BETWEEN the TIDES

Friends of Fitzgerald Marine Reserve

September 2024

Birds at Fitzgerald Marine Reserve

by Donna Pomeroy, FFMR Volunteer Naturalist

Approximately 250 species of birds have been recorded at Fitzgerald Marine Reserve. Of those, about 100 species are regularly occurring as resident, breeding, wintering or migrants. That leaves about 150 species which have occurred as rare or vagrant species, an incredibly high number. That leaves the question, "What makes this place so special that so many birds call FMR home or an important stopover?" The answer lies with the diverse mix of coastal habitats here, providing food and/or shelter, meeting the needs of so many species.

The birds found at FMR differ from season to season, except for those birds which are found here year round, like the Black Oystercatcher, Great Blue Heron, or Chestnut-backed Chickadee, among others. There are birds that spend the winter here, escaping harsh conditions in the north where food resources are scarce and temperatures are inhospitable. This includes most sparrows, ducks, and shorebirds like the Sanderling, found dashing in and out of the surf on the sandy beach at Seal Cove. There are birds which migrate here in spring to spend the breeding season of spring and summer in this mild climate with ample food resources, like the Wilson's Warbler, Pigeon Guillemot, and Allen's Hummingbird. Finally, there are the species of birds which use this location as an important layover during their spring or fall migrations to their breeding or wintering grounds, like the Wandering Tattler, or Sooty Shearwater, seen streaming just offshore in the late summer.

"What makes this place so special that so many birds call FMR home or an important stopover?"

Although Fitzgerald Marine Reserve is most renowned for the rocky intertidal, some of the other habitats important to birds include the rocky shoreline, sandy beach, open ocean, coastal scrub, riparian, and forest. The neighboring residential area with its perennial mixture of flowering plants is another important attractant to birds. Some of the most conspicuous birds are those that occur along the rocky shoreline, feeding in the tidepools twice a day, as the tide recedes. The Great Blue Heron is one of these. Although it is just as likely to hunt gophers or voles in the upland areas, it is also at home prowling among the intertidal looking for fish or crabs. The Black Oystercatcher, with is piercing call, feeds on small mollusks and other invertebrates along the exposed rocks. They are usually present in pairs and call to each other continuously when they are on the move. The Black Turnstone blends in well with the dark rocks along the rocky shoreline and intertidal area, but is highly conspicuous when it takes flight with its well-patterned black-and-white wings.

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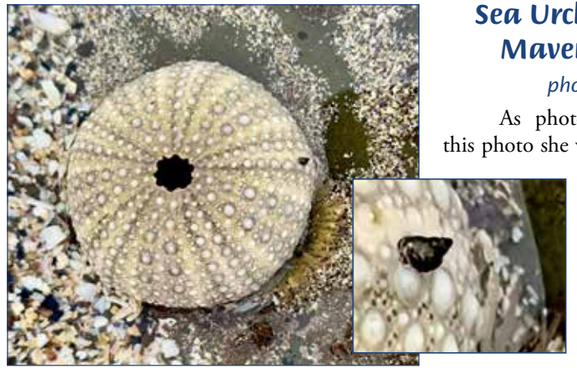
Black Oystercatcher

Great Blue Heron

Chestnut-backed Chickadee



Sea Urchin Shell Stack, Mavericks Tidepool

photo by Jody Cox

As photographer Jody Cox took this photo she was amazed to find the sea anemone hiding under the sea urchin shell. It wasn't until later when she looked much closer that she discovered that what she thought was a black pebble was actually a tiny black turban snail!

BTT Optional Electronic Delivery

The Friends of Fitzgerald Marine Reserve (FFMR) are extremely proud of our *Between the Tides (BTT)* newsletter that you are currently holding. We know many of our donors and collaborators appreciate the high quality and frequent delivery of this publication. And we have no plans to change either the delivery format or the quarterly schedule of *BTT.* However, in the interests of sustainability, and perhaps to reduce a little clutter, some donors might prefer to only receive the newsletter electronically.

In fact, *BTT* is already available electronically on the front page of the excellent FFMR website which also includes a great many additional resources https://fitzgeraldreserve.org. Going forward we will be sending an optional quarterly email link to the new edition of *BTT* to folks who only want an electronic subscription. If you would like to suspend your receipt of the hardcopy *BTT*, and only receive this quarterly reminder, please email me gecbrew@yahoo.com. Note, this is an opt-out agreement: No-one will stop getting the hardcopy newsletter unless they make this request. And you are free to change your mind at any time!

For any questions on this, or any comments on the *BTT* delivery, feel free to contact me at the above email address anytime. ◆

Land Acknowledgment Statement

The Friends of Fitzgerald Marine Reserve acknowledges that the Reserve is located on the unceded ancestral homeland of the Ramaytush Ohlone Peoples. As guests, we recognize that we benefit from the beauty and diversity of this land and seashore. We wish to pay our respects by acknowledging the ancestors and relatives of the Ramaytush community and by affirming their sovereign rights as First Peoples to govern their communities and preserve their cultures. Finally, we seek to honor the Ramaytush community's sacred relationship with ocean and marine ecosystems by educating the Reserve's visitors and protecting the Reserve for future generations.

We want to hear from you.

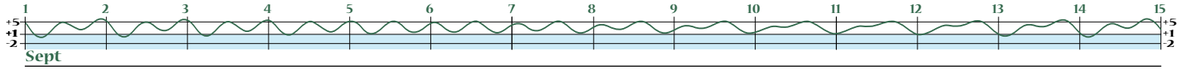
What do you like about the newsletter? What type of articles would you like to see in *Between the Tides*? What article could you write for us? Please contact the Editorial Board at: betweenthetides.editorialboard@gmail.com and we will be in touch. See you out on the reef!

The graph displayed across the page bottoms shows tides for 9/1/24 to 1/19/25 at Princeton Harbor. Where the date appears is midnight. Reefs are accessible for exploring at low tides during hours when FMR is posted as "Open." Low tides at least +1 or below are best for tidepooling. See: https://fitzgeraldreserve.org/lowtides

Good low spring/summer tides are in the early morning. They change to evening tides in September. 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:

-.45	9/16	3:59am		-.9	12/02	5:22pm
-.33	9/21	8:21pm		-1.64	12/15	4:40pm
.16	10/12	12:59am		*lowest tide of 2024*		
-1.20	10/19	7:09pm		-1.14	12/31	5:07pm
-.42	11/03	5:38pm		**2025**		
-1.63	11/16	4:51pm		-1.36	1/12	4:02pm



Birds *continued from page 1*

The open ocean in many areas of the world is an aquatic desert, but that is not the case here, as the California Current and strong spring winds create oxygen-rich and nutrient-rich upwellings from the cooler depths of the ocean, forming the basis for the marine food web. This accounts for the high number of Brown Pelicans, who make their way north after the breeding season in the warm but nutrient-poor waters of Mexico and Southern California, that have come to take advantage of abundant small fish like the Northern Anchovy. When the weather cools down in late fall, the pelicans begin to leave us, with very few remaining past Christmas. This "reverse migration," as it is called, is also seen with the post-breeding arrival of the Elegant Tern and the Heermann's Gull.

There are a number of other birds who feed in these waters. There are three species of cormorant here, the Pelagic, Brandt's, and Double-crested Cormorants, who all nest on nearby cliffs. As schools of baitfish move from spot to spot, large flocks of cormorants move with them. Anchovies, sardines, squid, and other baitfish are here feeding on the plankton which thrives in the upwellings. Common Murres, resembling penguins of the southern oceans, breed just north on the cliffs and off-shore rocks at Devil's Slide, and can be found feeding just offshore, especially obvious in summer as the parent father tends to his chick. The chick fledges early, long before it can hunt on its own or even fly. At this point, most mothers have completed their child-raising duties and the father takes over the feeding and protection of the chick. There is lots of back-and-forth calling on the water between the dad and chick, as the dad leaves it temporarily to dive for food. The adults can dive as deep as 100 meters in search of small fish.

The Pigeon Guillemot is a relative of the Common Murre. This all-black seabird has prominent white wing patches and can be seen flying back and forth just beyond the tidal zone. It is only here during spring and summer, nesting in crevices on nearby rocky cliffs.

There are a number of gulls that can be spotted at FMR, especially the Western Gull which breeds locally. Other species of gulls winter here, except for the Heermann's Gull, which is one of the trio of post-breeding southern visitors. Just a reminder that there is not a species called a Seagull. Gulls can be found inland on lakes and bays, but tend to stay close to land, even when they are at sea.

In winter, this area becomes a sanctuary for ducks, especially the Surf Scoter, which breeds in the Arctic, but spends the winters in the nearshore zone, feeding on benthic invertebrates. Along with the scoters, there are smaller numbers of Common Goldeneye and Red-breasted Mergansers taking advantage of the food resources. Among the ducks are the loons and grebes, of which there are several species of each found here.

But let's not forget the inland areas of this bird-rich location. Resident Chestnut-backed Chickadees and Pygmy Nuthatches can be found in the preserve, along with California Scrub-Jays, Steller's Jays, Red-shouldered Hawks, Wrentits, Pine Siskins, Purple Finches, Dark-eyed Juncos and Anna's Hummingbirds. In spring, they are joined by Wilson's Warblers, Orange-crowned Warblers and Allen's Hummingbirds.

This is just a small sample of the wealth of birds found at Fitzgerald Marine Reserve. ◆

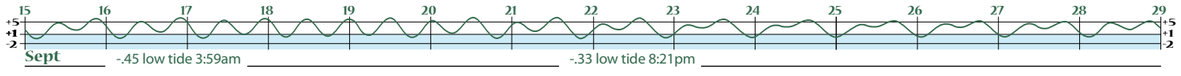
Common Murre

Brown Pelican and Heermann's Gulls

Surf Scoter

Black Turnstone

About the author: Donna Pomeroy has a BS in Wildlife Management from Humboldt State University. She has been a birder since high school and a photographer even longer than that. Now retired, she spends much of her time photographing wildlife and volunteering for Sequoia Audubon Society and the California Academy of Sciences intertidal monitoring project at Pillar Point, as well as many other ongoing citizen science projects. Donna is a long-time resident of El Granada.



Fourteen and Counting – Research Surveys Update

by Karen Kalumuck, FFMR Volunteer Naturalist

For the genesis and history of these surveys, challenges we faced, and updates, see "Two years of FFMR Surveys" in the June, 2023 *Between the Tides.*

Volunteer Naturalists conduct Survey #14 in Sector 2; Sector 1 team visible in the distance near the bluff. Photo: Karen Kalumuck

Way back in 2021, during the Covid pandemic, FFMR volunteer naturalists embarked on a long-term census project at the FMR reef (for the genesis and history of these surveys, challenges we faced, and updates, see "Two years of FFMR Surveys" in the June 2023 *Between the Tides*). We wanted to document the numbers of two species of anemones, at two defined Sectors of the reef. The anemones are commonly found at FMR—*Anthopleura xanthogrammica* (Giant Green anemone) and *Anthopleura sola* (Sunburst anemone). Historically, the Sunburst anemone was a southern CA species, but it has been migrating north for many years. No one knows exactly when the first of these aggressive anemones arrived at FFMR, nor how their presence is affecting the more placid Giant Greens . As our climate changes, will population shifts occur among these two species? We needed a "baseline," an idea of what is "usual" for the FMR reef, to enable future comparisons. In addition, we were interested in monitoring the return of sea stars to FMR, observing the Sectors for certain invasive species, and checking for possible indications of disease among the organisms. The San Mateo County Parks Department awarded us a permit for conducting this work for two years, and has extended it for an additional three. We are in the fourth year of conducting these quarterly census counts.

Survey Number	Date	Survey Number	Date
1	February 9, 2021	8	December 22, 2022
2	April 30, 2021	9	February 18, 2023
3	June 27, 2021	10	June 7, 2023
4	November 26, 2021	11	August 4, 2023
5	February 28, 2022	12	January 9, 2024
6	May 19, 2022	13	April 12, 2024
7	July 15, 2022	14	July 23, 2024

Figure 1. Dates of Research Surveys

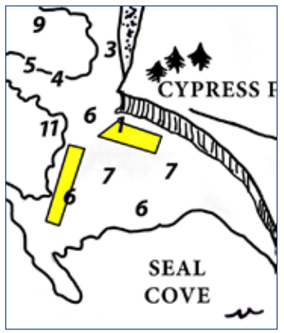


Figure 2. Diagram of Research Sectors highlighted in yellow. Sector 1 is the trapezoid and Sector 2 is the rectangular area.

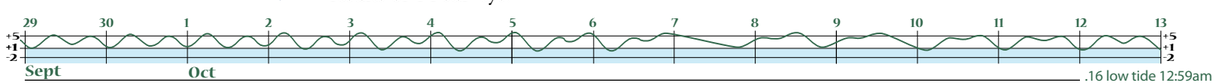
The Data

Figure 1 shows the date on which each Survey occurred. The dates may not be equally spaced for each quarter, due to the timing of the tides and/or weather conditions. Figure 2 illustrates the locations of our research areas, Sector 1 and Sector 2. The following six figures graphically display the accumulated results of 14 surveys.

Figures 3A and 3B show the numbers of each anemone that were counted during each Survey, by Sector. Note that the scale bars for the number of anemones differ between the graphs. Sector 1, an area between the bluffs and mussel beds and home to some of the largest Giant Greens, consistently displayed a greater number of Sunburst than Giant Green anemones. Sector 2, a long channel that encompasses the mid and low intertidal, is nearly devoid of Giant Green anemones, the fewest counted being zero, and the most only three.

Figures 4A and 4B display the percentage of each anemone out of the total counted. The numbers of animals counted can vary greatly due to season or reef conditions (e.g., exceptional surge, robust algal growth). Analyzing the percentage total of each type of animal makes the data more comparable from survey to survey. Note that the scale bars for percentage of the total number differ between the graphs. The percentage of Giant Greens in Sector 1 reached a high of 50 percent in Survey #5, but in general was less than half of the total, with some variability. Sector 2 is dominated by Sunburst anemones, to the near exclusion of the Giant Green anemones. While Sunburst anemone habitat is typically in the lower intertidal, we were stunned by the huge numbers of Sunburst anemones in each Sector.

Sea star numbers are depicted in Figures 5A and 5B. Ochre stars *(Pisaster ochraceous)* are the predominant species in each Sector, while Bat Stars *(Patiria miniata)* were found in lower numbers. That said, these numbers do not necessarily reflect numbers or density of stars for the entire FMR reef. One often sees some lovely stars just outside the boundaries of a Sector, but they cannot be included in the count. In addition, six-rayed stars *(Leptasterias* species), have frequently been observed in our study Sectors. While the numbers of stars may yet be small, it is encouraging that they are rebounding from their own pandemic, the Sea Star Wasting Disease, which began a decade ago and initially left the reef bereft of any stars at all.



At this point, we have a fairly good idea of the current, "normal" distribution of Giant Green and Sunburst anemones in our two study Sectors, and have observed that Sea Stars are mounting a comeback at the Reserve. To gather these data, over 40 different volunteers have donated their time and expertise, many participating in multiple surveys (thank you, volunteers!). We intend to continue this project as long as we have volunteers to conduct it. Our goal is to continue documenting the "usual," and arm ourselves with data to detect any unusual, and perhaps concerning, changes.

There is a magic to being at FMR for surveys, whether it's early morning or near sunset. There is excitement at gathering data, and awe encountering unusual creatures (see "It's a Bird, It's a Plane…." in this BTT issue). There is a camaraderie among us on the reef, whether one is a first timer or an old hand. When we drop our scientific lens, many of us realize an intimacy with the reef creatures beyond our census counts. We've become familiar with where certain animals live—the huge abalone at the northern edge of Sector 2, the most giant of the Giant Greens in a channel in Sector 1. If they aren't at their usual spot, we share concern for their well-being. Some of us "root" for the perceived underdog species (go, Giant Greens!). Besides data gathering, each Survey gives us another chance to be in shared awe of this beautiful place, and another path toward careful stewardship of Fitzgerald Marine Reserve.◆

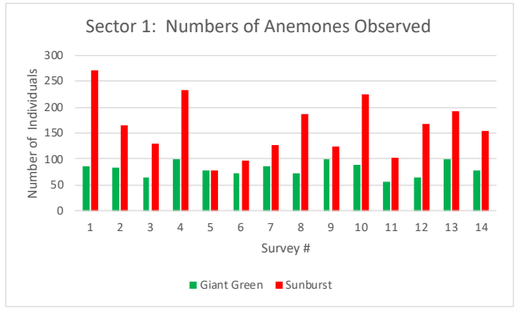


Figure 3A

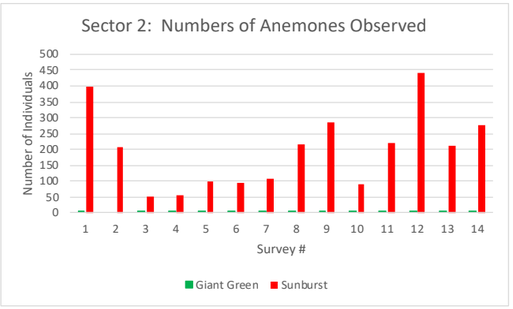


Figure 3B

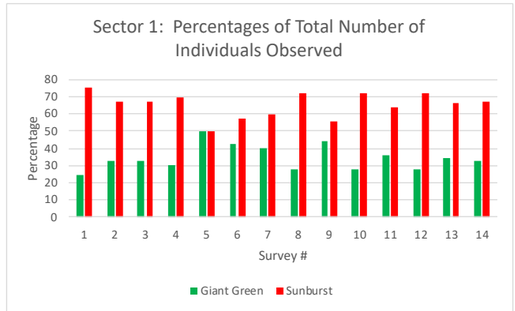


Figure 4A

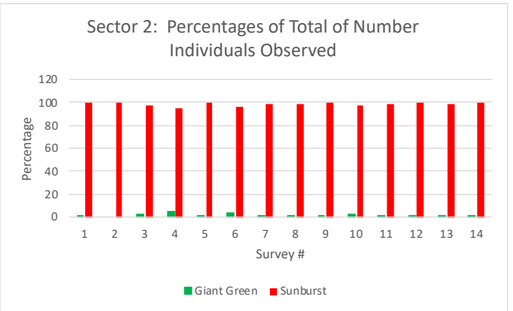


Figure 4B

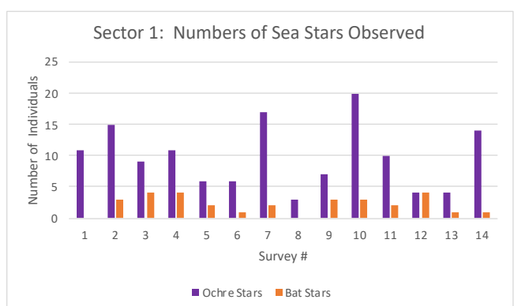


Figure 5A

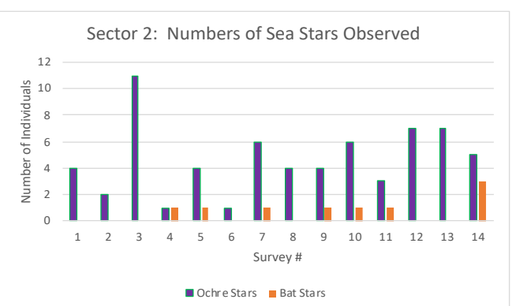
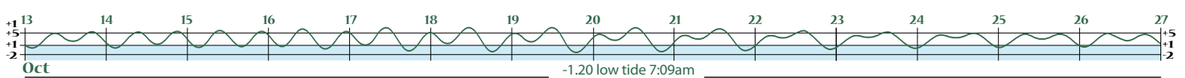


Figure 5B



Junior Naturalist Camp Returns to Fitzgerald Marine Reserve

by Erika Bessler, Interpretive Specialist Intern II, San Mateo County Parks

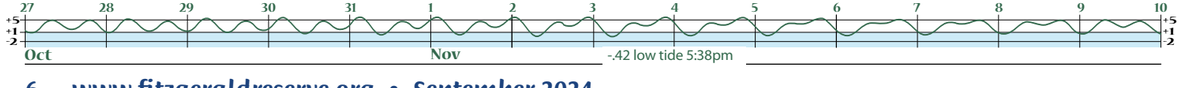
This June, the Interpretive Division of San Mateo County Parks reintroduced Junior Naturalist Camp for the first time since 2019. This was a wonderful collaboration with the Friends of Fitzgerald Marine Reserve who provided their tidepool expertise, and the SMC Parks Foundation who provided funds for transportation. We held two back-to-back sessions with community organizations from the County: San Mateo Police Activities League (PAL) and the Boys and Girls Club of the Coastside (BGCC). For many of our participants, this camp was their first exploration into the tide pools!

Each two-day session was jam-packed with awesome activities. The campers had a blast on Day 1 as they learned about tides and intertidal zones, explored the cypress forest, and enjoyed a relaxing afternoon at Seal Cove Beach. A favorite activity for campers and adults alike was a guided activity led by local Mindfulness Coach, Wendy Figone. Using noise-canceling headphones and soothing music, Wendy led San Mateo PAL through several exercises meant to heighten our senses, foster curiosity, and encourage relaxation. During Session 2 with BGCC, we were delighted to have local highschooler Elle lead a similar practice. Campers enjoyed drawing their surroundings or playing in the sand as we watched the waves roll in. We were even greeted by some curious seals swimming near the beach!

Day 2 started off strong with some amazing tidepooling. Both sessions had beautiful blue skies to complement our exploration. Campers found hermit crabs, sea stars, sea urchins, and even an elusive nudibranch! These findings brought up important conversations about animal adaptations within the tide pools. After lunch, campers decorated picture frames with sand, stickers, and sea glass, creating a unique memento to remember all the fun they had at Junior Naturalist Camp. A few campers have since joined us for hikes in other county parks, and are already asking when they can come back to camp! We look forward to continuing this work with the Friends of FMR next summer!

We are especially grateful to the following docents for leading stations and assisting throughout camp: Deborah Pierce, Ron Olson, Linda Ciotti, Tom Ciotti, Sharon Howell, Marina Luccioni, Karen Kalumuck, and Kristen Tinetti. We couldn't have done it without you! ◆

Throughout camp campers worked on their newly developed Junior Naturalist Workbooks which included educational activities on topics like harbor seals, plankton, and MPAs. Our goal is to develop workbooks like these for other parks in our system.

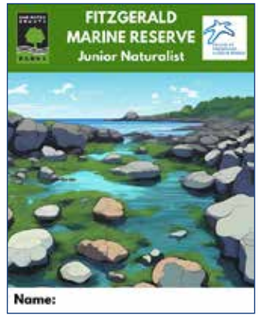


Message from President Ron Olson

With the return of summer, an air of normalcy is returning to Fitzgerald Marine Reserve. Pupping season is over, and the once vulnerable baby seals are living independent lives. Our ramp to the beach is now open, providing an easy beach access that is close to parking and the picnic areas. Our bridge across San Vicente Creek is welcoming people to bike and walk their pets along the Dardenelle Trail. We were happy to see the return of Summer Camp at FMR with over forty children able to experience much of what the park has to offer. Our gray whale skeleton is now supported on a platform to better protect it from the elements.

Photo: Rob Cala

The Friends of Fitzgerald Marine Reserve are pleased with the direction that the park has taken and continues to strive to improve in all areas. Our Visitor Center is now equipped with tools to better observe plankton and tiny creatures that live in our waters. We are busily training our naturalists to operate the equipment to make this an exciting and informative component for our guests to explore. We are also looking for ways to have the Visitor Center open more frequently. It is wonderful to hear from guests about how much they enjoy seeing all of the exhibits along with their interactions with our naturalists, but it also saddens me to hear how many times they have visited and have never seen the center open.



For over fifty years FFMR has trained hundreds of naturalists who have helped to protect the marine habitat and to educate the public. We currently have a little over one hundred active members to help carry out our mission. Many of those who are no longer active still carry the knowledge from our training class and are using it in their work or at other volunteer agencies. Sadly, some of them are no longer with us and we mourn their loss. Recently two naturalists passed away. Both had a true love and respect for nature. One gentleman was a mentor for me when I first started volunteering at FMR. He had a calming effect when leading a tour and could offer valuable advice to both new and experienced naturalists alike. You could always feel how much he cared for people and nature when in his presence. The second person who recently passed away was a young lady who was only a naturalist for a couple of years. She quickly grasped what it took to guide a tour group. My most prominent memories of her involved seeing how important each visitor was to her. She would always look for ways to make their visit meaningful. While both of their stories are different, there is a common thread that I saw: their love for people and nature. Both were able to express it in their own unique way. Although they are no longer with us, their actions will continue as lessons to guide us.

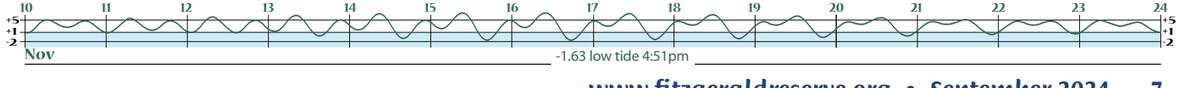
Although all naturalists go through very similar training classes, we each find ways to define our FMR experience. Some naturalists focus on tidepool experience by participating in tours or roving. Some tend to look at other aspects of the park with a spotting scope to observe seals or a microscope to observe the minute creatures in the ocean. Others will spend time at the Visitor Center or on the bluffs to point out the tree tunnel and help guests find the best examples of wildflowers or point out the geologic formations in the park as well as signs of coastal erosion.

Just as our visiting public come from a diverse background, so does our group of naturalists. Our goal is to use our interest in nature and our energy to better serve all. We encourage you to stop by and to enjoy our park. ◆

Looking through a microscope at a drop of water and seeing something so complicated, so clear (so weird!) will always put an amazed smile on a child's face. This photo is from 2007. We now have a much more powerful microscope in the Visitor Center.

Seen through a microscope: Corethron is a single-celled marine diatom.
Credit: Greg Langlois
https://fitzgeraldreserve.org/creature-feature-corethron

Seaside Wooly Sunflower aka Lizard Tail
Eriophyllum staechadifolium
Perennial Herb, Native
Photo: Karen Kalumuck



It's a Bird, it's a Plane, it's a...What?

by Karen Kalumuck, FFMR Volunteer Naturalist

On April 12, 2024, a group of a dozen FFMR volunteer naturalists were wrapping up our thirteenth Research Survey at FMR (for information on the Research Surveys, see "Fourteen and Counting," in this BTT issue). A fellow volunteer naturalist called out to a nearby group of us– he had found an unusual creature, and wanted to share his finding and gather our opinions as to what it was. None of us, in our perhaps 40 years of collective naturalist experience, had ever seen anything quite like it. The mystery animal (Figure 1) had an orange-ish, oval-shaped, fleshy body, about an inch and a half long, and a limpet shell on its back. We submitted photos to iNaturalist and Seek, but neither of those identifying apps provided us with satisfactory suggestions; it was certainly NOT a beetle. Or a limpet.

Figure 1. "Mystery" animal. Photo: Karen Kalumuck

None of us, in our perhaps 40 years of collective naturalist experience, had ever seen anything quite like it.

We continued to observe it in a tidepool for several minutes. It certainly looked like a nudibranch, but we could not locate rhinophores or other breathing apparatus. It moved at the speed of a galloping nudibranch—darn fast. I had never seen a limpet move in real time, although they can be pretty active at night and underwater, so this was further evidence that this was not a limpet. We checked our nudibranch guides listing approximately 50 species, but it did not match any in the guide. After another few minutes, finally, we could see fine tentacle-like projections coming from the "front" end of the animal—front being determined by direction of its travel. They were thin and pale, but we took this as confirmation of its identity. It had rhinophores, therefore it was a nudibranch. We speculated that this particular species was a wayward traveler, just passing through the Reserve, or perhaps a new resident species, migrating from its normal range due to changing ocean conditions. I characterized it as a nudibranch that was wearing a jaunty limpet hat. Others felt that some lazy limpet was catching a ride. Or, horrors, that the limpet had developed a taste for flesh and was slowly filing off succulent nudi flesh with its radula (apparently some limpets are believed to prey on very young barnacles that settle near their home scar, so this idea isn't so far-fetched).

The identity of the mystery animal was still to be determined, however. I decided to mine the many hours of collective rocky intertidal experiences of the FFMR Board of Directors, and sent them a few photos of the mystery animal, for their thoughts. Within minutes, two separate people shot me answers; it was indeed a limpet. A two spotted keyhole limpet, *Fissurellidea bimaculate.* I must admit that I felt a bit humbled, thinking that I knew better than iNaturalist!

When is a limpet not a limpet?

While doing a bit of research on keyhole limpets, I discovered that we were not totally off the mark by identifying it as a nudibranch. Wikipedia (and other websites) identify keyhole limpets as limpet-like sea snails. Sea snails! Nudibranchs! The main visible identifying characteristic is the apical hole in the shell, which is lacking in "true" limpets (Figure 2). While superficially, limpets and keyhole limpets look very similar, in fact, they are not closely related.

Both true and keyhole limpets are members of the taxonomic Phylum Mollusca, and the Class Gastropoda. These two groups of limpets part ways at the Subclass level, with true limpets belonging to the Patellogastropoda, and keyhole limpets to the Vestigastropoda. It is of note that various sources call some of the taxonomic groups "clades," and there are a variety of slightly differing sub-classes and orders that are currently in use. Evolutionary analysis using molecular techniques are relocating certain species of keyhole limpets to new branches of the evolutionary tree.

Differences in anatomy

While both groups of limpets have flattened, conical shells, the keyhole limpets have a "keyhole" shaped round or oval opening toward the peak of the shell. That hole is essentially the anus of the animal. Water is brought into the mantle through a space near the head, and passes over the paired gills. Spent water and waste products from the mantle cavity exit the anal "keyhole."

In true limpets, water is taken in at the front of the animals and flows bidirectionally down a groove in the shell called the mantle groove. The water flows over the gills, excretory organs, and anus. The two streams converge at the back of the animal's foot and exit under the shell.

The mantle of keyhole limpets is large, too large to entirely fit under the relatively small and flat shell. Hence, the shell can look like a cap on the animal's back. In some species, the mantle is so large that it completely covers the shell.

Distribution

Keyhole limpets prefer hard surfaces in intertidal zones, but some species can be found on sea beds up to 250 meters below the surface. They are primarily herbivorous, eating algae, but some will consume detritus. Certain species are known to eat sponge, or diatoms. Their distribution is worldwide, including tropical, temperate, and cold waters.

Have you Seen One?

In chatting with my fellow volunteer naturalists and other tide-pooling enthusiasts, I encountered few people who have actually seen a keyhole limpet alive. Their shells are common on local beaches, including at FMR, but I found only one person who had seen one, observed many years ago. My very unscientific survey revealed that many of us, including myself, had never even heard of keyhole limpets!

In order to get a better idea of how prevalent keyhole limpets may be in our area, I consulted iNaturalist. On their map of sightings for the two-spotted keyhole limpet, only about 12 observations have been submitted for the entire length of FMR intertidal areas. As a rough comparison, the rough limpet *Lottia scabra* was recorded nearly 100 times.

Conclusion

Whether we were more correct than incorrect in our initial identification of our mystery animal is not important. The important lesson is that, after years, we can all still find inhabitants of the tide pools that are new and fascinating to us, and inspire us to learn more, share our enthusiasm, and keep exploring.

Thanks to eagle-eyed Eric Bing for discovering this keyhole limpet and bringing it to our attention. ◆

Figure 2. Comparison of keyhole limpet shells (top) with true limpet shells. From author's collection. Photo: Karen Kalumuck

Rough keyhole limpet. Photo: Don Loarie

Keyhole limpets prefer hard surfaces in intertidal zones, but some species can be found on sea beds up to 250 meters below the surface.

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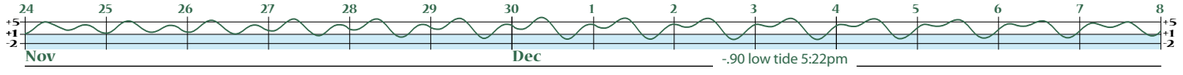
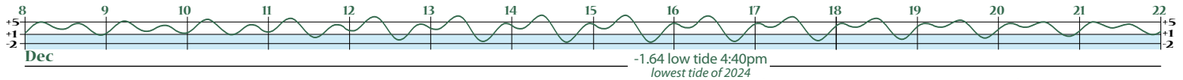




2023-2024 Friends of Fitzgerald Marine Reserve Tour Statistics

Moving forward, the new 2024-25 reservation system will again provide priority sign-up for SMC public schools.

...changes by SMC Parks to the reservation system a couple of years ago created a priority sign-up for Title 1 schools.

The number of tours conducted during the 2023-24 season is represented in the table below. Given the range of variables in recent years, it is a challenge to make season-to-season comparisons. That said, outside of the pandemic period and the closure due to storm damage, the totals are roughly comparable to recent "full" tour years.

Organizations	# of Organizations	# of Participants
Public Schools from San Mateo County	18	1,100
All other schools	13	697
Other non-school groups	4	117
Total	**35**	**1,914**

Looking a little closer, there are two trend lines of interest:

First, when the annual numbers for 2015-20 were analyzed they revealed that well under 20% of the schools visiting FMR for a tour were San Mateo County (SMC) public schools. Based on these results, we endeavored to increase this opportunity for students in SMC public schools. As a result of our work with SMC Parks and the SMC Office of Education, as well as outreach to educators directly by the Friends of FMR, the number of SMC public schools represented in the most recent tour season increased to over 50% of the total. Moving forward, the new 2024-25 reservation system will again provide priority sign-up for SMC public schools.

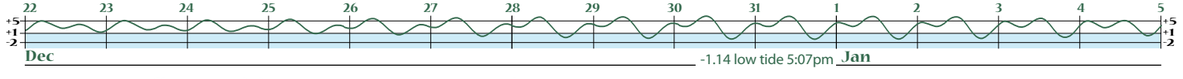
Second, the Friends of FMR and our partners have begun to look at increasing the opportunities for underserved student groups so they may experience the unique wonders of a field trip to the Reserve. With this goal in mind, changes by SMC Parks to the reservation system a couple of years ago created a priority sign-up for Title 1 schools. The new, updated reservation format for 2024-25 will maintain this priority sign-up. While we do not have year-to-year data at this time, the initial numbers appear positive. Additionally, knowing that transportation costs can make field trips challenging, the Friends of FMR appreciate the support provided to schools through bus scholarships awarded by the SMC Parks Foundation. ◆

July 4th Half Moon Bay Parade

by Eric Bing

We had a fantastic turnout of sea creatures at the "Half Moon Bay Ol' Fashioned" 4th of July Parade. This is a 53-year tradition in HMB with musical groups, horses, classic cars, and a wide variety of community groups.

There were many new faces, creative costumes, and plenty of taffy for the kids. Our group included Eric Bing, Marsha Cohen, Karen Kalumuck, Paul Gater, Cynthia Giovannetti, Cesar Cardona, and Sara Cardona. Angel Tinetti, whose HMB library display was featured in last month's BTT, also joined us with her mom Kristen Tinetti. Special thanks to Tom and Linda Ciotti for bringing the 35 pounds of saltwater taffy that we tossed to the kids. ➥



The 2024 FFMR Scholarships Recipients

We're delighted to announce the 2024 FFMR scholarships recipients. They have told us more about their interests in the marine sciences and their plans for college (and beyond)! Congratulations to Charles, Padraig and Josie—we can't wait to see what you achieve.

Charles Schuster:

I am committed to CSU Monterey Bay, which has a beautiful campus in a beautiful location. I'll be studying marine sciences there. After college, I'm hoping to get into research and development in the hopes to improve and stabilize our oceans and the climate.

As a student who grew up right here on the coast, getting to experience the wonderful marine environment and tide pools has been a luxury. It however was not something I truly knew enough about until I took the amazing marine ecology course at Half Moon Bay High School. Learning more about how species interact and affect the environment made me truly love the marine environment and all its wonderful organisms from the seagulls to the sea snails.

L to R: Charles Schuster, Padraig Rogerson, Josie Nelson

Thank you to the wonderful FFMR organization—I hope to do great things with my marine sciences major!

Padraig Rogerson

I am attending University of California Berkeley this coming fall and I plan to study Marine Sciences. After college, I plan on staying in the marine field whether that be through the park services or a business such as aquaculture.

My interest in marine sciences comes from the constant trips early in my life to the tide pools or the beach. I have always liked going to the beach and watching the different animals swim around or crawl along the beach. When I started to get more involved in the sciences, I soon discovered the marine sciences field and specifically focused on that. It has been wonderful learning about the marine ecosystems of our planet, and I cannot wait to further expand my knowledge.

Thank you so much to FFMR for the scholarship, it means a lot.

Josie Nelson

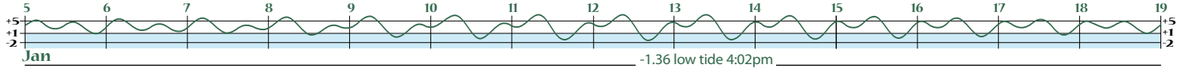
I plan to attend UC Santa Barbara where I will study marine sciences. After college I plan on doing some sort of conservation work specifically to help reduce the amount of plastic in the ocean. Plastic pollution in the ocean causes the death of hundreds of marine organisms. If that doesn't work out I plan on traveling around the world scuba diving in every ocean studying the behavior of different animals. ◆

➥ We were well-placed right behind the Marine Mammal Rescue truck, which meant that Sealia (brought along by Marsha) was able to do double duty. There were many great costumes this year, including Karen's "I am not a nudibranch" sea cucumber. Karen brought along a basket of cucumbers to emphasize her sea cucumber persona. Towards the end of the parade, she handed out a few of them to some very lucky and surprised parade watchers instead of the standard taffy.

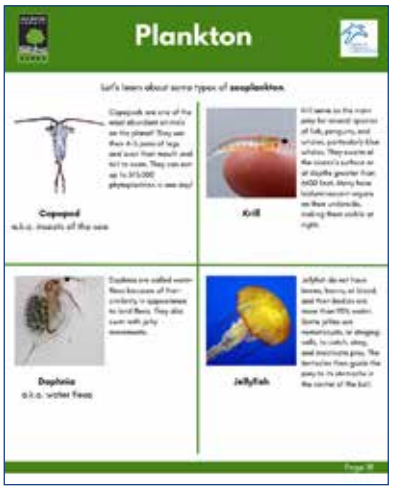
We've already started on a song list for next year and hope the weather cools down enough to get our nudibranch coalition back.

About the author: Eric Bing joined FFMR in 2022 and has enjoyed the parade every year since. You might know him as the Discord guy.

See page 12 for more photos of the fantastical FMR creatures.



A few more pages from the newly developed Junior Naturalist Workbook



July 4th Half Moon Bay Parade

see article and more photos on pages 10-11

Friends of Fitzgerald Marine Reserve

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

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).

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