.

Several students are naturalists and educators who, equipped with specialized knowledge of Greater Farallones and the National Marine Sanctuary System, will go on to increase ocean awareness and literacy in the community. The course supports ONMS' strategic goal to build volunteer capacity, and thus increase sanctuary outreach and education efforts.



Some of the teachers and students of the nine-week training for naturalists, educators, and ocean advocates. Photo: Jean Alupay/GFA

### **Building stronger marine sanctuary constituencies with state parks**

Greater Farallones National Marine Sanctuary education staff provided a docent enrichment program to 53 California State Park docents on May 23, 2020. Año Nuevo State Park draws millions of visitors from around the world to experience its elephant seal rookery via docent led tours.

Through compelling underwater video, photos, and graphics, marine life ranging from majestic to minuscule, and oceanic processes, were illustrated to impart the global significance of their park's offshore waters. This coastal ecosystem is protected by Greater Farallones and Monterey Bay national marine sanctuaries. Key sanctuary research education and conservation programs were highlighted.

These docents are now equipped with specialized knowledge of the sanctuary system and their local national marine sanctuaries,

which will increase ocean awareness and literacy. The docent enrichment workshop supports ONMS' strategic goal to build volunteer capacity, thereby increasing sanctuary outreach and education efforts.



Elephant seal ponders infinity.  
Photo: Robert Schwemmer/NOAA



Docent explains elephant seal conservation history and research at Año Nuevo State Park. Nearly exterminated worldwide, today they thrive due to protective legislation and public education. Photo: California State Parks

### **Sanctuary casts wider "net" with social media traffic spikes in first test-month**

In response to the COVID challenge, Greater Farallones National Marine Sanctuary ramped up its virtual outreach efforts with a new social media plan that highlights the sanctuary's wildlife and habitats, from seafloor to surface, and highlights each sanctuary throughout the system. Its first test month met with resounding success, with the Facebook post reach increasing 153%, and Twitter tweets sparking an 84% increase in impressions. Both platforms saw an increase in followers, likes, and interactions.

The new plan features weekly Marine Life Mondays, spotlighting wildlife; Trivia Tuesdays to test players' ocean literacy; Winged Wednesdays focusing on GFNMS's nearly

300,000 seabirds. Virtual Dive expeditions feature different sanctuaries; a virtual video tour introduces the National Marine Sanctuary System, and a virtual excursion explores the GFNMS's scenic coast.



## Visitor Center

*Closed until further notice.*

Greater Farallones National Marine Sanctuary Visitor Center serves ocean enthusiasts of all ages, from the San Francisco Bay Area and all over the world. It is located in San Francisco's Presidio National Park in the Golden Gate National Recreation Area and welcomes drop-in visitors, offers structured programs for various ages and interests, and hosts special events. School programs include plankton netting for view under a microscope, searching for shore crabs, and activities in the visitor center to learn about animal adaptations. Ordinarily, students take part in indoor as well as outdoor activities on adjacent Crissy Field.

## Visitor Center Field Trips

GFNMS staff, working with our partner the Greater Farallones Association, continued to offer visitor center field trip programs virtually

to promote ocean literacy and provide standards-based interactive programs for kindergarten through high school. Visitor center field trips served 287 students this quarter through the virtual format. Students were able to virtually tour the visitor center, watch the animals being fed, and interact with sanctuary education staff.

## Greater Farallones celebrates Earth Day with environmental professionals

On April 23 Farallones education staff led a webinar for 21 environmental consultants of Wetlands Research Associates, WRA, Inc. to celebrate Earth Day's 50<sup>th</sup> anniversary. Sanctuary marine life and ecosystems were highlighted through deep sea video, stunning images, and maps. Sanctuary stewardship projects and conservation work were emphasized. WRA, Inc. staff included biologists, botanists, engineers, administrative staff, and landscape architects who work to restore watersheds that drain into the sanctuary. This year many environmental collaborations took place online, allowing time to reflect and invigorate our collective stewardship efforts for the next 50 years.

## Weekend Family Workshops

Weekend Family Workshops are offered twice a month through the Greater Farallones National Marine Sanctuary Visitor Center. These programs foster connections within the sanctuary community and provide multi-generational environmental science education to children and adults. The planned on-site family workshops were cancelled. Instead, the education staff conducted front-end evaluations of alternatives and delivered virtual programs, maintaining connections with our community. This quarter, April through June, 267 children and adults participated.

## Educators pilot virtual Weekend Family Workshops

In April, sanctuary education staff conducted two 45-minute pilot virtual family workshop focusing on crabs. Three instructors taught separate sections in each class that covered an

introduction to the sanctuary, crab anatomy, and molting. Tools like polls, videos, webcams, and PowerPoint were combined with traditional teaching methods of showing live crab artifacts and dressing up as a crab. Participants provided positive feedback that will enhance future family workshops.

Throughout the spring, different workshops focused on plankton, seabirds, sandy habitat, sharks, and marine mammals. Activities included observing live plankton under a microscope, a real-time video feed of a salmon dissection, and stages of the salmon life cycle.

Visual content included artifacts of sharks and marine mammals, microscopic views of infauna, and live crab “show-and-tell.” Instructors also incorporated an art component, encouraging drawing, and some movement based activities, such as dancing like an albatross or crab, and moving around their spaces like plankton would.

### **“Sumer is icumin in” with Greater Farallones online summer camps**

The sanctuary education team shifted their traditional in-person summer camps to join with three partners, offering online programs tailored to local youths. First, in partnership with San Francisco Recreation and Parks Department's Randall Museum, the sanctuary is offering six one-week sessions (July through mid-August) of “Virtual Marine Explorers Camp” for 8 to 12 year olds. A second camp, “Watershed Advocacy via Environmental Science” (WAVES), is in partnership with Seven Tepees Youth Program, a community-based organization that provides comprehensive services to under-resourced urban teens in San Francisco. This long-running camp will meet three days per week for two weeks in July, culminating in peer-to-peer “Teach Back Days.” The third camp, in partnership with Mission YMCA of San Francisco, provided 12 hours of marine science programming over six weeks to San Francisco third to fifth graders. The sanctuary programs fulfill a significant need for science content for these partners and communities.

### **Greater Farallones “science blitz” -**

### **466 students/31 classes/6 weeks!**

Sanctuary educators retooled the existing in-person programming to create engaging and dynamic virtual classrooms and ensure continuity of science education within the communities served. Sanctuary educators coordinated and conducted one-hour ocean science programs for 31 classes serving 466 students between April 21 and June 4. Program elements included virtual sanctuary tours, salmon dissections, student participation in albatross and crab “dances,” interactive quizzes, and live-streaming of plankton samples. Classes ranged from second grade to university level, with over half the classes having high concentrations of low-income students. Communities served ranged from rural schools near the northern boundary of the sanctuary to urban schools in the heart of San Francisco.



Dungeness crabs, an important regional fishery, are among several focal species in Greater Farallones science programs. Photo: Justin Holl/NOAA

### **At Your School Programs**

At Your School (AYS) programs serve schools throughout the San Francisco Bay area and beyond, primarily during the school term. AYS has reached tens of thousands of students with programs such as the Crab Cab, Seabird Shuttle, Sharkmobile, and Ocean Acidification. AYS is an outreach program of Greater Farallones 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 12th grade. A total of 153 students took part in virtual AYS programs this quarter.

### **Online real-time seabird program urges high school students to action**

This spring Greater Farallones National Marine Sanctuary Education Department staff taught two online At Your School programs focusing on seabirds for students at Galileo High School in San Francisco. The teens learned about the diversity of seabirds in Greater Farallones sanctuary; over 350,000 breeding seabirds of 13 species nest on the Farallon Islands and mainland coastal habitats, sustained by nutrient-rich sanctuary waters. Others commute long-distance from the Central Pacific and Southern Hemisphere to forage.

The class covered special adaptations to life on the ocean, and the many ways in which human interactions impact their populations. The students also learned about current conservation efforts, and what they can do in their daily lives to help seabirds thrive in our national marine sanctuary.



Fast-Food Flythrough: Black-footed albatrosses fly 6,000+ miles round-trip between the N.W. Hawaiian Islands and Greater Farallones in only three weeks. Photo: Jamie Hall/ACCESS/NOAA

### **Fisherman in the Classroom**

*On hiatus until we can enter the classroom again.* The Fisherman in The Classroom promotes the principles of ocean literacy, sustainable fishing practices, and the value of commercial fishing in sanctuary waters to students in their classrooms.

### **Oceans after School**

*Programs cancelled this quarter until after school programs resume.* Using the endless

appeal of our local marine wildlife and habitats, the Sanctuary Education Team offers 18 hours of fun, hands-on, lively marine science learning through Oceans after School programs that cover topics such as sharks, salmon, seabirds, whales, squid, and plankton. These enrichment programs are dynamic, interactive, and integrated into state standards. Sanctuary marine science educators deliver the programs during a nine-week window and primarily serve low-income, under-served students.

### **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 become involved in real scientific investigations and become ocean stewards. It is a citizen science program that monitors the coastal ecosystems of California and helps youth develop a scientific understanding of the ocean. LiMPETS monitors the biology in rocky intertidal and sandy beach ecosystems and aims to provide publicly accessible, scientifically sound, long-term data to inform marine resource management and the scientific community. Due to extensive program cancellations, this past quarter one program served nine students.

### **LiMPETS program engages with citizen science club online**

The Greater Farallones Long-term Monitoring Program and Experiential Training for Students team met online with the Citizen Science Club at Lick-Wilmerding High School to discuss how data collected by students with LiMPETS is being used by resource managers such as Greater Farallones National Marine Sanctuary and the state of California's network of Marine Protected Areas. Students learned about current and future efforts to monitor important species like ochre stars and owl limpets that have been impacted by disease outbreaks and human harvesting.



Mass mortality among West Coast sea stars has affected species balance in coastal ecosystem. Photo: National Park Service



## 2020 Calendar Updates

*Note: all public activities are subject to COVID-19 restrictions in effect for the place and time.*

### August

- 24 Sanctuary Advisory Council meeting (virtual) at link: [meet.google.com/tyr-enfp-cet](https://meet.google.com/tyr-enfp-cet) or by phone: +1 641-812-2321 PIN: 135 736 466#

### September

- 26 Virtual Sharktoberfest! Watch for details on GFNMS, GFA websites and social media, below.
- TBD Sanctuary Explorations, TBD. Contact [sheintzelman@farallones.org](mailto:sheintzelman@farallones.org)

### November

- 14 Humpback Whale Soirée virtual presentation; details coming soon
- 19 Advisory Council meeting (virtual)

NOTE: Future sanctuary advisory council meeting information will be updated on the GFNMS website, <https://farallones.noaa.gov/manage/sac.html>

## Ongoing Public Programs

**Note: all public activities are subject to COVID-19 restrictions.**

### Sanctuary Exploration Series

*Temporarily suspended:* Year-round, the Greater Farallones Sanctuary Explorations Series provides monthly opportunities to connect with and experience the sanctuary and surrounding waters. Excursions include bioluminescence paddling, whale and wildlife cruises, coastal hikes, and tide pooling. Join one of our seasonal programs! Visit <http://farallones.noaa.gov/visit/exploration-program.html>

### Greater Farallones Visitor Center

*Closed Until Further Notice:* The Visitor Center in the San Francisco Presidio offers special Weekend Family Workshops about sharks, squid, salmon, octopuses, plankton, ROVs, and sea otters! These programs can also be booked for your exclusive birthday parties or special event. To book programs for individuals, or special events, contact [Justin.Holl@noaa.gov](mailto:Justin.Holl@noaa.gov). Wednesdays through Sundays, 10 a.m. to 4 p.m., our visitor center naturalists can introduce you to our aquarium critters.

### Bolinas Lagoon/Kent Island Restoration Project

*Rescheduled to September:* From April through October volunteer teams work to remove invasive species to restore normal tidal flow in the lagoon. See details on joining this effort at <https://farallones.noaa.gov/eco/bolinas/kentisland.html>

### Sanctuary Soirées

*Temporarily Suspended:* Sanctuary soirées, held twice yearly, are sophisticated evening celebrations of science, art, and culture. They

feature top-of-the-line scientist presentations blended with arts, music, and crafts for an adult (16+ yrs.) audience. These events are held each spring and late fall. Keep posted through our website at <http://farallones.noaa.gov/> and our nonprofit association at <http://farallones.org>.

## Get Involved, Stay Informed

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

To learn how you can become involved in the sanctuary visit: <http://Farallones.noaa.gov>.

To subscribe to *Upwelling*, the Farallones Marine Sanctuary Association newsletter, visit <http://www.Farallones.org> or see <https://twitter.com/GFNMS>

Learn more about the Sanctuary Advisory Council: <http://Farallones.noaa.gov/manage/SanctuaryAdvisoryCouncil.htm> or contact Alayne Chappell at [alayne.chappell@noaa.gov](mailto:alayne.chappell@noaa.gov) to subscribe to the SAC list serve.

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Social media, follow:

[Greater Farallones National Marine Sanctuary:](#)



And our ONMS *Earth is Blue* Campaign at:



### Greater Farallones NMS Superintendent's Quarterly Report

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