BETWEEN the TIDES

Friends of Fitzgerald Marine Reserve

March 2026

Night Tidepooling Returns!

by Sarah Carter, FFMR Volunteer Naturalist, Editorial Board Member

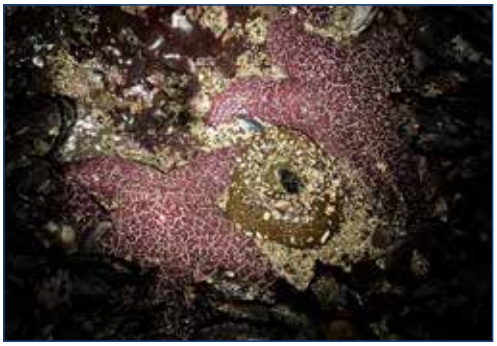
Back in August a binder full of historic physical issues of *Between the Tides* surfaced. I cherished flipping through each issue, most of which were collected by Ginny Welsh, former Board President. As I thumbed through, I felt increasingly connected to the Reserve—to the things we can count on to change and to the things we know never will.

In the fall of 1987 there was an ad for Fitzgerald's first Night Tidepooling outing. The conducted tour promised to feature the "night shift" of organisms as they go about their business. Since then, night tidepooling has been an ongoing program at Fitzgerald. An event is held annually, weather permitting.

On December 5th, for the first time in four years, a lucky group of us got to go out and experience the reef at night! Volunteer naturalists and Fitzgerald neighbors were hosted by San Mateo County Parks, including rangers and their families. We donned our headlamps and UV lights and stepped onto the reefs, crossing a threshold into the unknown, into the even more bizarre and otherworldly scene of the tidepools in the dark of night.

What did we see?

It makes sense that December housed the Sea Star Solstice event further down the San Mateo coastline—sea stars were out in droves at Fitzgerald! Early in the evening we saw a beautiful bat star. There were mottled stars, six-rayed stars, ochre stars, and even a brittle star.



Bat Star, Brittle Star and Two Ochre Stars

All told, the group saw three octopuses during our night tidepooling event. A group of naturalists and I spent almost two minutes with a stunning red octopus. The way they move is so calculated. Some of our volunteers saw another octopus nearly capture a kelp crab! For the following handful of minutes, the crab was on its back legs, ready for battle, understanding the precariousness of its situation.

Many of the Friends of Fitzgerald have a soft spot for nudibranchs; their unique color and pattern expressions are mesmerizing and intricate. Seeing a new species of nudibranch is thrilling. We saw a Noble Sea Lemon and a Sandalwood Dorid (see photos on page 12).

Anemones are particularly stunning under UV lights. Better than any Black Sabbath poster! We saw a few anemones with their achoragi, or fighting tentacles, exposed. A good reminder that anemones are mobile and territorial. FMR naturalists have seen these achoragi a few times during our quarterly invertebrate surveys, which often happen in the still, early morning hours.

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East Pacific Red Octopus

Friends of
Fitzgerald Marine Reserve
P.O. Box 669
Moss Beach, CA 94038
www.fitzgeraldreserve.org

Our Mission:
The protection and preservation of the Fitzgerald Marine Reserve as a unique intertidal and coastal environment through the promotion of educational and experiential activities for students, visitors, and researchers.

Recent Changes to the Between the Tides Editorial Board

by Paul Gater, FFMR Volunteer Naturalist, Editorial Board Member

The Editorial Board for *Between the Tides* was established in the middle of 2022. A few updates: Tom Ciotti and Miranda Holeton have recently stepped down from the Board.

Tom and his wife Linda will be moving to Carmel Valley in the summer. We are all very grateful for the amount of time/work Tom and Linda have put into FFMR over the last 20 years. We plan to feature their story in the next issue of *BTT*.

Many of you will know Miranda as a former County Parks ranger at the Reserve and also as a Friends Board member. She is now focusing on her family and her new role as climate change and water contamination litigation attorney. We wish her the best!

We thank both Tom and Miranda for all they've done on the Editorial Board ensuring great quality newsletters every quarter.

The Editorial Board is delighted to welcome Sarah Carter and Kaua Hermosura as our newest members. Sarah has been a volunteer with Fitzgerald since 2022. She is excited to join this team of editors and to contribute to the great legacy of *BTT*. Kaua Hermosura brings professional experience in marketing, digital storytelling, and community engagement, and is passionate about conservation, education, and connecting people to place through thoughtful communication.

Please contact us if you're interested in joining the Editorial Board. The time commitment is quite low and we welcome more ideas for articles and authors for the newsletter. Please contact the Editorial Board at: **betweenthetides.editorialboard@gmail.com** and we will be in touch. See you out on the reef! ◆

Land Acknowledgment Statement

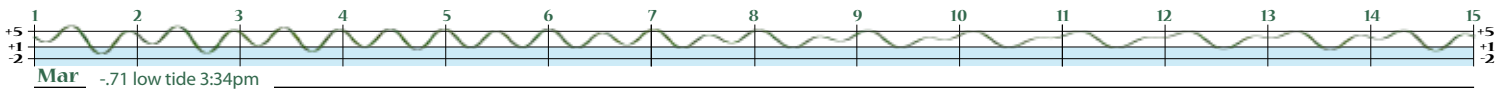
The Friends of Fitzgerald Marine Reserve acknowledges that the Reserve is located on the unceded ancestral homeland of the Ramaytush Ohlone Peoples. As guests, we recognize that we benefit from the beauty and diversity of this land and seashore. We wish to pay our respects by acknowledging the ancestors 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.

The graph displayed across the page bottoms shows tides for 3/1/26 to 7/19/26 at Pillar Point 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 Pillar Point Harbor:

-.71	3/1	3:34pm	-2.0	5/18	6:47am
-.39	3/22	7:59am	-.88	5/31	5:51am
-.3	3/27	1:44pm	-2.11	6/15	5:46am
-1.38	4/19	6:56am	-.79	6/29	5:34am
-.65	5/2	6:07am	-1.79	7/14	5:33am



Night Tidepooling *continued from page 1*

Based on the empty crab carapaces (shells) that often show up at Fitzgerald, I'd venture to say that nighttime is fraught with peril for our crustacean friends. Luckily, in addition to seeing crabs narrowly escape octopus clutches, we saw a number of other rock crabs and kelp crabs living their best life. One huge piece of bullwhip kelp housed a group of about fifteen kelp crabs. Naturalists counted "there's one…two, three…" and so forth. The abundance of crabs this time of year is well documented, dating back to the 1990s.

Why do organisms look cool under UV light?

Anemones contain proteins that absorb and re-emit light, a process called biofluorescence. Pigment molecules in the anemones' tissues are absorbing the UV radiation and re-radiating light in the visible range. These proteins are present during the day, but are more pronounced at night. These proteins highlight adaptability: they can attract prey, warn predators, and act as a safeguard against oxidative stressors. In humans, oxidative stress triggers migraines.

Many of the creatures we encounter at night are out to hunt. In addition to biofluorescence, organisms have adapted to have larger eyes, the ability to camouflage, and complex non-visual sensory systems, which help them detect movement in the water. All of these adaptations contribute to their survival.

Eventually, the rhythmic sound of the crashing incoming tide became apparent. A group of three of us were last on the reef around 8:30pm. It's difficult to leave that environment; it's such an incredible privilege to get a glimpse into what happens on the reef after the sun sets.

Savoring the last few minutes looking up at Orion, turning back towards reality, we were greeted with a nearly full moon, one day past December's Cold Supermoon. Tidepooling and night sky gazing are an unlikely but profound duo.

In Winter 1993, Bob Breen wrote the first article on the Night Tidepooling program. I thought about him, Ginny, and all of the other docents from decades past who stepped on this same reef, under this same night sky. All naturalists and citizen scientists I've known are driven by immense curiosity. I got curious about what they saw or how structurally different the reef might have been. I wondered what they learned from the intertidal zones and from each other. I wonder how much of what the Fitzgerald naturalists practice today is a result of their stewardship.

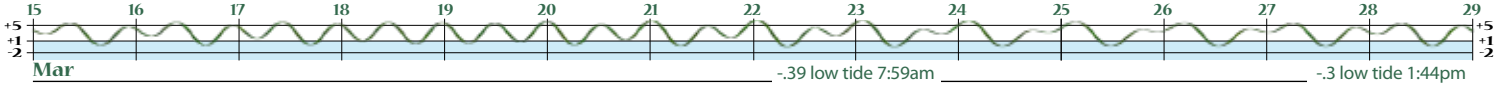
Bob ended that article with a passage from poet-philosopher Ralph Waldo Emerson's "Each and All." I thought I'd borrow his idea and share a passage from a different but fitting Emerson poem, "Seashore."

Behold the Sea,
The opaline, the plentiful and strong,
Yet beautiful as is the rose in June,
Fresh as the trickling rainbow of July;
Sea full of food, the nourisher of kinds,
Purger of earth, and medicine of men;
Creating a sweet climate by my breath,
Washing out harms and griefs from memory,
And, in my mathematic ebb and flow,
Giving a hint of that which changes not.
Rich are the sea-gods:—who gives gifts but they?
They grope the sea for pearls, but more than pearls:
They pluck Force thence, and give it to the wise. ◆

Anemone with UV Light

Anemone with achoragi (fighting tentacles) exposed

Kelp crabs congregating around bullwhip kelp. See if you can find 7 crabs.



The Visitor's Center: Further Updates Inside and New Paths, Signage, Picnic Tables and Benches Outside

text and photos by Kathy Barton, FFMR Volunteer Naturalist, Member Editorial Board and Martie Sautter, FFMR Volunteer, BTT designer

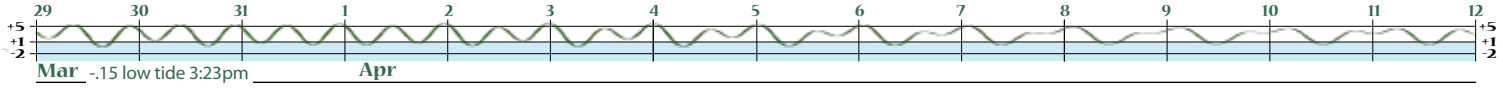
It's been about three years since a big storm knocked down tall cypress trees around the Visitor's Center at Fitzgerald Marine Reserve. Those trees had destroyed many picnic tables when they fell. In the ensuing cleanup many of the remaining trees were deemed to be unsafe or damaged and had to be removed.

Happily, the grounds around the Visitor's Center have now been replanted with new trees and vegetation. New sturdy benches and picnic tables have been installed. These were fabricated by the rangers from locally sourced lumber. The new ample picnic tables form a U shape so that tour groups can gather around and listen to guide presentations.

A new accessible path goes from the parking lot past the gray whale skeleton display out to the sidewalk on California Avenue. Stone benches have been placed along this path for visitors to view the skeleton. Attractive new signage describing the skeleton has been added to the exhibit. ◆

This new sign at the Visitor Center does an excellent job of tracing activity on this section of the San Mateo Coastside from 5,700+ BCE to today.

Families appreciate the new exhibits at the Visitor Center. Everyone wants to pet the super soft fur of the baby harbor seal.



Volunteer Spotlight on Martie Sautter

by Kathy Barton, FFMR Volunteer Naturalist, Member Editorial Board

In this issue we introduce you to Martie Sautter. Martie has done design and production on *Between the Tides* for more than twenty years. Recently Martie and I got together in Montara where she lives and talked about her time working with the Friends of Fitzgerald, how she came to the SF Bay Area and, not least, her love of nature.

It was a warm and sunny day at Sage Bakehouse in Montara (highly recommended) when we met for this interview. Both coastal inhabitants, we agreed it was too hot in the sun and chose a table indoors. We had met in person previously at quarterly newsletter folding/mailing "parties" but this was the first time I had a chance to hear Martie's story. Martie is a striking not-quite blond with warm laughing eyes, lots of energy, easy to talk to and we get right down to my list of questions.

Martie hails from eastern Ohio. Throughout the school years, she acted and worked backstage and front of house with the local Children's Theater which had been founded by her mother. Her first career, one that she loved very much, was in theater lighting design and stage management. She worked in theaters in Ohio and New York City and travelled throughout the northeastern and southeastern states doing summer and winter stock and traveling broadway shows.

Martie didn't grow up as a nature enthusiast. That came later and Martie remembers exactly how that happened: it was during a camping trip in the High Sierra with her boyfriend (later to be husband). Despite the fact that it was a miserably cold experience, she caught the bug and has been a nature enthusiast ever since. (see sidebar on page 6)

Martie and her husband moved to California in the 1970s so that her husband could finish at USF. Upon arriving in San Francisco, she took a job at the Institutes of Medical Sciences in their fundraising department. A newsletter was part of the development effort and this became one of Martie's assignments. Those were the days of tedious cutting and pasting to create copy for printing, something Martie does not remember fondly.

Fast forward a few years and Martie found herself living in Moss Beach with a young son and needing a job that she could do from home. A friend of hers had recently demonstrated one of the then brand new Apple Mac computers for her and Martie immediately saw a way to create a publishing career from home. She taught herself graphic design and before long she was producing a variety of print work including billboards high above the SF motorways. When a local friend had to stop working for health reasons, Martie inherited her graphic design work for Ocean Shore Printing in Half Moon Bay.

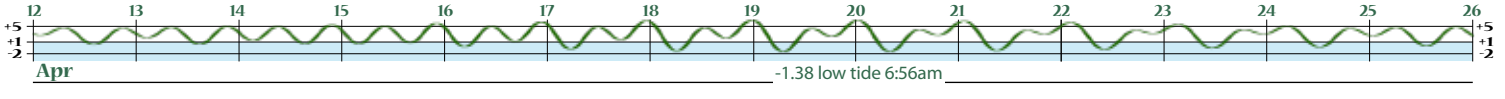
Martie found out about *Between the Tides* from her neighbor across the fence, Jenna Kinghorn. Jenna (also an FFMR Board Member) was the person responsible for editing *Between the Tides* at the time and asked Martie to put in a bid for the job of production and design of the newsletter. That was 26 years ago and of course the rest is history.

The newsletter you hold in your hand right now would be much less engaging and lucid without Martie. Every quarter, the acting editor (a round robin rotation) solicits, gathers and edits articles for the upcoming newsletter. These are then passed along to Martie as text files with associated image files. Martie turns these rather plain efforts into the articles you see on the page—she formats the text, adds pull quotes and information boxes, finds helpful illustrations, writes headlines, and adds additional information and images where she feels clarification or expansion are needed. Martie frequently suggests topics we should explore for new articles. She writes additional copy where needed. And she does all of this without complaining on what is usually a condensed timeline. For her work on the newsletter, Martie is paid from FFMR funds for about two thirds of her time. The other third is volunteer effort. She is exceptional as one of the few volunteers who didn't join the organization as a volunteer naturalist.

With four grandchildren up the street, a string of guest dogs running underfoot, walks in the beautiful coastside nature, good friends and her publishing work, Martie has her plate full. We are grateful she makes time for us and grateful for all the pizazz and clarity she adds to each issue of *Between the Tides.* ◆

see sidebar on page 6

With four grandchildren up the street, a string of guest dogs running underfoot, walks in the beautiful coastside nature, good friends and her publishing work, Martie has her plate full.



Reflections from Megan's Bench

*by Jan McFarland-Brown, FFMR Volunteer Naturalist, 1993-2002**

I remember live abalone camouflaged in the crevices next to the giant sea anemones opening up to start their own adaptation of hunting.

Recently, sitting at Megan's bench watching the tide recede, revealing the tide pools at FMR, my memories of this wonderful place began to reappear, just like the many tide pools themselves.

My oldest memories are like the splash zone, filled with turban snails and hermit crabs patrolling the surf or in the first set of rocky tide pools, hiding from the gulls, and oh! the crabs, all sizes and shapes tucked into the crevices and under the rocks where the brittle stars live.

The fresh sea breeze blowing off the ocean. I remember.

As the low tide reached the intertidal zone, my memories were more about the people and our relationship with FMR. Now there were deeper pools farther out, each holding a community of animals and plants. I remember Bob Breen, taking the docent training course at Coyote Point Museum. Upon completion of the program, I remember leading public groups of all ages out into the pools. Mostly school groups: students, teachers, and parent volunteers. I remember the look of joy on the faces of the students, teachers, and parent volunteers when they made personal connections or new discoveries as they stepped carefully around exposed tide pools. Learning that the pools were nurseries for a multitude of creatures, small and mighty, places to hide and grow. I remember the motto "Eat or be Eaten."

I remember Bob Breen and the wealth of knowledge that he gave out freely with the hope that it would inspire others to understand and treat the tide pools with respect and wonderment.

The low tide is now complete. The subtidal zone, all pools and the reefs exposed to be studied for a brief time. I remember the colonies of purple urchins burrowed into the side of the deepest pools. The delight of a chance encounter of a solitary red urchin hunting in the pools and then returning to the ocean seabed. Quietly observing the harbor seals hauled out on the outer reefs. Watching the sea palms swaying and bending each time a wave broke over them

The edge of the terrestrial world.

Sitting at Megan's bench watching as the tides reverse and it is now high tide. I remember the outer pools rapidly disappearing, directing my groups off the reefs, sometimes scrambling as the water rose over our shoes. I remember live abalone camouflaged in the crevices next to the giant sea anemones opening up to start their own adaptation of hunting. Stinging, paralyzing tentacles wait for the unsuspecting prey. Now ➥

Volunter Spotlight on Martie Sautter *continued from page 5*

My first encounter with real nature (and California) was a backpacking trip my boyfriend set up which involved two backpacks with cans of food, a few clothes, $10 sleeping bags and one thin mat—leading to hiking the switchbacks from Toulumne Meadows to Cathedral Lakes which were frozen, a cold hash dinner and a good hard cry (me). For some reason I have yet to comprehend, I agreed to go on for four more days! It was scary, glorious, difficult and astounding. After this initiation we backpacked through King's Canyon and Yolla Bolly Wilderness among others. Once we were a family with a child, our adventures calmed down when we discovered San Mateo Memorial Park, the magical Redwood trees, Pescadero Creek and camping next to your car!!! Sheer heaven! That was over 40 years ago and that park is still my spirit home. ◆

Backpacking King's Canyon back in the day

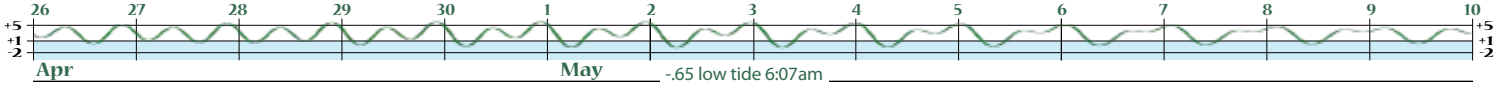


Photo: Jan McFarland-Brown

➦ the incoming tide is filling in the intertidal zone. I remember my own children crouching down peering into a submerged world before moving toward the beach.

I remember docent gatherings, meeting and supporting new docents, and the Jr. Ranger Summer camps. I remember the moonlight tours with Bob Breen. Flashlight beams catching the nocturnal antics of the residents of FMR, broken back shrimp and large crabs on the prowl.

Back to the splash zone, all pools submerged in the cold Pacific waters. I remember leading groups back to the kiosk but stopping long enough to point out the fossilized whale bone embedded in the mudstone. Millions of years old, to the amazement of the group, making sure before they leave the beach to touch the past.

I remember sunrises and sunsets coloring FMR.

But most of all sitting at Megan's bench, I remember the thrill of being part of a unique environment.

And when you come and sit at Megan's bench, remember to include that moment in your memories. ◆

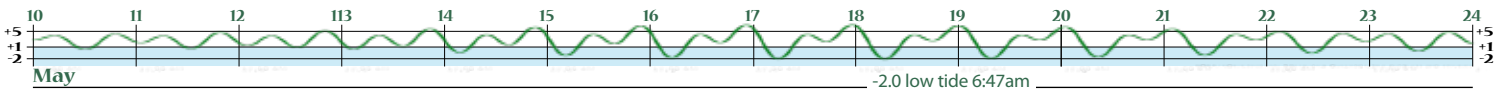
Author Info: In addition to serving as one of FFMR's first Volunteer Naturalists (originally termed docents) Jan has continued volunteering in many marine-related organizations: 2016, Beach Watch North Point Año Nuevo; 2023, Naturalist, Pacific Beach Coalition; 2023, Director (board member) for the San Mateo County Parks Foundation.

Editor's Note: Many of us on the coast know Jan from her years as a fabulous teacher first at Hatch school, then at Farallone View where she had the very popular classroom with Bob the snake.

Megan's Bench is named in memory of Kelly and Bill Huber's daughter. Kelly was another FFMR early docent, a member of the Board, and also used her artistic talent to portray FMR creatures for a number of years for the *Between the Tides* newsletter.

I remember leading groups back to the kiosk but stopping long enough to point out the fossilized whale bone embedded in the mudstone....making sure before they leave the beach to touch the past.

Megan's Bench at Fitzgerald Marine Reserve, a wonderful spot for contemplation. Photo: Jan McFarland-Brown



Seeing the Invisible; the FFMR Microscopes in the FMR Visitor Center

by Karen Kalumuck and Gregg Langlois, FFMR Volunteer Naturalists

Once a month a group of FFMR Volunteer Naturalists gather tiny and nearly invisible organisms from the Pillar Point Harbor. Once back at FMR, in a flurry of activity, jars of dock-fouling organisms and magnifying glasses are set on tables, while inside the VC two microscopes and many cables, cameras and a computer are ultimately connected to a large HD screen. What happens next can seem like pure magic—microscopic plants and animals are projected on the screen, inches tall, allowing visitors to see a variety of "hidden" life forms. (Figure 1).

The event, termed "Plankton Palooza and Friends," began in August, 2023 with Gregg Langlois and Karen Kalumuck cobbling together their personal (and rickety) equipment to conduct the first event (read about the genesis of the event in "From Flagella to Flippers" *BTT*, March 2024). It was a huge success, drawing many visitors to the VC.

A year later FFMR was fortunate to be awarded a $3000 grant from the Marine Protected Area Collaborative which we used to purchase a Stereo or Dissecting Microscope, a Compound Microscope, plus the equipment needed to project the images onto a large HD screen.*

The Stereo Microscope (Figure 2) enables 3-D imaging of larger specimens, such as dock organisms. It can magnify a specimen so that it appears between 7X to 45X its actual size. This microscope has a continuous zoom set of lenses. When properly adjusted prior to each use, the image can be zoomed between its low and high value, and will stay in focus. The results can be stunning as seen in Figure 3, a ghost shrimp feeding while clinging to a colonial bryozoan.

Figure 1. The diatom Chaetoceros, a microscopic phytoplankton viewed with the compound microscope.

Figure 2. Trinocular Dissecting (Stereo) Microscope

Figure 3. A ghost shrimp holding on to a colonial bryozoan.

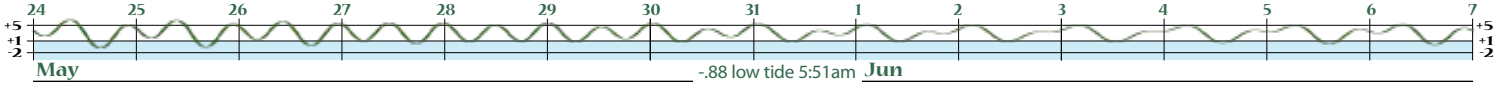
The compound microscope (Figure 4) takes over where the Dissecting Microscope leaves off, having magnifications of 40x, 100x, and 400x. This range of optical magnification allows us to show visitors the smaller photosynthetic phytoplankton (20 to 100 micrometers in size, the thickness of a human hair) and the larger zooplankton that feed on them. The lower power allows us to scan the microscope slide for things of interest. With the higher powers we can observe the intricate shapes of the silica-celled diatoms (Figure 5) and the larger zooplankton (Figure 6). With the ability to actually show the public these tiny organisms on the monitor, FFMR Volunteer Naturalists can explain their importance as primary producers (absorbing carbon and producing 50% of the earth's oxygen), and as the base of the marine food web that sustains all of the unique marine invertebrates on the FMR reef.

The Paloozas are held monthly. Dates of the next Palooza can be found on the FFMR website https://fitzgeraldreserve.org/ and our Facebook page https://www.facebook.com/FMRFriends/ ➥

Figure 4. The FFMR compound microscope

Figure 5. The chain-forming diatom Stephanopyxis, with golden-brown chloroplasts visible

Figure 6. A larval stage, called a trochophore, of a marine worm called a polychaete



➦ FFMR Microscopes *continued*

* But how did we obtain the funds?

The Marine Protected Area (MPA) of California consists of 14 local collaboratives whose mission it is to empower diverse communities to engage in MPA stewardship, management, and education. San Mateo County (including FMR) is part of the Central Coast division.

For more information on MPA's see https://www.mpacollaborative.org/what-is-an-mpa/

In 2023, the Central Coast MPA received a grant from Coastal Quest, a privately funded California agency that funds outreach and educational grants programs. After polling the members of the collaborative, the leaders of the Central Coast MPA determined that helping organizations improve their volunteer training and retention was a need for many of the member organizations, so this became the funding priority. Friends of Fitzgerald Marine Reserve was awarded $3000 which was used for purchasing the equipment needed to introduce students and visitors to microscopic organisms. Housed in the FFMR Visitor Center, our hope is that volunteer naturalists who cannot lead reef tours will discover an alternative and engaging way to interact with and educate the public. ◆

FFMR DONATION SUPPORTS COASTIDE RESIDENTS

by Karen Kalumuck, FFMR Volunteer Naturalist

Coastside Hope staff accepting a small portion of the donated clothing.

On Monday, December 15, with every available spot in my car crammed with white plastic trash bags filled with brand new tee shirts and sweatshirts, I drove from my home in Moss Beach to Coastside Hope* in Half Moon Bay. The shirts were the entire inventory of FFMR clothing merchandise for sale, and we were donating them to be distributed, for free, by Coastside Hope to folks in need. But, why?

If you are a regular reader of *Between the Tides,* you've seen articles about the new initiatives that FFMR volunteers have designed and executed over the last three years. Among them are Quarterly Research Surveys, Plankton Paloozas, dock critter collection and display, preparation, preservation and display of marine algae, and more. Each of these successful, ongoing activities arose directly from FFMR's Mission Statement: *The protection and preservation of the Fitzgerald Marine Reserve as a unique intertidal and coastal environment through the promotion of educational and experiential activities for students, visitors, and researchers.*

Each of these new activities require specialized equipment and supplies, and these needed to be securely stored between uses. FFMR has a small storage hut at the Reserve, which had been filled to capacity and beyond. Unfortunately, merchandise (tee and sweat shirts primarily) occupied nearly one half of the storage unit's shelving.

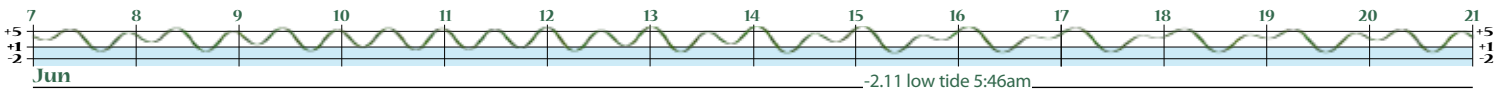
Merchandise has been offered for sale by FFMR volunteers at the Visitor Center for many years. These sales were never intended to generate revenue, and indeed, a year's sales often broke even or amounted to less income than the expenditures for the items. Long time FFMR volunteers Carol Ferguson and Ann Mangold kept all aspects of the merchandise-for-purchase going for years (thank you so much, Carol and Ann), including acquisition, sales, and accounting of the merchandise. Despite several concerted efforts over the last two years, additional volunteers could not be found to assist/take over merchandise sales, leaving only a 2- hour window on Saturdays for sales, staffed by Carol and Ann.

Due to our expanded experiential offerings at FMR, and our desperate need for storage space to support these efforts, the FFMR Board of Directors made the difficult decision to cease merchandise sales at the end of 2025. We decided that the best option, for us and the Coastside community, was to donate the tee shirts and sweat shirts to a charitable organization, Coastside Hope.

President Ron Olson and I conducted the inventory of the clothing and bagged the same sizes of shirts together. We were astounded by the sheer number of shirts – 332 in total. Coastside Hope was thrilled to receive them, right before the holidays, a perfect time for distribution.

We now have ample storage space for frequently used equipment, and a bit of room left of additional storage. The donation was a win for FFMR and a win for Coastside residents. We won't be surprised to see many people sporting FFMR shirts around town this spring. ◆

* Coastside Hope, a 501(c)(3) nonprofit, was established in 1976, and is chartered by San Mateo County to be the primary core human services agency for the San Mateo County mid-coast. Among its offerings is a food pantry, assistance for families and individuals in crisis, immigration and citizenship services, temporary housing, and much more.



Solstice Sea Star Search: Tracking Sea Star Recovery Through Community Science

by Kaua Hermosura, Volunteer Naturalist, Editorial Board Member

Purple sea star (Pisaster ochraceus,) *While deep purple individuals are abundant and striking, the species can also be found in shades of bright orange, reddish-brown, yellow, and dull brown. The color variation is a natural characteristic of the species.*

The Solstice Sea Star Search is a statewide community science program designed to monitor sea star populations during the lowest tides of the year. The survey takes place twice annually, in June and December when intertidal zones are most accessible. On December 5, 2025, participants surveyed tidepools at Fitzgerald Marine Reserve, as well as other locations along the coastline, as part of the Winter Solstice Sea Star Search, contributing observations to a long-term dataset tracking sea star abundance and distribution along the California coast.

The program was launched by the California Academy of Sciences in partnership with iNaturalist following the rapid spread of sea star wasting disease beginning in 2013. Sea star wasting disease caused widespread mortality across nearly all sea star species on the West Coast. Affected sea stars exhibit symptoms including lesions, limb detachment, and rapid tissue deterioration, often leading to death within days. While the precise causes of the disease are still being studied, its impact on intertidal ecosystems has been profound.

By continuing to participate and share observations... community members help support long-term monitoring efforts and provide critical information needed to assess the future of sea stars in California's intertidal ecosystems.

Several species experienced especially severe population declines. Sunflower sea stars *(Pycnopodia helianthoides)* declined by an estimated 94.3 percent across their range and were listed as endangered under the U.S. Endangered Species Act in 2023. Giant pink sea stars *(Pisaster brevispinus)* and ochre sea stars *(Pisaster ochraceus)*, both important predators in rocky intertidal systems, also declined dramatically. The loss of these species has altered species interactions in tidepools and nearshore habitats, including increased mussel dominance and purple urchin colonies in some areas.

Ochre sea star feeding; (Pisaster ochraceus) *Photo: Melody Ng Lee*

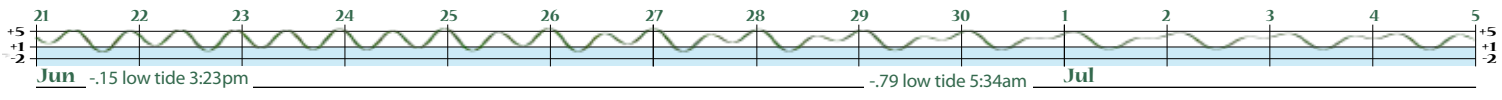
The Solstice Sea Star Search was created to help scientists track whether and where sea stars are returning. Because professional researchers cannot survey the entire coastline regularly, community participation is essential. Observations collected during the searches help identify population trends, geographic gaps, and early signs of recovery. Even observations of common species or sites with no sea stars present are valuable for understanding regional patterns.

Participants record their observations using iNaturalist, a biodiversity documentation platform that allows users to upload photos, locations, and species information. Once uploaded, observations are reviewed and identified by a combination of community members and experts. Verified observations become part of a research-grade dataset that can be accessed by scientists, land managers, and conservation organizations. iNaturalist also allows data from Fitzgerald Marine Reserve to be compared with observations from other sites along the coast.

Community participation in the Solstice Sea Star Search does not require prior experience. Individuals can survey on their own by downloading the iNaturalist app, checking tide charts using tools such as TideFinder, and visiting a tidepool site during a low tide window. Participants are encouraged to photograph sea stars without handling them and to follow all reserve regulations and tidepool etiquette to minimize disturbance to wildlife.

At Fitzgerald Marine Reserve, the Solstice Sea Star Search complements ongoing education and conservation efforts by providing a structured way for visitors to contribute to marine research. The collected data helps inform scientists about the status of sea star populations within the reserve and contributes to a broader understanding of intertidal recovery along the California coast.

The Winter Solstice Sea Star Search project page on iNaturalist allows participants to view current findings, assist with species identifications, and explore data from previous years. By continuing to participate and share observations using the hashtag #SolsticeSeaStarSearch, community members help support long-term monitoring efforts and provide critical information needed to assess the future of sea stars in California's intertidal ecosystems. ◆



Message from President Ron Olson

A hidden treasure of great wealth has been found at Fitzgerald Marine Reserve. It was not in the form of gold or jewels, but in the form of knowledge. A number of our naturalists had the foresight to collect almost all of the *Between the Tides* issues, going all the way back to the summer of 1988.* Some articles are as relevant today as they were on the day they were written. There were many articles written about marine life: algae, sea palms and sea grass, anemones, urchins and sea stars, harbor seals, visiting sea otters and sea birds. There were several articles on geology and fault studies conducted above Seal Cove. There were two articles about historic treasures removed from FMR. One was about the discovery of a baleen whale skull that was found in our cliffs. It is now being stored at the California Academy of Science. The second was the discovery of a cutting tool that was found during a project to excavate a prehistoric Native American campsite at the reserve that is located directly on top of the San Gregorio (Seal Cove) earthquake fault. The tool dates back almost ten thousand years. That treasure is stored at the San Mateo County Museum. There were a few articles about Jurgen Wienke and his attempt to develop the coast side. Frequently called "the Mayor of Moss Beach," Mr. Wienke survived the 1913 scandal of his arrest for hosting a cockfighting event. One of the "treasures" that meant the most to me was an article written by Arthur Smith, where he vividly described life while visiting his great aunt's house at Seal Cove in the early 1900s.**

Reading these articles gave me a great perspective and even greater admiration for the scope and depth of the work undertaken by our "Friends of Fitzgerald" group since their founding in 1985. From the inception of the reserve, Bob Breen looked at ways to protect our coastal environment by working to establish Marine Protected areas and reserve designations. Education was the key to achieving his goals. Our current naturalists and seal ambassadors continue this work to educate the public on the value of preserving and protecting our fragile coastline.

I would personally like to thank the County Parks staff, FFMR volunteers and our neighbors for making our December Night Tidepooling Event such a success. You can read more about this event elsewhere in this issue of *BTT*. First documented in a 1989 *BTT* issue, night tidepooling continues to be a great way to strengthen our bonds as a community.

I would also like to thank the dedicated group of naturalists that set up our last Planktonpalooza on January 24th at the Visitor Center. Collecting and returning specimens back to the harbor, as well as the time spent setting up tables and equipment was well worth the effort. The smiles on the faces of visitors and naturalists alike made for a perfect day. ◆


BETWEEN THE TIDES

FRIENDS OF FITZGERALD MARINE LIFE REFUGE

Bad Tempered Rock Crab Is A Selective Pincher

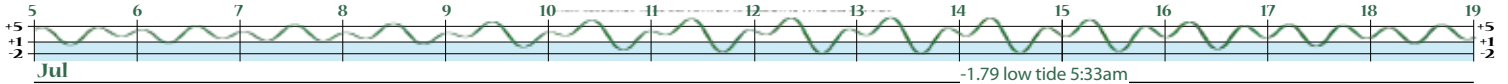
Geology of Marine Refuge Discussed on Sept. 24

BTT, Summer 1988

*One of our volunteers has scanned the back issues of *Between the Tides* and we're working to get them all on our website. Currently you can browse them back to September 2016.

**My first recollection of visiting my great uncle and great aunt at Seal Cove is when I was seven or eight (1918-19). My folks took me to Moss Beach from where we lived in Oakland. We came across the Bay by ferry and out to the Bernal Cut where we took the Ocean Shore train to Moss Beach, changing engines to get over Mt. San Pedro. I recall Chauffeur "Thomas" picking us up in a 1917 Pierce Arrow and driving us to Seal Cove

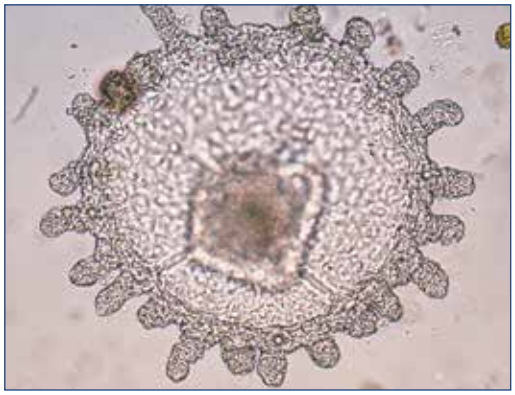
[Highlights from the rest of Arthur Smith's reminiscences] ...when a very low tide would hit we'd go out on the reefs prying off as many abalone as we could eat. We'd clean and pound them and mom would cook a wonderful meal for all of us. ... I remember the five-foot leopard shark [my dad] caught. Also, I recall my uncle bringing a large octopus up onto the beach. ...We kids would like to fill the bulbous end of kelp with sandfleas, of which there were many on the beach, and then watch the chickens go wild chasing these hopping creatures around the yard. ... we would always have our fill of artichokes which grew in abundance in a field nearby.



More Images from the new FFMR Microscopes

Imagine, each of these is smaller than the thickness of a human hair. These views are from our two new microscopes. The Stereo Microscope enables 3-D imaging of larger specimens, such as dock organisms. It can magnify a specimen so that it appears between 7X to 45X its actual size. The Compound microscope takes over where the Stereo Microscope leaves off, having magnifications of 40x, 100x, and 400x.

Polychaete Larva – A larval stage, called a trochophore, of a marine worm called a polychaete.



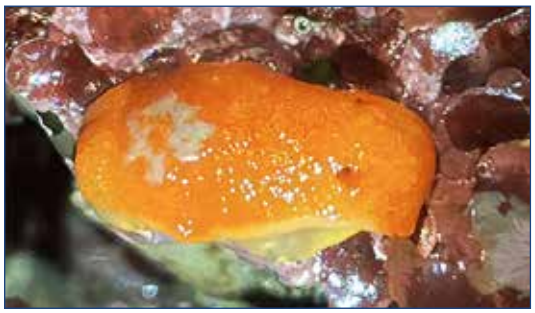
Planktonic Medusa – A free-swimming medusa, possibly a life stage of a hydrozoan (a relative of jellyfish and sea anemones).

Pseudo-nitzschia – The diatom responsible for producing the marine toxin domoic acid, which has been responsible for the deaths of hundreds of marine mammals and seabirds each year, primarily in southern California.

A large difference in size! The above specimens are actually smaller than the thickness of a human hair. In comparison these nudibranchs look large, however they are approximately as shown: 2-4 inches in length making them one of the smallest creatures seen by eye in the tidepools..

Night Tidepooling *page 1*

Many of the Friends of Fitzgerald have a soft spot for nudibranchs; their unique color and pattern expressions are mesmerizing and intricate. Seeing a new species of nudibranch is thrilling.



Noble Sea Lemon and a Sandalwood Dorid.

Friends of Fitzgerald Marine Reserve

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