

BETWEEN *the* TIDES

F r i e n d s o f F i t z g e r a l d M a r i n e R e s e r v e

March 2024

From Flagella to Flippers: discovering plankton at the Visitor Center and its critical role in our planet's health

by Karen Kalumuck and Gregg Langlois, FFMR Volunteer Naturalists

“Wow, what’s that flappy flappy thing? It looks like Dumbo!” “Oh! It has bunny-rabbit ears!” These delighted reactions were heard at the FMR Visitor Center (VC) in response to viewing hidden denizens of marine ecosystems—plankton and fouling organisms. While the harbor seals, whale skeleton, and the tide pool creatures are the stars of Fitzgerald Marine Reserve, plankton, as well as the members of “fouling” communities, play essential roles in healthy marine ecosystems. However, due to their size or location, they are not easily seen and are generally underappreciated. We—Volunteer Naturalists Gregg Langlois and Karen Kalumuck—decided to shine a bright light (literally) on them.

Even when tides are high, there can still be many visitors to FMR. Though the water impedes their view of urchins and stars, visitors can still learn about the rocky intertidal zone and oceanic mammals by exploring the specimens and videos at FMR Visitor Center. To enhance this dry land experience, we have been prototyping a live exploration of plankton and fouling organisms.

Drawing on our scientific backgrounds and love of viewing tiny things through a microscope, we cobbled together our personal equipment to do a first trial in August of 2023. Gregg, a volunteer with the phytoplankton monitoring program he developed in the California Department of Public Health, used his phytoplankton net to conduct a plankton tow at Princeton Harbor, capturing the most numerous plankton, while Karen scraped “fouling” organisms from the docks. We

hauled in our personal microscopes, computer, monitor, microscope camera, slides, Petri dishes, taxonomy keys, extension cords and more, along with the precious samples. Setting up the equipment in the cramped space in the VC was challenging, but we did our best to jury-rig a viewing station for visitors. Despite the clunky tangle of cords and components, the system worked pretty well!



Figure 1. A mix of common diatoms and dinoflagellates found along the California coast. Note the large ciliate filled with dinoflagellates. There are more dinoflagellates like the ones pointed to—see if you can spot them!

Figure courtesy of the Marine Biotoxin Monitoring Program, California Dept. Public Health

What did we find?

Diving into the microscopic world of phytoplankton can seem intimidating, as there are over 10,000 species worldwide in the two most common groups captured in our net: diatoms and dinoflagellates (Figure 1). Thankfully there were usually only 5 to 20 species in a given sample, many of which reoccurred frequently.

Viewing a sample of our first phytoplankton tow under the microscope revealed 14 different diatoms, 6 dinoflagellates, and several zooplankton. Diatoms are algae that truly live

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In the ocean plankton provide a crucial source of food to many small and large aquatic organisms, such as bivalves, fish, and baleen whales.
Source: Wikipedia

Friends of Fitzgerald Marine Reserve

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Moss Beach, CA 94038
www.fitzgeraldreserve.org

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Our Mission:

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

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Flagella *continued from page 1*

in glass houses, with cell walls made of silica. They can't swim, so many form long chains of cells with silica spines to aid floatation and discourage predators. In contrast the dinoflagellates have two flagella for swimming and, while many are photosynthetic, others can ingest prey. Visitors that came by were most attracted to things that move, so dinoflagellates gliding around our microscope slide in their rotating, corkscrew pattern and zooplankton flitting about were very popular. The latter group included vase-shaped ciliates that zoomed in and out of view, wreaking havoc with the more stationary phytoplankton, as well as larval stages of common invertebrates like barnacles (Figure 2), sea stars, and polychaetes. Over the next two months our samples showed a slight shift to dinoflagellates before a return to a diatom-dominated assemblage. There was an abundance of cute polychaete larvae in September, which fascinated our visitors as well as us!

Over time the species composition and abundance will vary with changing ocean conditions, making each sample a new adventure and an opportunity to share with visitors the interrelationship between ocean temperature and phytoplankton health and diversity, which in turn affects all our invertebrate friends in FMR.

Plankton specimens magnified one hundred times or more, viewed via a monitor, are fascinating to many older children and adults. However, toddlers and young children are more engaged with things at real-life scale, items that they can see and touch. Here



Figure 2. A Barnacle larva (nauplius), the first of two free-swimming larval stages. The later cyprid larvae will hunt for a place to attach and produce its characteristic plates.

Figure courtesy of the Marine Biotoxin Monitoring Program, California Dept. Public Health

is where the fouling organisms are useful. The term “fouling organisms” is a bit pejorative. It was coined due to the decrease in efficiency of ship speed when the hull is colonized by large communities of fouling organisms, which need to be periodically removed (similar to how a “weed” is merely a plant out of its human-determined proper place). However, most of the organisms in fouling communities can also be found in the rocky intertidal, for example mussels and barnacles. Many of the fouling community organisms are filter

We want to hear from you.

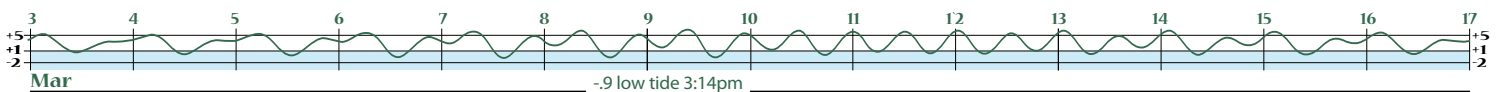
What do you like about the newsletter? What type of articles would you like to see in *Between the Tides*? What article could you write for us? Please contact the Editorial Board at: betweenthetides.editorialboard@gmail.com and we will be in touch. See you out on the reef!

The graph displayed across the page bottoms shows tides for 3/3/24 to 7/20/24 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>

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:

-0.9	3/08	3:14pm	-1.27	5/26	7:26am
-0.42	4/04	2:07pm	-1.64	6/06	5:19am
-1.08	4/11	7:21am	<i>lowest tide of 2024</i>		
-0.73	4/27	7:39am	-1.47	6/23	6:28am
-1.63	5/09	6:16am	<i>4th lowest tide of 2024</i>		
		<i>2nd lowest tide of 2024</i>	-1.29	7/05	5:10am
			-1.10	7/20	4:47am



➔ feeders that clear and purify their watery home. These communities also provide a nursery—shelter and a safe habitat—for tiny fish and invertebrate larvae.

Exploring the “dock schmutz” (Karen’s term of affection for fouling organisms) samples with visitors has revealed some wonderful surprises and curiosities. For example, each sample has contained numerous charismatic polychaetes, whose identity stumped us both. These turned out to be the candy striped polychaete, *Dorvillea meniloceras* (Figure 3). This fast-moving polychaete is a favorite among visitors, especially with its four black eyespots, striped segments, leg-like parapodia, and adorable bunny-ear-like palps. Another sample included feather duster worms that had come out of their tubes—beautiful and fascinating (Figure 4). We discovered that keeping the samples in a plastic tank at “child-eye height,” providing magnifying glasses, and allowing children to hold or touch the animals (these are not under MPA protections) thrilled the children, as well as adults.

Why these particular creatures?

A primary mission of FFMR is education, not only for students visiting for tours, but also for all of our visitors. The addition of these experiences to our offerings to the public will help us to address current critical issues in science.

The stories that we volunteer naturalists tell to our visitors often focus on the tales of individual creatures—the life of the whale, the nuts and bolts of reproduction of a species, the adaptations to brutal intertidal life developed by each species. More and more frequently, teachers leading field trips are requesting that we weave “climate change” into our tours.

To appreciate the falling domino effects of climate change, one needs to understand the whole story of ecosystems, especially the interconnectedness of all organisms and their environments. Tiny phytoplankton, which comprise only around two percent of all plant carbon on

earth, produce more than 50% of earth’s oxygen, and capture about 40% of the total of fixed carbon every year—between 30 and 50 billion metric tons. Phytoplankton are eaten by zooplankton, which are eaten by tiny fish and filter feeders, which are eaten by other larger beings, all the way up

to whales—and us. Whale poop, (and other poop) in turn, provides necessary nutrients for the phytoplankton. At

the VC, the whale skeleton, in conjunction with phytoplankton, fouling organisms, jarred specimens and spectacular videos, provides us with a natural springboard to tell the story of marine ecosystems, from single cells to gigantic whales, from whale poop to single

cells, from filter feeders to our tables. If warming waters kill off phytoplankton, what will become of us?

What’s Next?

As of this writing, we have conducted four prototyping sessions at the VC. Each time, we have refined our set-up, and improved the visitor experience. With the San Mateo County Park Rangers’ collaboration, there will be a re-organization of the Visitor Center to better utilize the space and incorporate new explorations. A recent grant to FFMR from the Marine Protected Area Collaborative will help to fund the equipment needed to offer the plankton and dock organisms activity on a regular basis. We hope to train more docents in how to gather samples and use the equipment.

**Come and see us
at the Visitor Center soon!**



Figure 3. *Dorvillea meniloceras*, the candy-striped polychaete as seen on monitor in the Visitor Center.

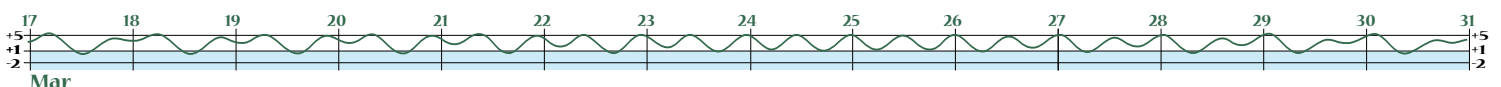
Photo: Karen Kalumuck



Figure 4. Feather duster worm of the Family Sabellidae. Bristly setae can be seen along the sides of the body.

Photo: Karen Kalumuck

To appreciate the falling domino effects of climate change, one needs to understand the whole story of ecosystems, especially the interconnectedness of all organisms and their environments.





A Message from Board President Ron Olson

Last year ended as it began. Strong winter storms, once again, teamed up with King Tides resulting in more storm damage. So far that damage is less consequential to our operations than that from the winter of 22/23 but still leaves us concerned about continued coastal erosion. Seal Cove came through relatively unscathed. The stairs withstood the pounding by waves with the nearby cliffs showing signs of erosion.

The main beach by the Visitor Center didn't do as well. The end of the rock and concrete ramp that was split open by enormous waves last winter is starting to break apart. Some of the low steps that lead to the beach were undercut and have since been reinforced. Much of the soil that sits behind the concrete ramp is exposed and waiting for the next storm to wash it away. I'm no engineer, but I think we will be lucky to have this easy access in place in a couple of years.

In early January, we did receive some good news. After months of inquiries on our replacement bridge over San Vicente Creek, we were finally told that the bridge was ready. All that was needed was to drive it cross-country from Pennsylvania. With a few more tricks up her sleeve, Mother Nature gave us an arctic blast with blizzard conditions across the midwest. Heavy snow over the Sierra made passage challenging. In spite of all of these obstacles, the arrival of the bridge was delayed by only one day. The bridge was assembled in our parking lot over the next couple of days. A few calm days were needed for the old bridge to be removed and the new bridge to replace it.

On January 26, 2024, our new bridge was lifted into place by crane to its new home. This was witnessed by neighbors, visitors and park staff. Many, if not all of the people who had seen San Vicente Creek as a barrier that cut off their access across the park, were now happy and smiling in the knowledge that FMR was returning to what it was. Visitors will have safe, easy access

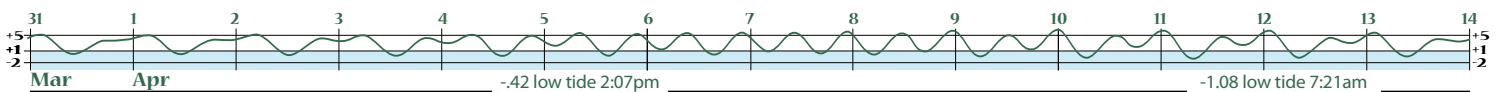


to the cypress forest, the beach overlook and the Dardanelle Trail.

As a volunteer naturalist, I see even more. I see safer naturalist led tours, along with more visitors to the picnic area and Visitor Center. I see the return of our youth program.

With spring just around the corner, I envision many reasons for optimism. Our park experience will be enhanced by a significant landscaping project. We can soon look forward to seal pupping season along with a freshly trained group of volunteer naturalists.

**Our future looks bright.
Come share it with us.**



What's at the Visitor Center?

by Tom Ciotti, FFMR Volunteer Naturalist



Elephant Seal skull

Have you been to the FFMR Visitor Center lately?

It's chock full of beautiful, informative displays, shells, fossils, whale baleen, animal skulls and pelts, lots of stunning photos and much, much more!

The *Between the Tides* Editorial Board decided to take a peek into the old Ranger logbooks to discover the genesis of the center and its specimen collections. We'll delve deeper into the specimens in future articles.

In anticipation of creating the reserve San Mateo County began purchasing land in Moss Beach in 1965. The parcels where the VC originally sat and where it now sits were bought in 1967.

The initial entries in the logbooks were made by Robert Sanders, a San Mateo County Park Naturalist Aide, in the summer of 1968. His entries for August 4 and 5 state he worked on exhibits of specimens he collected at the reserve. It is not known whether any of those specimens are in the current VC. The next series of entries were made by Ranger Tom O'Conner. His first two entries, made on November 1 and 2, 1968, state "Assisted roving crew in placing Reserve office" and "built porch for office." That office building would later be the VC. His November 22, 1968 entry says that "Jerry cut ramp from parking lot to beach, also leveled off around office."

In December 1968 Ranger Doug Lackey began service at FMR. His December 20 entry says "relocated office 20 feet north, regraded ramp." After that relocation the office was located on the bluff between San Vicente Creek and the Goldthorpe home. The photo below shows the office at that

location. The office is the small building in the middle of the photo—the Goldthorpe home and garage (still currently located there) are the larger buildings directly behind the office.

Ranger Lackey's January 29, 1969 logbook entry states, "started collecting for geology display." It is not known whether any of those collected items are currently displayed at the VC.

Ranger Lackey's last logbook entry, made April 22, 1969 says, "New man Bob Breen reported today. Spent day making him familiar with area and duties." Of interest is Ranger Breen's May 30, 1969 logbook entry "James Fitzgerald here 10:00." It is not known whether that was Fitzgerald's first visit to the reserve, but it was the first one recorded in the logbook.

Based on personal communications between Bob Breen and the author, the incentive to relocate the Reserve office from its location in the photo to its current location was primarily flooding of the former by the San Vicente Creek during heavy rainfall. The logbooks indicate the relocation occurred on December 20-21, 1972.

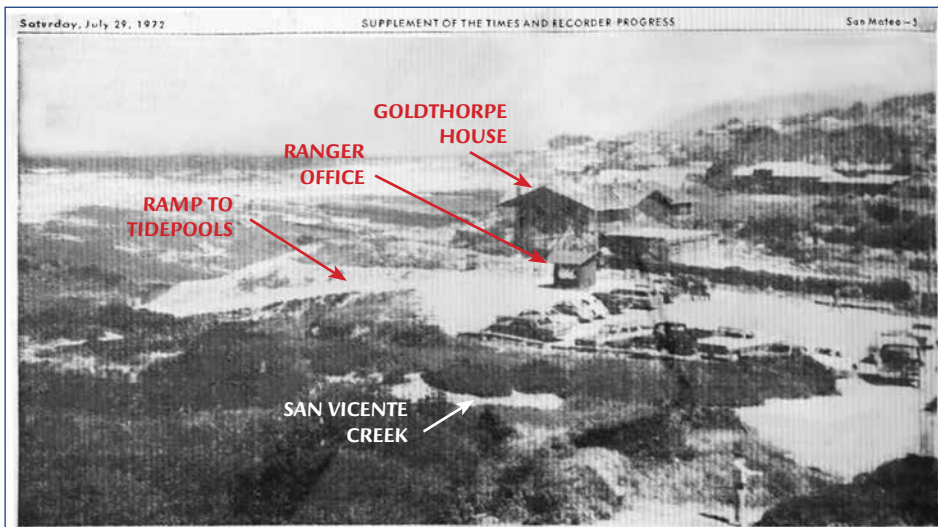
During Bob's tenure and up until 2016 the reserve office also served as a visitor center with many of the specimens Bob had collected as well as some collected by the rangers who succeeded Bob displayed on shelves in the office/visitor center building.

Winter 2004: Elaborate, exciting plans were made

The San Mateo County Parks and Recreational Foundation hired a consulting firm specializing in interpretive and education centers. As seen from the planning documents:

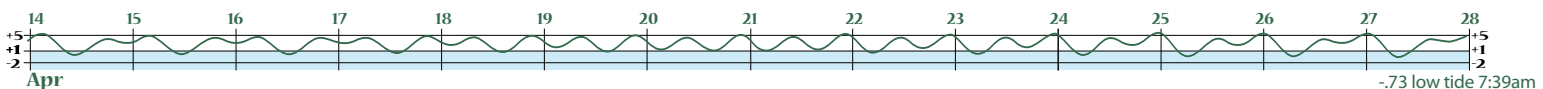
"The new education center will be a stimulating mix of exhibit gallery, reef lab, office for the park staff, docent all-purpose room, reception and gift shop area. It will be located in the current parking area.

One will enter the exhibit gallery through a darkened alcove to set the mood and to showcase the red abalone, a symbolic



The office location on the bluff between San Vicente Creek and the Goldthorpe home, 1972.

continued on page 6





Rendering of proposed 2004 Interpretive & Education Center

One will enter the exhibit gallery through a darkened alcove to set the mood... Tidepool sounds will be piped in.

Further plans included ...a larger than life climbing and exploration wall called the Octopus Garden...

link that will tie all the center's exhibits together. The red abalone was chosen because it has a long history of human interaction and, like Fitzgerald, it is a beautiful piece of nature that is tenacious, yet vulnerable. Tidepool sounds will be piped in. Once inside there will be a film about the reef

and the animals that inhabit it, as well as proper tidepool etiquette. There will be six other exhibits, all very interactive.

The first will be Zonation: Life in the Splash Zone using an I Spy approach. Next is Feeding Strategies: Grabbers and Grazers, highlighting crab, sea stars, abalone, sea urchins and barnacles. Survival Strategies: feet and fins, The Ohlone: pre-20th century human dependence, The Decline: 20th century exploration, development and misuse, and finally, Reversing the Trend."

Further plans included a reef lab, a larger than life climbing and exploration wall called the Octopus Garden, an amphitheater outside the VC and an Ohlone exhibit at the Pillar Point Marsh.

The estimated cost was at least \$2 million.

This amazing, although controversial, plan never came to fruition.

March 2008: a new interpretive center is planned

As part of the Consolidated Appropriations Act of 2008 (P.L. 110-161), \$669,750 of a federal budget "earmark" has been designated for use in and around our planned Fitzgerald Marine Reserve Interpretive Center.

Receiving this funding is expected to smooth the way for further fundraising efforts to be conducted over the next few years. The total cost of the project is estimated at \$3 million.

FFMR hopes the new interpretive center will open its doors in 2011.

This plan never came to fruition.

2016-2017: Success at Last!

In 2016 San Mateo County Parks built a new ranger office and adjoining Friends of Fitzgerald Marine Reserve (FFMR) office/storage space at the southwest corner of the FMR parking lot. That then made it possible for Rangers Rob Cala and Katherine Wright to supervise renovation and conversion of the former reserve office/visitor center into the current Visitor Center.

While it is not recorded where many of the shells, bones and other anatomical specimens that currently reside in the VC came from, it is almost certain that Ranger Bob Breen collected most of them during his 35 year tenure at the reserve.

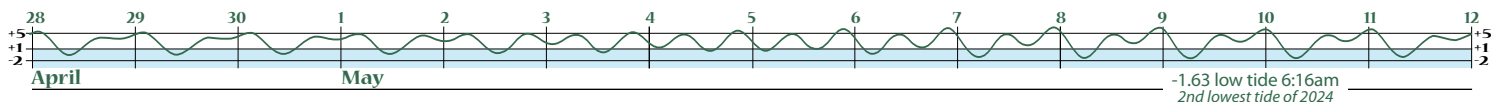
The seal and otter pelts were obtained from the California Department of Fish and Wildlife

The video screen at the west end of the building was donated by FFMR and the lighted display case came from SMC Parks' San Pedro Valley facility. FFMR volunteer Keith Mangold collaborated with Ranger Cala in putting the shipwreck display together. The sperm whale flipper displayed at the east end of the building was collected and mounted by Bob Breen in the 1970s and was donated to FMR by Bob's widow, Mary.

Recent additions to the VC are the gray whale skeleton display collected at Seal Cove by FMR Rangers in 2021 and the three bird wings donated in 2023 by the Audubon Society.

2024

The visitor center continues to be a site for creative interactions. Recently Volunteer Naturalists Karen Kalumuck and Gregg Langlois set up a station for viewing some of the smaller creatures living at Fitzgerald. Curious what is out there? See their article on page 1 of this issue. ♦





**Success at last !!!
Though small in size, the new Visitor Center delivers BIG.**



The plankton viewing station set up by FFMR Volunteer Naturalists Karen Kalamuck and Gregg Langlois; Gregg adjusting the microscope.



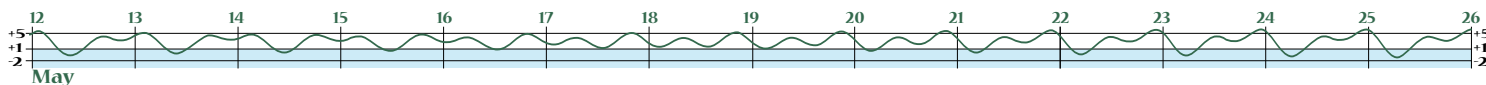
FFMR Volunteer Naturalist Karen Kalumuck welcoming visitors outside the VC.



*Top: Video screen on the end, signage on Abalone, Geology and Whale Migration
Bottom: Sperm Whale Flipper*

Keep your eyes out for the next chapters focusing on the exhibits and specimens at the Visitor Center.

In the meantime, come visit mid-day on a Saturday or Sunday—bring the children and be educated and amazed.



The Sea Surface Microlayer

by Tom Ciotti, FFMR Volunteer Naturalist

The SML...is formed of a complex aqueous mixture of carbohydrates, salts, proteins, lipids, and, of course, small floating organisms.

The SML is acknowledged to be one of the largest and most important interfaces on the planet.

I know, you've been to the Fitzgerald Marine Reserve many times and never saw a "skin" on the ocean. Of course you didn't see those zillions of marine viruses (which I wrote about in a previous edition of this newsletter) that are in the ocean either. Why? Because, like those viruses, the ocean's "skin," technically called the sea surface microlayer (SML), isn't readily visible to the human eye.

The SML is the boundary interface between the ocean and the atmosphere. It is estimated to be between 1 and 1000 microns thick. In comparison the thickness of a human hair averages about 70 microns. While thin, it is enormous in area since the ocean covers about 70% of the earth's surface. Although the existence of the SML has been known for about seven decades extensive scientific study of it has only begun recently and it and its influences on earth processes are still incompletely understood. In late 2021 U.C. San Diego completed development of SOARS (Scripps Ocean-Atmosphere Research Simulator). Research using that simulator is expected to provide a better understanding of how the SML influences vital ecological processes that occur at the ocean-atmosphere interface.

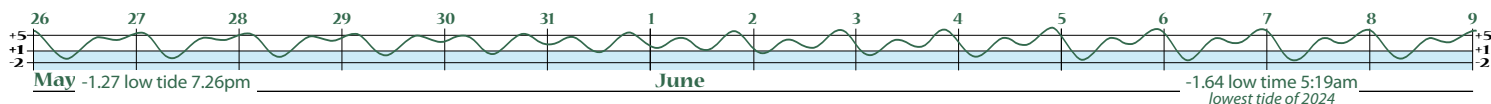
The SML is believed to be a hydrated gel-like layer or biofilm. It is formed of a complex aqueous mixture of carbohydrates, salts, proteins, lipids, and, of course, small floating organisms (see diagram on page 9). The small floating organism content of the SML is collectively called the "neuston" whereas "plankton" refers to similar organisms that inhabit the underlying ocean waters. The main microbial components of the neuston are bacteria (the bacterioneuston), small algal groups such as diatoms (the phytoneuston), and viruses (the virioneuston). All three of these components are thought to be selectively recruited from the planktonic populations of the underlying water and are thus sub-populations of the respective planktonic populations. Their diversities and activities are postulated to be ecologically regulated involving controls such as prevailing meteorological conditions, solar radiation intensity, presence or absence of pollutants, and organic matter food source.

The gel-like biofilm structure and the chemical and microbial compositions of the SML are distinctly different from those of the underlying ocean water. It is thought to be enriched in concentration of microbes as well as dissolved and particulate organic material relative to the underlying water. Its lipids and carbohydrates are key to its gel-like structure. The dominant carbohydrate component consists of transparent exopolymer particles (TEPs) formed by aggregation of dissolved polysaccharides released during microbial production and decomposition. TEPs are sticky and can bind to other particulate material in the SML. The concentration of TEPs in the SML has been measured to be many-fold that in the underlying water.

Despite its thinness the SML is remarkably stable. This is principally due to its gel-like structure, its surface tension, and its high concentration of surface active agents. Its surface active agents are produced primarily by the phytoneuston activity and decomposition of the bacterioneuston. Studies have shown it is stable enough to exist above the average global wind speed. High wind speeds may cause breaking waves (commonly called white caps) to temporarily disrupt the SML and disperse its materials into the underlying water. However those same waves produce rising bubble plumes to which the dispersed materials rapidly adsorb and enable the SML to reform.

The high concentration of surface active agents in the SML, which is particularly elevated in coastal waters, is involved in two ocean phenomena often seen at FMR—sea slicks and sea foam (see photo page 9).

Because surface active agents have both a hydrophilic (water-loving) portion and a hydrophobic (water-hating) portion they tend to accumulate right at the ocean-air interface. At low wind speeds localized areas of accumulation produce wave dampening and attenuation of small waves on the sea surface. That in turn alters the light reflection properties of the surface and reduces the glittering effect of sunbeams on the surface, resulting, as seen in the accompanying photo, in the surface appearing smooth or



“slick.” Variation in coastal ocean currents cause slicks to appear as bands on the sea surface.

Now about that sea foam...I confess I have often told schoolchildren on FMR tours that it is caused by Rangers doing their laundry in the ocean. I'll try to be a bit more honest here. Sea foam is really caused by waves whisking air bubbles into surface active agent-rich sea water such as the SML. The surface active agent makes the bubbles stable enough that the foam can exist for hours and accumulate. It does this by slowing down the rate at which water drains out of the thin bubble wall. Sea foam entraps organic particles, neuston, and even marine eggs and larvae and serves as nutrition for neuston as well as larger marine organisms and waterfowl.

The SML is acknowledged to be one of the largest and most important interfaces on the planet. All energy and mass entering or leaving the ocean passes through it. Across the SML large scale environmental changes occur such as warming, evaporation, greenhouse gas exchange, ocean acidification, and marine aerosol formation potentially influencing global carbon recycling, climate change, cloud formation, precipitation, and other natural processes. Studies to date make it eminently clear that the SML mediates many, if not all, of these processes that affect the health of our planet and the life that inhabits it. The complexities and magnitudes of the SML and these processes present formidable challenges to our ability to measure and analyze them and ultimately understand them and their effects. Gaining that understanding using devices such as SOARS may be critical to controlling and surviving threats such as global warming.

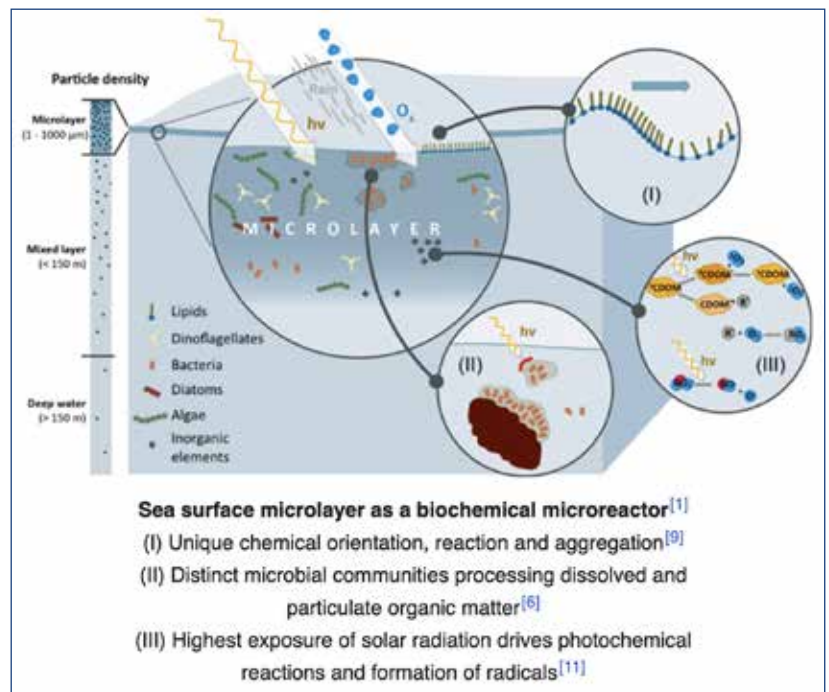
One aspect of this that I personally find ominous involves the apparent ability of the SML to concentrate just about everything within itself. Recent studies have shown that microplastics are currently found in concentrations in the SML up to 100 times that found in underlying water. And humans continue to pour more microplastics into the ocean. While studies of this are ongoing, some researchers believe microplastics may negatively affect the ability of the SML to mediate the processes described above.

Harking back to my facetious comment about the Rangers doing their laundry in the ocean, a major source of ocean microplastic contamination comes from unfiltered laundry efflu-

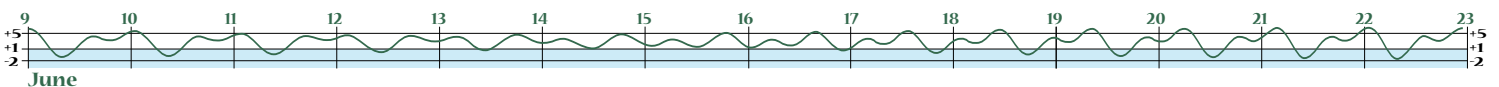
ent because laundering tends to mechanically degrade the synthetic polymer fibers from which many of our fabrics are made. Other large sources of microplastic contamination are discarded cigarette butt filters and particulate wear from vehicle tires. We can all take steps to reduce and hopefully eliminate these sources of microplastic contamination. ♦



Sea foam and, further out, Sea Slick, in Moss Beach in 2024. Photo: Tom Ciotti



https://en.wikipedia.org/wiki/Sea_surface_microlayer



2023 Volunteer Luncheon



Last September, after a three year hiatus, the volunteer naturalists of FFMR were finally able to get together for our annual Volunteer Appreciation Luncheon. We used the amazing community room in the Half Moon Bay Library, a lovely spot. The room includes a glass wall that can be completely opened onto a courtyard and provides plenty of space and fresh air. The BBQ lunch was organized by naturalists **Mary Shields** and **Chris Tauscher**, and capped off with the cutest sea creature cupcakes. About forty naturalists attended. In general, we were all so happy to meet up, converse, catch up, and enjoy each

others company that it was hard to quiet down and start the event, but there were prizes to be awarded!



L-R: Kumi Ishida, Linda Ciotti and Betty Sills

First, the FFMR Board members were introduced, and **Ron Olson**, president, gave an overview of the organization and a big thank you for making the 2023 tour season a success despite all of the challenges

of weather, access, and number of tours. **Karen Kalumuck** debriefed us on total hours provided by the docents for the 2022-23 tour season—1710 hours in total!



L-R: Julie Walters, Barbara Dye and Anne-Ly Crump

Appreciations were extended to all (both those present and those who couldn't attend) for making an FMR field trip a highpoint for students, and for their help in educating, protecting, and supporting the efforts to preserve the unique habitat of the Fitzgerald Marine Reserve.

We took a moment to remember naturalist **Sasha Cohen Greenawalt** who had passed away the week before. An article on her life, work and contributions was published in the December 2023 issue of *BTT*.

Two emeriti naturalists joined the luncheon. **Kumi Ishida** took the first training class that Bob Breen gave and was an active docent and board member before transitioning to the Visitor Center where she put her professional teacher training to excellent use. **Betty Sills** joined in 2003. She was instrumental in using the spotting scopes to engage visitors and educate about the harbor seal population, and also brought an artistic flair by creating seal, crab, chiton, and octopus creations for various events, including FFMR's participation in many Half Moon Bay 4th of July parades.

Linda Ciotti made service acknowledgments and presented service awards.

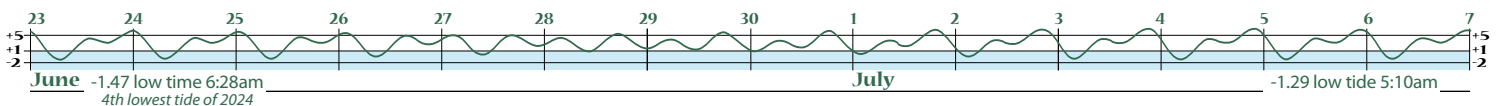
Five dedicated volunteers were acknowledged for recent exceptional service to FFMR. **Carol Ferguson**, **Ann Mangold** and **Tom Ciotti** were acknowledged for opening and promoting the Visitor Center. **Karen Kalumuck** was acknowledged for heading the FMR Research Survey since 2020. **Deborah Pierce** and **Tom Ciotti** were acknowledged for developing a land tour for seniors at the reserve.

Because we hadn't met for the past several years, awards were presented for multiple years.

The **Ginny Award** recognizes a volunteer who has distinguished themselves by being active for many years and by furthering the FFMR mission in a variety of ways.

The award was given to **Ron Olson** for the year 2020. Ron has been an active volunteer since 2011 and has served on the FFMR Board of Directors for many years including as President for the past three. Ron participates in the naturalist training course and the Junior Naturalist Training camp, and has conducted countless school tours over the years.

The Ginny Award was presented to **Joseph Centoni** for 2020 and 2021. Joseph has been our primary instructor for the annual volunteer naturalist training classes since 2013: Ten years of giving up his Saturdays in order to train the majority of the volunteers who were present at the luncheon! Joseph grew up in HMB, and was actually a Jr. Ranger under the direction of Bob Breen. When Joseph was a student at HMBHS,



he took the Marine Biology class that Bob developed for the school, and was the recipient of the second ever FFMR scholarship awarded then as now to a deserving student interested in environmental studies. Upon graduating from college, Joseph began teaching at the elementary level and when Bob Breen decided to retire from teaching, Joseph was hired to take his place. Joseph not only teaches AP Environmental Studies and AP marine Biology, he has been the Head of the Science Department at HMB HS for the past 10 years.

The award was given to **Elaine Reade** for 2023. Elaine joined FFMR in 2001. She has been a member of the board since 2019, is on the Education Outreach Committee and is involved in continuing education. Most importantly, Elaine coordinates the volunteer tour scheduling and coordinates with the SMC Parks Department and the rangers. We are not sure where we would be without her contributions of time, skill, and patience! The 2023 tour season was incredibly difficult with so many logistical problems thrown into the mix after the bridge was destroyed but Elaine got us through it all.

The **Sea Star Award** recognizes a new volunteer who has distinguished themselves by jumping right into conducting tours and participating in other volunteer activities.

For 2022, the award was presented to **Deborah Pierce**. In addition to helping with tours as soon as the 2022 training class concluded, Deborah has been a part of the newest tours focused on senior citizen community organizations. These are land-based tours and focus on the history, geology, and flora found within FMR. Together with Tom Ciotti, Deborah has helped fine-tune the tours and has connected several senior groups to FFMR.

For 2023 the award was presented to **Kevin Hall**. Kevin participated in many of the tours once the training class concluded. This was very helpful since 2023 was a very difficult tour season with many tours being canceled due to weather, the storm damage that caused the park to close on two separate occasions and the loss of the pedestrian bridge.

The event was capped off in its lovely, traditional way...with the presentation of the 2024 Critter Pin, organized by Linda Ciotti. If you were there, you now have a Pelican in your collection!

Since we could not celebrate in 2022, we acknowledge the founding of the Friends in 1972 with a commemorative 50th Anniversary of FFMR pin.

Our thanks to Melody Lee for photographing the event.



Melody Lee and Sarah Carter



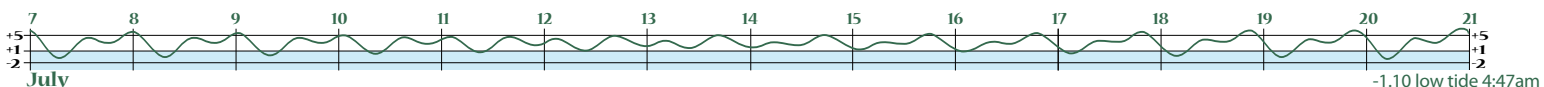
L-R: Keith Mangold, Ron Olson and Ann Mangold



L-R: Joseph Centoni, Susan Evans and Karen Madsen

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.



Sami Chang, artist of the new Fitzgerald Marine Reserve County Park poster



I am a proud East Bay Area native. Growing up, I explored my suburban jungle of a backyard, sketchbook and pens always in my hand, and drew everything I saw.

Though art was one of my first loves, I became passionate about marine sciences when I was 12 years old

after taking a marine biology and environmental science class. This passion for ocean ecology drove me to pursue a Marine Science degree from California State University, Monterey Bay (CSUMB) where I got to study a large range of marine organisms, from the humpback whales that visit the bay during the summer months to feed on schools of sardines to the black abalone that hide deep within the rocky crevices of the intertidal to avoid being eaten by sea otters.

Since art was still at the forefront of my mind, I went on to pursue a graduate certification in Science Illustration at CSUMB in hopes of educating large audiences on various marine organisms and ecological processes as well as how they are impacted by human interactions.

Like many in the Bay Area, my first time tidepooling was at Fitzgerald Marine Reserve where my fondness for the ocean and

all the colorful and interesting creatures that live in this environment grew even more.

* I wanted to capture this space in its entirety—the journey to the intertidal through the cypress bluffs, the lower tree canopy red from the Trentepohlia algae that grows on the lower branches, along the stairs that climb down the sandstone cliffs, and across the beach, avoiding the harbor seals resting on the sand.

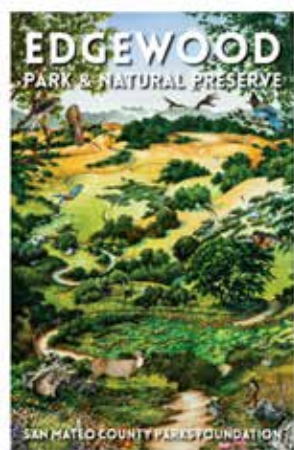
* I also wanted to illustrate all the treasures that lie beneath the water and are exposed at low tide to show how diverse this intertidal habitat is. From the nudibranchs to the seagrass to the oystercatchers looking for their next meal, this space is home to so many creatures that survive through changes in the tides.

* I also wanted to pay homage to the sunflower star (*Pycnopodia helianthoides*), an intertidal icon that was once a common sight at the Fitzgerald Marine Reserve and has sadly become locally extinct due to the sea star wasting disease.

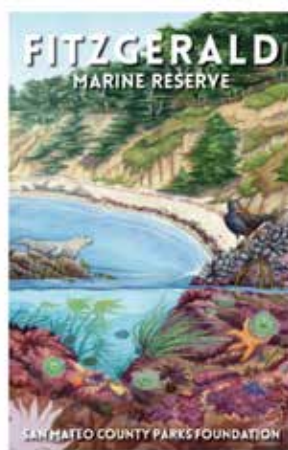
*From the nudibranchs to the
seagrass to the oystercatchers
looking for their next meal, this
space is home to
so many creatures that survive
through changes in the tides.*

*** I wanted to illustrate this space
for all the beautiful reasons that many
travel far and wide to enjoy. ♦**

We at the San Mateo County Parks Foundation are thrilled to unveil the first three posters depicting three popular San Mateo County Parks: Edgewood Preserve, Fitzgerald Marine Reserve and Memorial County Park.



Bruce Washburn, "In the Edgewood Preserve"



Sami Chang, "A Day at the Fitzgerald Marine Reserve"



Rebecca Holland, "Morning in Memorial Park"

We started this new program with the goal of engaging local artists and celebrating the diversity and wonder of our amazing county parks. With all the milestones happening lately, including Memorial Park turning 100 this year, the timing just felt right to bring together parks and art.

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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