BETWEEN the TIDES

Friends of Fitzgerald Marine Reserve
September 2021

Report from the Reef: FFMR Conducts its Third Research Survey

by Karen Kalumuck

On Sunday, June 27, a group of 13 Friends of Fitzgerald Marine Reserve (FFMR) volunteer naturalists gathered at the Seal Cove stairs at 6:30 a.m. Personally, I prefer to still be asleep at this time, especially on the weekends, so what could compel me, and 12 other dedicated folks, to exchange a cozy blanket for boots and orange safety jacket, basking in the chill early morning fog of the Coastside? It was the third FFMR Research Survey! An excellent low tide of -1.4 feet was occurring at 7:15 a.m., and we were all anxious to take advantage of it and check in with the organisms we are tracking.

If the concept of FFMR conducting our own research surveys is news to you, check out the March 2021 edition of *Between the Tides* and the article "Friends of Fitzgerald Marine Reserve Granted Scientific Permit from San Mateo County," by yours truly. We plan to continue monitoring select species over the long term, looking for trends in population changes, checking for novel invasive species, and monitoring the general health of the organisms (for example, keeping an eye out for the return of the Sea Star Wasting Disease).

This was the first survey we have conducted since the reef has been reopened to the public. We were prepared for early-bird tidepoolers, and were prepared to educate folks about what we were doing and why (and direct them away from our research sectors while we were collecting data). Fortunately, we were the earliest of the early birds, and the few visitors that arrived a bit later were engaged in their own discoveries at the farthest reaches of the low tide.

Each time we conduct a survey, especially during this inaugural year of FFMR surveys, we adjust what we are doing based on what we have learned so far—helping to make our surveys more efficient and more scientifically useful. We have been documenting the numbers of sunburst anemones (*Anthopleura sola*), giant green anemones (*Anthopleura xanthogrammica*) over 3 inches in diameter, sea stars (with attention to their health), nudibranchs, select invasive species, and anything "unusual" that we see. We added an additional sea star species to this survey—the tiny, six-rayed *Leptasterias* genus. On prior outings, we had noticed these stars, but had not realized that they, too, had been severely affected by the Sea Star Wasting Disease (See "The Smallest Stars Have Gone Out" by Gretchen Lang, in *Bay Nature,* February 11, 2020; https://baynature.org/2020/02/11/the-smallest-stars-have-gone-out/). We decided that it was important to include them also in the surveys.

Results and Interesting Observations

The tally of organisms from Survey 3 is shown in Table 1. The results are fairly consistent with what we have seen in the two prior studies—many more sunburst anemones than giant green anemones, few stars, and few nudibranchs. When we complete our first year of surveys, we look forward to compiling and comparing results from each

continued on page 3

We plan to continue monitoring select species over the long term, looking for trends in population changes, checking for novel invasive species, and monitoring the general health of the organisms .

Six-rayed star, Leptasterias hexactis
photo: Karen Kalumuck

Friends of Fitzgerald Marine Reserve

P.O. Box 669
Moss Beach, CA 94038
Phone: 650.728.3584
www.fitzgeraldreserve.org

Our Mission:
To inspire the preservation of our unique intertidal environment through education and the support of research.

Newsletter Editors:
Janet Pelinka
Sasha Greenawalt

Design and Production:
Martie Bateson Sautter
Sautter Graphics and Print

Webmaster:
Galen Goyer

Banner photo:
Rob Cala

Scholarship Awards

Decades ago Bob Breen, Supervising Naturalist at FMR for 35 years and a founder of FFMR, started a marine biology class at Half Moon Bay High School (HMBHS). In 2001 Bob and FFMR initiated awarding a college scholarship to an outstanding graduating senior from Bob's class. The scholarship is awarded annually at HMBHS's Scholarship Night at which various community organizations, including FFMR, give scholarships to graduating seniors. Joseph Centoni, currently the teacher of the class Bob started, chair of the HMBHS's Science Department, and FFMR Board Member, was the first Bob Breen Scholarship recipient. Over the years FFMR has increased the number and value of the scholarships. For the past several years we have awarded three scholarships, each for $5,000.

FFMR congratulates these three outstanding young people on their academic achievements and wishes them success in college.

Brianna Johnson

I will be attending UC Santa Cruz for college. I plan to study biology with my major being combined with environmental studies. I hope to attend grad school after college to pursue a masters in marine biology. I would also definitely like to focus on marine conservation.

I've had a longtime interest in the ocean and marine life. I remember always being so fascinated by sea life, saying I wanted to be a marine biologist when I was little and that passion has stuck with me all the way through high school. I've definitely come to understand the importance of the marine environment as I've gotten older and I have a huge interest in coral reefs and kelp forests due to their unique ecosystems and biodiversity. My interests stem from both a curiosity about the ocean as well as a desire to help conserve so many amazing ecosystems.

Gwinna Putz

I will be attending UC Santa Cruz where my proposed major is environmental sciences.

I'm not sure what I'll be doing after college. The field of environmental science has so many paths, and I want to explore as much as possible.

I've always been interested in marine life. Even as a kid, my dream job was to work as an animal caretaker at the Monterey Bay Aquarium. Looking forward, I want to explore the mysteries of the ocean and, most of all, to protect the marine organisms that quietly sustain our world.

Elijah Lurie

I'm going to UC Berkeley and studying Environmental Sciences. I plan on devoting my career to helping the environment. I hope to either be an environmental manager for a company or to start my own business that does something to help the environment.

My interest in the environment comes from growing up on the coast. I enjoy surfing and I work as a state lifeguard so I'm on the beach all the time. I want to protect the marine environment to preserve the beauty of the coast and protect the wildlife that lives here. ◆

The graph displayed across the page bottoms shows tides for 9/19/21 to 2/5/22 at Princeton Harbor. Where the date appears is midnight. The reefs are accessible for exploring during low tides—at least +1 or below. This area is shaded light blue. See: fitzgeraldreserve.org/lowtides/

There are 4 days of King Tides in this date range. Note that these same days also have very low tides. For more information and a list of events and talks in the Bay Area, and to see photos of recent King Tides, visit https://www.coastal.ca.gov/kingtides/

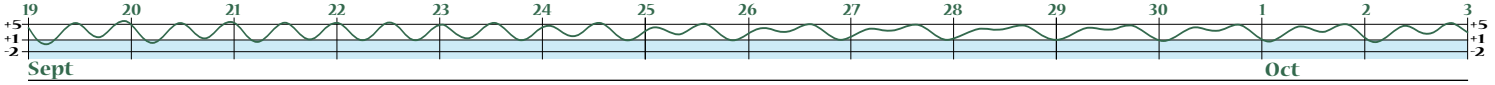
The winter afternoon low tides change to morning low tides in March. There are almost equally low tides several days before and several days after the noted low tide dates.

The lowest tides this period at Princeton Harbor:

-.59	10/09	7:46pm	-1.87	12/05	5:25pm
.05	10/23	7:13pm	*3rd lowest tide of 2021*		
-1.43	11/06	6:38pm	-1.86	1/2	4:25pm
7th lowest tide of 2021			*2nd lowest tide of 2022*		
			-1.48	1/31	4:13pm

King (very high) Tides this period at Princeton Harbor:

+6.79	12/4	9:29am	+6.92	1/2	9:11am
+6.76	12/5	10:15am	+6.85	1/3	10:01am



Report from the Reef *continued from page 1*

survey, and sharing them with the readers of *Between the Tides,* San Mateo County Parks Department, and other interested organizations.

Of note is that the one leather star found in our Survey Sectors appeared unhealthy. The image, and information about it, was forwarded to the California Academy of Sciences. It is unknown if this is the return of the Sea Star Wasting Disease, so it's important that we keep an eye out for other unhealthy-appearing animals.

Table 1. Results of FFMR Research Survey #3

	Sector 1A	Sector 1B	**Total Sector 1**	Sector 2 East	Sector 2 West	**Total Sector 2**	**Grand Total**
Sunburst Anemone	78	52	**130**	20	29	**49**	**179**
Giant Green Anemone	53	10	**63**	1	0	**1**	**64**
Ochre Sea Star under 5 inches	0	0	**0**	0	0	**0**	**0**
Ochre Sea Star over 5 inches	6	3	**9**	5	6	**11**	**20**
Leather Sea Star over 5 inches	0	0	**0**	1 (unhealthy)	0	**0**	**1**
Bat Sea Star under 5 inches	4	0	**4**	0	0	**0**	**4**
Leptasterias (Six-rayed)	0	1	**1**	0	3	**3**	**4**
Nudibranchs	0	0	**0**	0	1 black-tipped	**1**	**1**

Leather Star, Dermasterias imbricata
photo: Marsha Cohen

Sunburst anemone, Anthopleura sola, *the white, more rounded, tentacles (acrorhagi) are used to fend off other anemones. photo: Scott Snow*

Other interesting observations reported by the research team included:

• A variety of different species of nudibranchs were observed in a channel that was closer to the ocean;

• A pool at the northern end of the channel for Sector 2 held a variety of creatures—nudibranchs, six-armed stars, and a gum boot chiton. However, these were outside of our survey area.

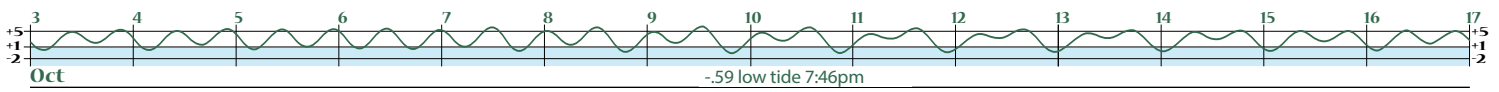
• At the very northern end of Sector 2, underneath a short overhang, a live red abalone was observed. This appears to be the same abalone observed at the very same spot during FFMR Research Survey #1. It's at the conjunction of two channels, so it probably has an abundance of food flowing past it regularly.

Team Members and Camaraderie

The research team on this outing included FFMR volunteer naturalists Graham Brew, Linda Ciotti, Tom Ciotti, Marsha Cohen, Jeanette Hyer, Karen Kalumuck, Karen Madsen, Ed Milner, Beth Roellig, and Scott Snow. We were pleased to welcome a new volunteer, J.R. Blair, to the team. Also joining us were two recent college graduates of Marine Biology programs, Marisa Agarwal, and Skylar Hanford.

Our work was complete by 9 a.m., and most of us were able to reconvene at Mezza Luna café, for some very much needed warm libations and sustenance…not to mention sharing our observations, and regaling each other with fascinating tales from our lives. This was definitely a good time shared by Friends. ◆

The results are fairly consistent with what we have seen in the two prior studies—many more sunburst anemones than giant green anemones, few stars, and few nudibranchs.



Message from Board Member Ron Olson

The new website has huge potential with possibilities for more instructional videos as well as live interactions with students by rangers or naturalists.

Dear Friends,

This year marks my tenth year as a volunteer naturalist, several years as a board member, and I am just beginning my second year as president of the Friends of Fitzgerald Marine Reserve. As a naturalist, I have seen many changes in our park. Prior to our beach closure due to COVID-19, FMR slowly changed from a county park to one more reflective of a marine reserve. There are fewer beach balls and kites and more people with their heads down, looking for the elusive octopus or the playful hermit crab.

Being a board member for the FFMR gives individuals a way to show how much they care for the environment and community. The Director of County Parks, Nicholas Calderon, attends our monthly meeting to discuss concerns of naturalists and the general public. Several Board members served with County personnel on a task force that worked on plans to reopen our beach, taking into consideration the health and safety of naturalists, visitors and park staff. The beach and tidepools reopened on May 3 with little incident and huge docent participation.

The FFMR website has been redesigned to make it a more useful tool; one that is easier to navigate and still inspire potential visitors. The new site has huge potential with possibilities for more instructional videos as well as live interactions with students by rangers or naturalists.

In recent months, FFMR has initiated a research program that collects data about the marine life at FMR. The data are shared with other agencies, and our hope is that this work will help us to determine the health of our intertidal zones and work at better ways to protect them.

The FFMR Education committee has established an online Phylum Club where docents can continue their education at home and be inspired by the in-depth conversations that this venue cultivates. We have had our first terrestrial plant walk at the reserve, and look forward to enriching the FMR experience with tales of the plants and their uses by Native Americans who once lived here.

FFMR has an important and close relationship with Half Moon Bay High School. Their environmental science and marine biology programs teach students about issues that are right outside their door. Some students have become naturalists, either here or in other parts of the country. FFMR is proud to sponsor several students each year by providing them with college scholarships.

Much of the strength of the FFMR Board of Directors lies in skills each of us brings to the table, along with a common love of, and desire to enjoy and preserve, the beaches and wildlife for future generations. Our goal is to keep FMR a place that can be enjoyed by all who share a curiosity and interest in a coastal environment.

As president of the FFMR, I do welcome you to our park. Please continue to follow "Between the Tides" for updates on changes to beach access and activities

Ron Olson; President, FFMR

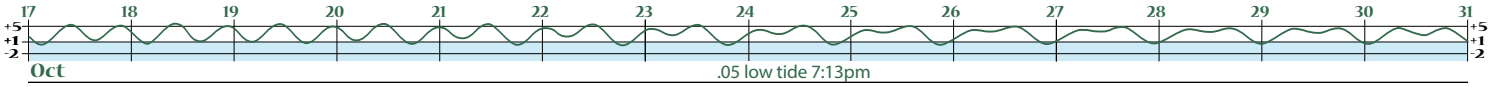
FFMR Educational Tours

San Mateo County Parks Department have a new system for making reservations for educational tours led by trained FFMR Volunteer Naturalists at Fitzgerald Marine Reserve. They instituted an application process, replacing the request to telephone the Reservations Dept. on a Monday-Thursday schedule. To find out more about the new reservation system, go to:

https://parks.smcgov.org/fitzgerald-marine-reserve-reservations

All groups of 15 or more are required to make a reservation for an educational tour. To find Available Tour Dates for the application, go to www.fitzgeraldreserve.org and click on "Visit."

We look forward to welcoming you and your students back to FMR! ◆



Volunteer Spotlight: Kumi Ishida

by Marsh Cohen

In 1988, while on a College of San Mateo biology class field trip to Fitzgerald Marine Reserve, Kumi Ishida decided she would like to become a volunteer there. She had heard about the Volunteer Naturalist training class offered by FMR Ranger Bob Breen through CSM and she has been an active FFMR volunteer ever since.

She had retired in 1986, after 34 years of teaching kindergarteners in San Mateo, and was looking to use her background to continue to inspire young children to experience the natural world around them. Her classroom was always filled with animals that her young students could see up close and care for, which led her principal to comment that her classroom always smelled like a barn!

Kumi's commitment to environmental education and stewardship is extensive. In addition to her volunteer work at FMR, Kumi has been a docent at Año Nuevo; a tidepool volunteer at the California Academy of Sciences; a volunteer at Dunes Beach to monitor snowy plover nests as part of the Snowy Plover Outreach program; a docent at the Japanese Tea Garden in San Mateo's Central Park; and was awarded two separate fellowships to study at Harvard University to develop environmental science programs for elementary school children.

Her kindergarten classroom was always filled with animals that her young students could see up close and care for, which led her principal to comment that her classroom always smelled like a barn!

Kumi was given special recognition by her fellow teachers in San Mateo when they planted a Japanese maple tree in her honor in the Japanese Tea Garden in Central Park in San Mateo.

Kumi has been committed to life-long learning by taking classes ranging from opera and classical music to natural history. Hiking and travel have always been her passions. She has traveled extensively including South East Asia, New Zealand, Australia, Costa Rica, Europe, Canada and much of the USA.

All of these accomplishments were a vision Kumi could never have imagined as a young girl growing up on a family farm in Irvington, a district of what is now part of Fremont. Kumi's family was part of the over 120,000 Japanese American citizens and those with Japanese ancestry who were uprooted from their businesses and homes during World War II and held in assembly centers throughout California before being sent to internment camps located in remote regions of the western United States for the duration of the War. In 1942, Kumi, along with her mother, father and four brothers and sisters, were held at the Tanforan Race Track in San Bruno for seven months before they were sent by train into confinement, along with 8,100 other Japanese Americans, at the Topaz Internment Camp in central Utah.

Upon arrival, Kumi's first impression was noticing how everyone's shoes were white. That's because Topaz is located in an ancient alkaline lake-bed. The family endured many hardships but helped to create a temporary city and a cohesive community with two elementary schools, one secondary school, a mess hall, newspaper, and churches.

Kumi graduated high school while at Topaz. After the War ended in 1945, Kumi went to New York City to join her older sister to pursue a nursing career. However, she decided to return to San Mateo, where she attended College of San Mateo and San Francisco State University to obtain her teaching credential. In 1952, Kumi was the first non-white teacher hired by the City of San Mateo.

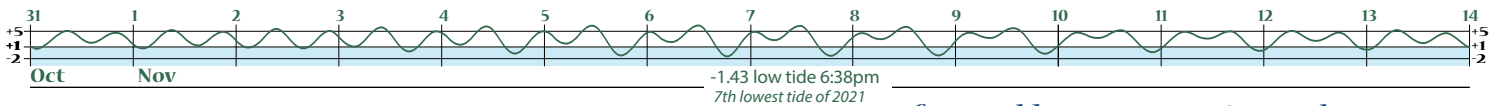
Teaching is in Kumi's DNA. Her guiding principle in creating many of the learning tools still used by FFMR Volunteer Naturalists is to encourage young children to get up close and experience nature. Young children need non-verbal learning tools so Kumi created and built the portable harbor seal station, curated several marine invertebrate hands-on displays and donated books and photo collections for young children that are located in the FMR Visitor's Center.

Thanks for sharing your enthusiasm and knowledge, Kumi! ◆

Kumi has a real flair for displaying her many FFMR volunteer naturalist pins

Japanese maple tree planted in honor of Kumi in the Japanese Tea Garden in Central Park in San Mateo

National Historic Landmark sign at the location of the Topaz Internment Camp in Utah.



-1.43 low tide 6:38pm
7th lowest tide of 2021

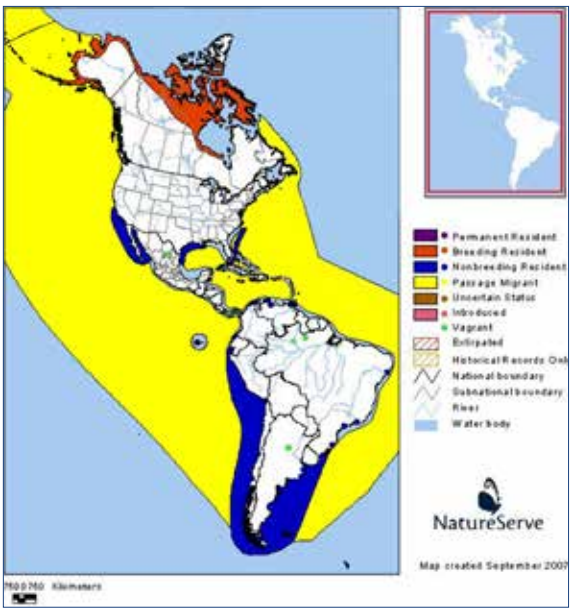
Pirates of the Seas and Skies

by Mary Jane Schramm

"Jaeger," is German for hunter.

He was an opportunist, a marauder and a risk-taker; sometimes a loner. But he was comfortable in his skin, for larceny was in his very DNA. His strong, streamlined body, and tapered, falcon-like wings allowed him to move with great speed and maneuverability, perfectly suited for ambush attacks on his victims. Sweeping low across the waves with steady wingbeats, his dark eyes searched among the terns and gulls that were dipping and diving on a shoal of anchovies. Suddenly, he swerved into the group, deftly avoiding mid-air collisions, and targeted a tern that had just downed several small fish. Intent and fully focused, he harassed it repeatedly, the two rising in a tangle of wings in a zig-zag aerial dance. In the end, the tern was no match for its attacker: it upchucked its catch and fled. The jaeger dived to intercept the fish, then swooped aloft. With a gulp the fish were downed, and with a vigorous full-body shrug, he settled each ruffled feather into place and resumed his patrols. Grooming is important, even for such a formidable pirate of the high seas and skies: the Parasitic jaeger, *Stercorarius parasiticus.*

Parasitic jaeger, photo: Akasmita. Wikimedia Commons



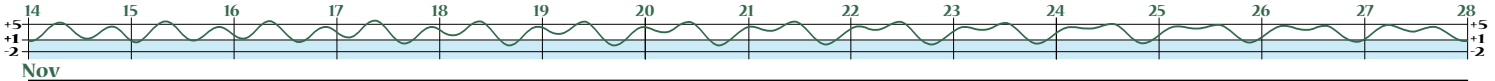
Parasitic jaeger range. Montana.gov

Citizens of the World: Parasitic jaegers are found in all ocean basins, where they engage in epic globe-spanning north-south migrations, mostly along continental margins. Our local population follows the Pacific Flyway migratory corridor as stopover visitors each spring and fall, to rest and refuel, building strength and stamina for their treks between Arctic and sub-Arctic breeding grounds and Southern Hemisphere feeding grounds. They'll arrive there in October and November and feed off South America and eastern Australia. The following February and March they'll embark on their return journey north, again passing through our waters.

Feathered Freebooters: Parasitic jaegers are true to their name, "jaeger," German for hunter. They regularly feed in the nutrient-rich waters of the California Current Ecosystem in Greater Farallones, Cordell Bank and Monterey Bay national marine sanctuaries in North-central California. These dark, gull-like birds demonstrate a distinctive seasonal split personality. On their high-latitude summer breeding grounds, they prey directly on shorebirds, songbirds, waterfowl, and their eggs; adding assorted rodents, berries and carrion for variety. But in non-breeding season at sea they become unrepentant "kleptoparasites"—avian kleptomaniacs—pilfering meals from fellow diners; we know the type.

Parasitic jaeger and prey, photo: Art Sowls, USFWS

Parasitic Parenting: These jaegers nest across the Northern Hemisphere in circumpolar tundra habitats. Mated pairs form long-term bonds to each other and to their nesting sites. They build open-air nests near coasts and rivers with true "feng shui"—which aptly translates to "wind and water." The nest is a simple depression, usually on a slight rise, with a lining of tamped-down moss and lichens. The female lays up to three eggs each season. She and her mate alternate sitting and foraging duties. Their



Mated pairs form long-term bonds to each other and to their nesting sites.

downy chicks hatch after a month, and are tended for a further month until ready to fledge. With breeding over for the year, the adults go their separate ways out to sea, but return the following year to reunite. Sometimes, older hatch-year birds overstay at the nest site—Millennials? Fledged non-breeding birds may remain at sea, feeding for two to three years before returning to land.

Stalking The Stalker: To catch Parasitic jaegers in the act, go where the action is. Preferring the waters over the Continental Shelf, this jaeger can often be found both offshore and nearshore in estuaries, lagoons, and sometimes at river mouths. To expand your search range and sightings potential, consider a vessel-based whale and seabird cruise led by a qualified naturalist. Fall sea conditions here are generally calmer than springtime, making the quest and the viewing more enjoyable.

Parasitic jaeger in flight, photo: CorneliaOedekovn, NOAA-SWFSC

Parasitic jaeger engaged in aerial sortie with gull, photo: Peter Flood/Earth is Blue-NOAA

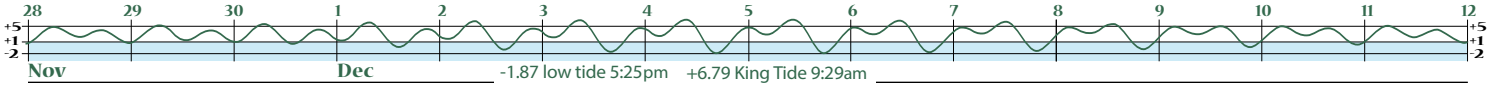
Look for Trouble: Jaegers are similar to gulls in shape and size, but their raucous habits are a dead giveaway. To spot them, use your binoculars to scan the skies for a dark gull, especially one flying above seabird feeding aggregations. Look for a commotion, a squabble, or just an unusually fidgety group of seabirds. You might become witness to a dramatic attempt at flyway robbery.

'Least Concern' —For Now: Parasitic jaegers are protected internationally by the Migratory Bird Treaty Act, and are listed as a "species of least concern." Their numbers worldwide remain stable due to the remoteness of their Arctic breeding grounds. However, lemmings - small rodents that are among their favorite summertime snacks - may be affected by climate changes on the tundra, so scientists are monitoring those ecosystem impacts. Much of the jaeger's West Coast feeding range is protected through national marine sanctuary designation, which helps ensure the health and bounty of the seas that sustain them. ◆

For some great coastal seabird places to visit, see
https://farallones.noaa.gov/visit/locations.html

For information on Greater Farallones National Marine Sanctuary's seabird research, education and resource protection, see
https://farallones.noaa.gov/eco/seabird

For a more complete description, jaeger calls, and other details, see the Cornell Lab site at
https://www.allaboutbirds.org/guide/Parasitic_Jaeger/



Pacific Harbor or Common Seals (*Phoca vitulina*)

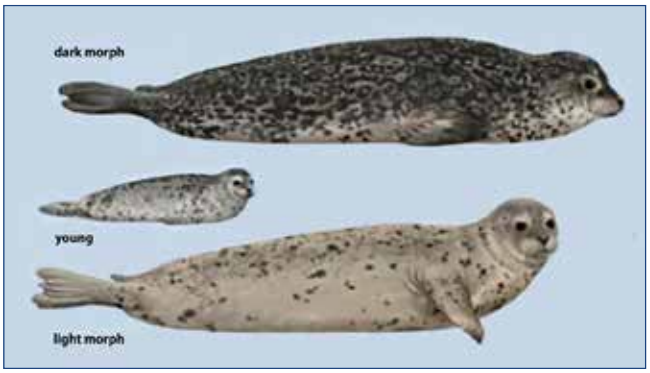
by Kris Liang

Their fore flippers are used primarily for steering, while their hind flippers, with side-to-side body motions, propel them.

Editor's Note: Kris Liang has studied and worked with Pinnipeds around the world, including on the Farallone Islands, and along the coasts of Ireland and the Netherlands. She is well known among the Friends of Fitzgerald Volunteer Naturalists and many others for her passion for protecting the FMR harbor seals. She participates in seal surveys and works with the Marine Mammal Center on seal rescues. The Seal Sitters group was formed by Kris, who conducts volunteer training. Stationed on the beach the "sitters" provide information about the seals to visitors who are offered a view of the animals through a spotting scope. Kris wrote an extensive chapter on harbor seals that was included in the Año Nuevo docent training material.

Description

Meaning of scientific name: *Calf-like seal* (Phoca = seal; vitulina = calf-like). Harbor seals are the only "spotted" seals in the contiguous United States. Their coloring ranges from white, tan or silver with scattered dark spots (light morph), or grey, brown or black with light rings (dark morph); all are more heavily patterned on their dorsal sides and dark morph seals are lighter-colored on their ventral sides. Some have spots and rings.



dark morph, reddit.com/r/seals light morph, sciencedirect.com

photo: Kris Liang

photo: Kris Liang

Juveniles are often lighter-colored and exhibit less patterning. 4-32% of seals that spend time in San Francisco Bay become fully or partially reddish in color due to the "deposition of iron oxide precipitates on the hair shaft" (coats return to "normal" after the molt).

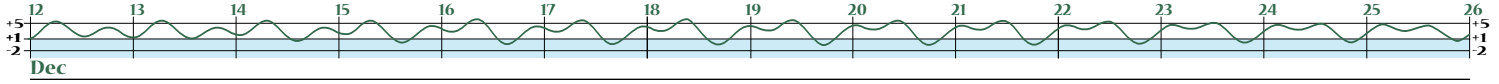
Harbor seals are phocids or "true seals" with specialized bodies shaped like torpedoes. Their pelvic bones are fused, like otariids (sea lions and fur seals) but harbor seals are not capable of rotating their hip joints (which enables other otariids to "walk" on their rear flippers), so seals undulate on land like caterpillars, using their front flippers for momentum. Their body shape reduces drag in the water and is further streamlined by a layer of blubber that rounds off all bony protuberances. Their fore flippers are used primarily for steering, while their hind flippers, with side-to-side body motions, propel them. They have claws on both their front and rear flippers. Their ear holes are visible when they are open. Harbor seals have approximately 42 light-colored, beaded vibrissae (whiskers) on the sides of each heart-shaped nostril.

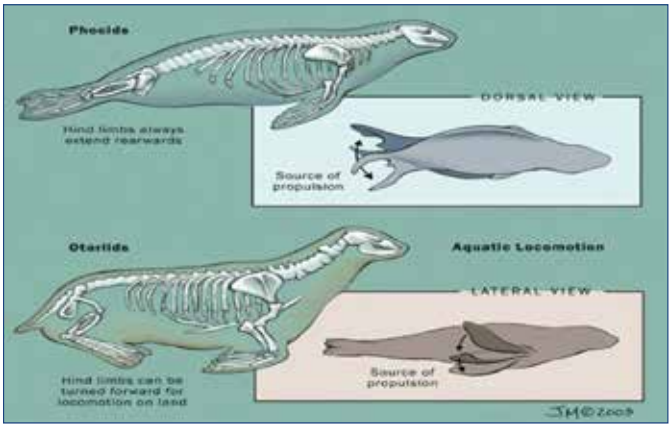
Because they show reduced sexual dimorphism and have internal testes, it can be difficult to differentiate between males, which may grow to 6.3 feet (1.9 m) in length and weigh up to 370 pounds (170 kg) and females, which may grow to 5.7 feet (1.7 m) in length and weigh up to 290 pounds (130 kg). Older males can sometimes be identified by their "neck rolls."

Harbor seals are shy, skittish and do not vocalize much beyond mom and pup interactions. Males can be heard "growling" as part of their lekking mating system, which includes males aggregating and displaying in the water to attract females.. While it is not uncommon to see seals "nose touching" on land or in the water, they are protective of their "personal space" and will slap, thrust their heads and/or bite at other seals that approach too closely. This is particularly true of females with pups.

The seals' eyes are situated dorsally, which affords them a wide visual field and may also allow them to keep their eyes above water while swimming at the water's surface. Above the water's surface, harbor seals' vision is equivalent to terrestrial mammals.

Harbor seals are the longest-lived pinnipeds in the contiguous United States, with an average lifespan for males of 25 years, and a longer average lifespan for females (similar to all other pinnipeds) of 30 years.





Locomotion: University of Michigan Museum of Zoology

Range/Habitat

Harbor seals are the most widespread pinniped species in the world; they are found along temperate and Arctic marine coastlines of the Northern Hemisphere, and coastal waters of the northern Atlantic and Pacific oceans and the Baltic and North Seas.

They form small, stable local populations along near-shore coastal waters and adapt to varied substrates such as rocks, islands, sandy beaches, mudflats, bays, coastal rivers and estuaries. Seals haul out year-round, almost daily, and more often during pupping and molting (which occurs shortly after pups are weaned). During the molt, all age groups come ashore at the main haul-outs to shed their fur (which gives biologists a good estimate of the total number of seals in any given area). Individual molts last one to two months and begin with yearlings, followed by subadults and ending with adults. Mixed haul-out groups may be due to the availability of haul-out space and reproductive and feeding strategies. During pupping season, females form tight bonds with their pups. They may choose larger beaches for birthing space. Once with their pups, they may inhabit areas with tidepools suitable for nursery pens.

Harbor seals are non-migratory but may make local seasonal movements of up to 300 miles in response to prey distribution (usually in winter). They are semi-pelagic, partially inhabiting deeper sunlit waters, typically above the continental shelf. A comparison of the movements of wild and rehabilitated harbor seal pups suggests that wild pups learn foraging behaviors within their first 32 days (pre-weaning). Rehabilitated pups traveled nearly three times farther daily than wild pups and possessed less haul-out site fidelity than wild pups.

These animals are cosmopolitan and endemic. Recent genetic analysis suggests three primary subspecies. Pacific harbor seals occur along the North Pacific Rim ranging from southern Japan to Baja California (Mexico). The FMR subspecies, *Phoca vitulina richardii,* is named for Captain G. H. Richards, who led the 1861-1862 British survey expedition along Vancouver Island for the San Juan Islands Boundary Commission.

Life Cycle

Harbor seals mate in the water and give birth on land, beginning in southern colonies in spring, ending in summer in the north. Pups weigh 18-26 pounds (8-12 kg), are capable of swimming at birth and diving within hours. Once a female has given birth, she will usually, instantly, turn around and begin nosing and sniffing her pup, beginning the bonding process. Mothers may leave pups on land while they forage (which is rarely if ever seen at Fitzgerald) but maintain close contact throughout pupping season as pups double their weight after nursing for approximately 28 days. Females use smell and sound to recognize their pups (pup's sounds are occasionally compared to the sound/word, "mah" or "mom"). Mating occurs soon after pups are weaned.

Males reach sexual maturity when they reach about 165 pounds (75 kg) (3-7 years); females reach sexual maturity when they reach about 110 pounds (50 kg) (3-6 years) and generally reproduce annually. Adult males are promiscuous, occupy discrete territories around a central haul-out area during mating season and will produce visual displays on the surface including tail-lobbing, flipper-slapping and rolling. Harbor seals, as well as other pinnipeds, display embryonic diapause (delayed implantation), which delays embryo development for a certain amount of time, enabling seals to give birth at the same time each year. Twins are extremely rare.

Predators

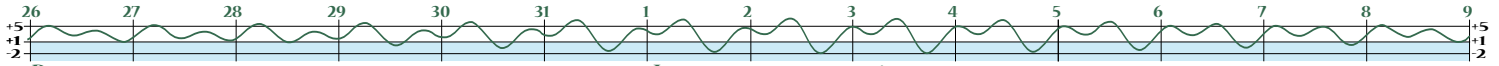
Primary predators are sharks and orcas, and in some cases, other pinnipeds, including (although rare) Northern elephant seals. Land predation by mountain lions and canids (coyotes and dogs) is mostly confined to pups.

Harbor seals' ability to damage or remove catch from gillnets has caused conflicts with com-

During the molt, all age groups come ashore at the main haul-outs to shed their fur (which gives biologists a good estimate of the total number of seals in any given area).

Harbor seals are non-migratory but may make local seasonal movements of up to 300 miles in response to prey distribution (usually in winter).

Adult males are promiscuous, occupy discrete territories around a central haul-out area during mating season and will produce visual displays on the surface including tail-lobbing, flipper-slapping and rolling.



mercial fishers, which creates economic losses and often fosters an antagonistic attitude toward seals. They can also be caught and killed or injured in fishing gear, primarily in gillnets and occasionally in crab pots, as well as other types of ocean trash.

These seals often appear curious about humans while they swim safely in the water, approaching closely and swimming near divers; however, they are wary of people while on land and will flush (rush into the water) if approached too closely or disturbed. Repeated colony disturbance has led to haul-out sites being abandoned and females will abandon their pups due to human interaction.

Prey

Harbor seals generally rest during the day, hunt at night and spend roughly half their time on land and half in water, sometimes sleeping in the water.

They can swim as fast as 12 miles per hour but are usually observed cruising at slower speeds. They repeatedly dive for short periods (3-7 minutes) to less than 200 feet (61 m), but can dive for up to 40-minutes, and to depths of 1,500 feet (457 m). They are opportunistic feeders, can consume prey whole while underwater and eat a wide variety of schooling fish (herring, cod, hake), flatfish (flounder, sole), sculpin, crustaceans, octopus and squid.

Status

Harbor seals are usually found in small groups, but sometimes occur in numbers of up to 500. The population of *P. v. richardii* was last assessed in November 2014 at 190,000 and is increasing; they are a species of "least concern" under the IUCN Red List. The worldwide population of harbor seals was last assessed in January 2016 and is "unknown"; however, it is thought to be an estimated 315,000 adults worldwide. Harbor seals within the United States are protected under the Marine Mammal Protection Act, which forbids the killing, harming, or harassing of any marine mammal. There is some evidence the population has sharply declined over the past couple of years.

Cultural History

Native Americans have hunted harbor seals for fur and food for thousands of years, and they still play a crucial role in the culture and diet of Alaska Natives, with an annual (declining) subsistence harvest of about 1,800 to 2,900 animals.

Before the 1849 Gold Rush, American, English and Russian fur hunters were drawn to Spanish (and then Mexican) California's Fur Rush, to exploit its enormous fur resources. It was California's early fur trade, more than any other single factor, that opened up the West, and the San Francisco Bay Area in particular, to world trade.

Toward the end of the Fur Rush when there were approximately a few hundred harbor seals left in the state of California, they were commercially harvested in British Columbia, Canada, also greatly depleting the subspecies population. They were protected in Canada in 1970. Commercial and recreational use also occurred in Alaska but was prohibited by the Marine Mammal Protection Act of 1972. Alaska Natives are allowed to harvest harbor seals for subsistence and creation of authentic handicrafts. Native handicrafts and edible portions may be sold in Native villages and towns.

Fitzgerald Marine Reserve Colony

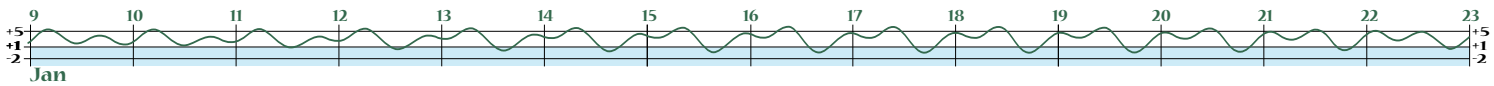
There has been very little research conducted on harbor seals at Fitzgerald. Surveys are conducted within the reserve by Beach Watch and LIMPETS.

Seals are routinely observed year-round throughout the entire reserve, from the syncline on the north, to Ross' Cove on the south. Harbor seals that haul out on the docks inside Pillar Point Harbor are also observed. Since 2020, surveyors have observed seals hauling out in greater numbers in Frenchman's Reef, which may be attributed to coyote predation on the Main Beach.

Pupping season generally begins in April and continues through the beginning of July. In 2021, the season peaked, with over 192 adults and immatures observed, and 73 pups.

Looking Forward

There are a few things I'd like to write about, but they're not yet fully baked. There's a photo database of harbor seals that started in Pacific Grove. It includes seals from Point Lobos, and the team is beginning to photograph our seals to add to the database. And, I'm meeting with folks from NOAA, Cal Academy, Pacific Grove, LaJolla and Point Reyes National Seashore to discuss a statewide citizen science survey program. A number of us (and Beach Watch) conduct surveys throughout the state, but there isn't a lot of cross-communication. A few of us (PRNSS, Pacific Grove and I) noticed a decline in the number of adults in 2021, and NOAA has heard the same thing from others. So, in addition to NOAA scheduling an (overdue) aerial survey, they're interested in putting together a citizen science group to keep tabs on the population in real-time. Pretty exciting. (I could also see this taking years to pull together.) ◆



Registration for 2022 FFMR Volunteer Naturalist Training Class

The 2022 FFMR Volunteer Naturalist Training Class will consist of nine Saturday classes, plus six additional hours spent at the reserve with a mentor. The classes will be held on the Coastside and at the reserve. The proposed schedule for 2022 is: Jan. 29, February 5, 12, 19, 26; March 5, 12, 19, 26. The times of the classes have yet to be determined. Volunteer naturalists must be physically capable of navigating rocks and the reef and must be 17 years of age.

Classes will cover the four major invertebrate phyla plus Marine Mammals, Geology, Birds, Worms, Bryozoan, Tidepool Ecology, Algae and more. Six hours of mentoring with a naturalist will be required along with lab work and class instruction directly on the reef.

Please send the enclosed Registration Form with check to Susan Evans to ensure your participation.

Space is limited. Your Registration Form and Fee must be received prior to the deadline to hold a space. Registration deadline is Jan. 24, 2022. No refunds available after Jan. 24.

Mail the completed Registration Form with a $80 check made payable to FFMR to:

Susan Evans
FFMR Training Class
P.O. Box 3482
Half Moon Bay, CA. 94019

For more information please e-mail Susan Evans at susanmtnvw@aol.com or visit our web site: www.fitzgeraldreserve.org.

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone (cell and/or landline): _____

Email: _____

How did you hear about the training class?

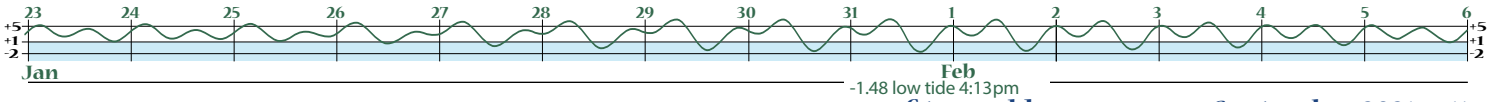
_____

Tell us a little about yourself (any prior volunteer experience; any education, travel, or experiences relating to marine science).

_____

_____

_____



FRIENDS OF FITZGERALD MARINE RESERVE

P.O. Box 669 • Moss Beach, CA 94038
www.fitzgeraldreserve.org

Juvenile Harbor Seal:
see page 8

Parasitic jaeger and prey:
see page 8

King Tides: A cosmic phenomenon

— exerpted from Sea Grant California, a collaboration of the National Oceanic and Atmospheric Administration (NOAA), the State of California and universities across the state to create knowledge, products and services that benefit the economy, the environment and the citizens of California.

The term king tide is generally used to describe the highest tides of the year. King tides provide a great opportunity to get a glimpse of what our coast may look like as sea-level rises. The water level reached by an extreme high tide today will be the same water level of more frequent moderate tides in the future. Seeing what areas flood during these events can help us plan for the future.

Most tides in California are mixed semidiurnal. That means we typically get two high and two low tides in a 24-hr period. Because of this, not only does the king tide bring extreme high water levels, we also get very low tides. Roughly seven hours after the peak high tide, beach goers can see the splendor of tidepools, critters, and coast that typically remains hidden to those of us without gills.

This year King Tides at FFMR are November 15-16 and December 13-15, 2020

https://caseagrant.ucsd.edu/extension-outreach/facts-and-resources/king-tides-a-cosmic-phenomenon

King Tide, Pacifica 1-22-2019, photo: Grant Sautter

Friends of Fitzgerald Marine Reserve

Donation Chair, P.O. Box 669, Moss Beach, CA 94038, or through our website: www.fitzgeraldreserve.org

Contribution Levels:

❑ $25 ❑ $100 ❑ $1000

❑ $50 ❑ $500 ❑ Other _____

❑ I want to double the value of my gift through my employer's matching gift program (please enclose the matching gift forms).

Name _____

Address _____

City _____ State _____ Zip _____

Email _____