

# 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  
S e p t e m b e r 2 0 1 7

## Friends of Fitzgerald Marine Reserve Seize the Day

FFMR Naturalists never fail to disappoint; the group came home with another ribbon from Half Moon Bay's annual Fourth of July parade. Led by our colorful King Neptune, we pranced, we danced, we jigged our jellies and tossed salt water taffy to children's eagerly outstretched hands. In addition to our leader, our array consisted of a giant bull whip kelp, a seal on wheels, an octopus, several jellies decorated in Fourth of July themes, and

members in FFMR jackets wearing crab hats. We departed with an uplifting feeling that is always conveyed to us by the enthusiastic Half Moon Bay community.

Representing FFMR were Juliet Bolding, Tom and Linda Ciotti, Marsha Cohen, Carol Ferguson, Paul Gater, Sasha Greenawalt, Jeanette Hyer, Dave Karlin, Janet Pelinka, Elaine Reade, Linda Theroff and her daughter Heather, and Julie Walters.

Why not join in the fun next year. Costumes are not required, but creativity is always welcome. Many members wear FFMR jackets and don crab hats as their costume. A pleasant feeling of satisfaction is guaranteed. ♦



# Friends of Fitzgerald Marine Reserve

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Moss Beach, CA 94038  
Phone: 650.728.3584  
<http://www.fitzgeraldreserve.org/>

### Board of Directors:

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### Our Mission:

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

### Newsletter Editors:

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# Nudibranch Survey at Pillar Point

by Julie Walters

Conditions were perfect for the May 27 nudibranch count at Pillar Point. It was a sunny, calm day, the water was clear, and there was a wonderful low tide of -1.7. Some new trends were observed. The overabundance of the Hopkins rose appears to have faded. The cannibalistic nudibranch, Hilton's aeolid, appears to be taking over, representing 42% of the nudibranchs observed. The most exciting find of the day was seeing a species never seen before during our counts, the *Tenellia columbiana*, also known as the British Columbia aeolid. It is found from Alaska to San Diego and feeds on hydroids. FFMR naturalists in attendance were Susan Evans, Sandi Meyers, new docent Tom Yang and Julie Walters.

Here is a summary of the 635 we saw in a two-hour period:

- |  |   |
|--|---|
| A whopping 266 <i>Phidiana hiltoni</i>   | 5 <i>Triopha catalinae</i> (sea clown)                            |
| 168 <i>Dendronotus subramosus</i> (ranging in color from white to orange to brown)             | 3 <i>Okenia roseacea</i> (Hopkins rose) We saw hundreds last year |
| 90 <i>Doto amyra</i> (these are very tiny and difficult to spot; seeing any at all is a treat) | 2 <i>Geitodoris heathi</i>  |
| 42 <i>Hermisenda crassicornis</i>  | 2 <i>Dendronotus albus</i> (a rare find)                          |
| 20 <i>Doriopsilla albopunctata</i> (sea goddess)   | 2 <i>Anteaeolidiella olivae</i> (another rare find)               |
| 13 <i>Cuthona lagunae</i> (First time we have seen this many of this species)                  | 2 <i>Cadlina modesta</i>  |
| 10 <i>Triopha maculata</i>   | 1 <i>Dirona picta</i>   |
| 6 <i>Flabellina trilineata</i> (three-lined aeolid)  | 1 <i>Limacia cockerelli</i> (Cockerell's dorid)                   |
|  | 1 <i>Aeolidia papillosa</i> (shag rug)                            |
|  | 1 <i>Tenellia columbiana</i> (a first)                            |

Next nudibranch count will most likely be either November 5th or December 31st. ♦



*Tenellia columbiana*

*Cadlina modesta*

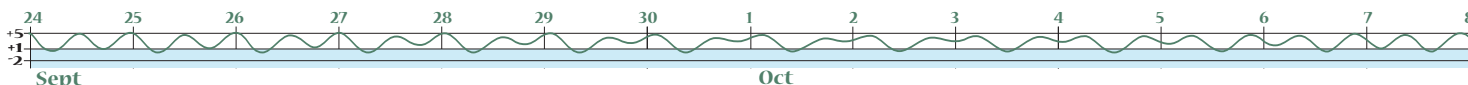
clockwise from top: *Cuthona lagunae*, *Aeolidia papillosa* (large shag rug), *Cadlina modesta* (yellow) tucked under the shag rug, two *Dendronotus subramosus* (orange), *Dendronotus albus* (white), *Flabellina trilineata* (white with reddish orange)

The graph displayed across the page bottoms shows tides for 9/24/17 to 2/11/18. Where the date appears is midnight. The reefs are accessible for exploring during low tides—at least +1 or below. This area is shaded light blue. See: <http://www.fitzgeraldreserve.org/newffmrsite/lowtides/> for a more detailed tide chart.

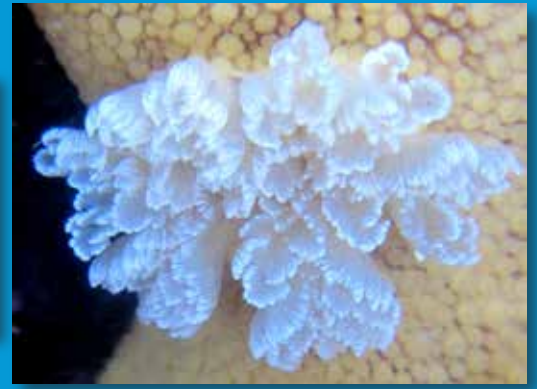
September brings in the winter afternoon low tides. They change to morning low tides in March. There are almost equally low tides several days before and several days after the noted low tide dates. The lowest low tides tend to occur around the full moon and the new moon each month.

The lowest tides this period are:

-0.26	10/9	8:18 pm	-0.52	12/18	4:50 pm
-1.11	11/6	6:08 pm	-1.70	1/2	4:53 pm
5th lowest tide of 2017			2nd lowest tide of 2018		
-0.40	11/19	5:08 pm	-0.44	1/16	4:31 pm
-1.59	12/4	5:04 pm	-1.38	1/30	3:51 pm
3rd lowest tide of 2017					

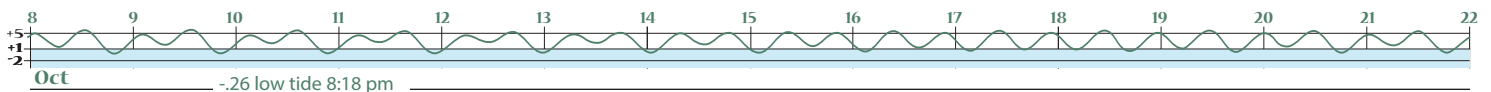
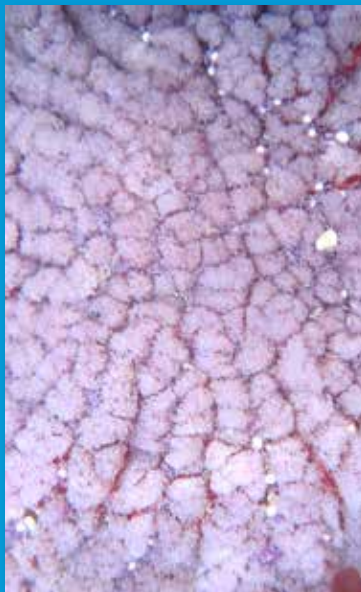
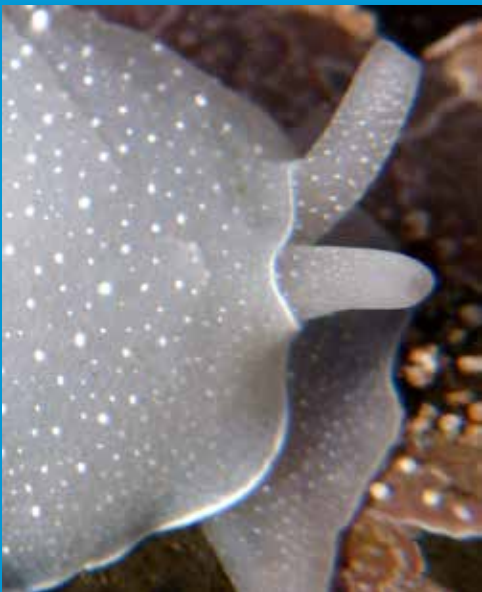
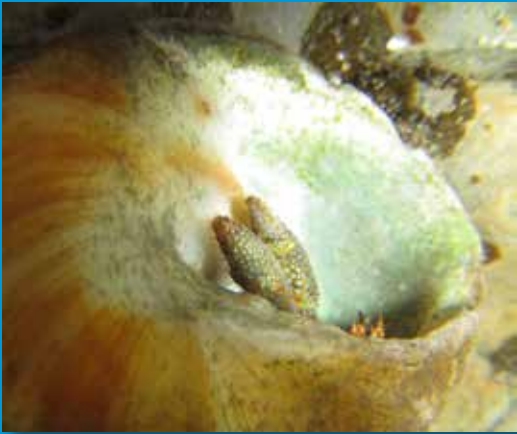






## CAN YOU IDENTIFY THESE ANIMALS?

This issue's photo page consists of close-up, detail shots contributed by Julie Walters, FMR Naturalist. Answers are on page 5.



## FFMR Summer Activities

Some people use the summer months to relax and unwind. Not so with the Friends of Fitzgerald! We use the summer months to maximize every opportunity possible. Before school ended and the “June Gloom” fog started rolling in, I was able to participate in one of



*Recipients of Friends of Fitzgerald Marine Reserve Scholarships: HMB High students Daisy Loreto, Aneesha Gharpurey and Elizabeth Pyle with teacher Joseph Centoni.*

my favorite FFMR activities: providing three five-thousand-dollar scholarships to three worthy students from Half Moon Bay High School. This year's recipients, Daisy Loreto, Aneesha Gharpurey and Elizabeth Pyle, demonstrated exemplary work in the classroom and exhibited a keen interest in the field of science. All three of these fabulous young women are now headed off to

college to continue their education. We wish them well and encourage them to stay in touch with us and come back to visit us often.

For those Coastside kids not quite ready for college yet, the Friends of Fitzgerald made their summer shine by hosting another successful Junior Naturalist Camp at the reserve (see article pages 6-7). From July 17th through the 21st, thirty-one young campers were treated to “Science By The Sea”—our first STEM\*-focused Junior Naturalist Camp. The young campers truly embraced the scientific aspect of camp this year, and I'm already thinking up some new science-based ideas to add to their camp workbook activities for next year.

I want to give a special thank you to all of the FFMR volunteers and rangers Katherine Wright and Rob Cala who helped make this year's camp so very special. I want particularly to acknowledge Casey Passmore, who served her second year as the camp leader. As I have mentioned before, there is a great deal of planning

and setup that goes into this camp and it truly takes a village of volunteers to make the magic happen. The Friends of Fitzgerald and the San Mateo County Parks are so very lucky to have you and we thank all of you for sharing your talents with us and with our young campers.

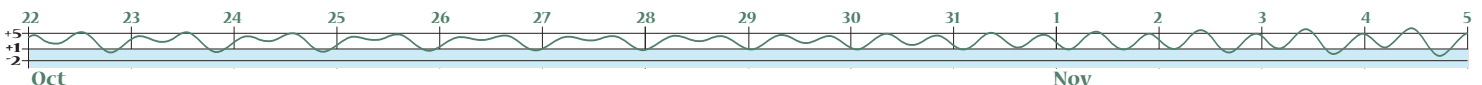
And speaking of a village of volunteers—thank you so much to the SEVENTEEN volunteers who came out August 12th to help commemorate “Get Into Your Sanctuary Day.” The National Marine Sanctuary Campaign encouraged people to enjoy their National Marine Sanctuaries across the country by raising awareness of and celebrating the sanctuaries. The Greater Farallones National Marine Sanctuary (GFNMS) organized and led several small events over the weekend, and Friends of Fitzgerald Marine Reserve celebrated the day in style.

The highlight of my Sanctuary day was sharing time with veteran volunteers Kumi Isheida and Betty Sills. Kumi set up her “Please Touch” display on the front deck of the Visitors Center and encouraged children to pick up shells and fossils, to pet pelts and to play her



*Kumi Isheida and FFMR Sanctuary banner*

mystery game. A pink box containing shells, rocks, sponges, sea stars and other marine objects was on display. Kumi set out flashcards that corresponded to each object in the box. Young visitors were encouraged to place a hand inside a sleeve that extended into the box, and identify (by touch only) objects that corresponded to the flashcards.





While Kumi held court at the Visitor's Center, Betty Sills set up her Seal Stand at the top of the ramp to the beach. Salia, a life-sized harbor seal (handmade by Betty), was the grand dame of the seal display. Betty also supplied seal and otter pelts as well as flashcards, posters and info sheets on pinnipeds in general and our lovely resident harbor seals in particular.

In addition to the information stands manned by volunteers at the ramp and the hut, we also had volunteers perched at the cone line and on the bluff armed with binoculars and spotting scopes to share views of the seals with our visitors. Ranger Rob Cala led a Whale Walk and Talk and we had volunteer rovers out in the tidepools at both beaches.

Mother Nature helped us celebrate Sanctuary Day also by providing perfect weather conditions, whales that were present in front of the reserve almost all day, flocks of pelicans that flew over our heads constantly, and sea stars that sparkled from the depths of the tidepools at low tide. It was a magical, special day indeed, and to have the opportunity to share this day with seventeen volunteers made it all the more special. Thank you, all of you, who came down to help celebrate our sanctuary--Fitzgerald Marine Reserve. It's your enthusiasm, knowledge and love for what you do that makes lasting memories for our visitors.

And lastly, I would like to acknowledge and thank the Kirby Foundation Fund at the East Bay Community Foundation for their recent generous donation. The donation made to us is on behalf of Vlad, Celina and Nora Tenev. As you know, the Friends of Fitzgerald Marine Reserve is a non-profit group of volunteers who work hard to improve the reserve and educate and inspire our visitors. Donations to our cause have a huge impact on what we can do in the future. Thank you Kirby Foundation and thank you to our other donors who help fund our activities and improvements. We have added a "Donate Now" button to our website and to our facebook page and encourage you to share the link with friends and family who have joined you in enjoying the beauty of Fitzgerald Marine Reserve.

With gratitude,  
Kathleen Hayes



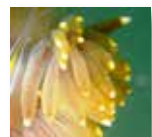
Betty Sills shows her harbor seal "stuffie" Salia to young visitors.



### CAN YOU IDENTIFY THESE ANIMALS? (from page 3)



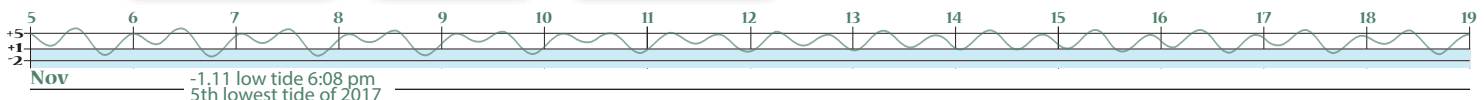
left to right:  
tubercles on the back of a sea lemon nudibranch  
sea lion  
sea lemon nudibranch gill



left to right:  
hermit crab  
*Hermisenda crassicornis* nudibranch  
knobby star



left to right:  
*Berthella californica* rhinophores  
sunflower star  
sunburst anemone





# Junior Naturalists Learn Science by the Sea

by Casey Passmore



*The Junior Naturalists explored the tidepools as often as possible.*

During the week of July 17-21, the Friends of Fitzgerald Marine Reserve and the San Mateo County Parks Department co-hosted a Junior Naturalists Camp focused on “Science by the Sea.” This is the fourth year in recent history that the camp has been offered and it set an attendance record, with 31 campers aged 8-12. Although the lowest tide of the week was only +1.5 feet, the campers and naturalists had a great time exploring the tidepools and many other areas of the reserve.

On their first morning, the Junior Naturalists spent over two hours exploring Seal Cove and were thrilled by the animals they spotted. In the



*left: Coloring, cutting out, and gluing harbor seal puppets as part of Ranger Power Hour*

*below: Showing off the jellies they created from paper lanterns.*

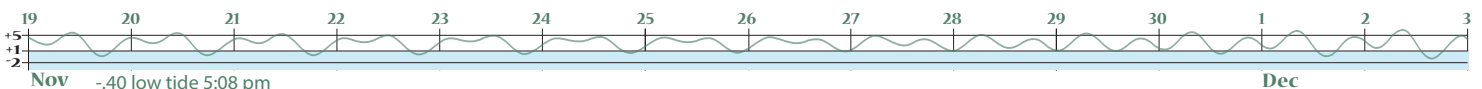


afternoon, Ranger Katherine Wright led Ranger Power Hour, in which the campers learned about the largest residents of the reserve—harbor seals. They made seal puppets and decorated personal notebooks that they used all week.

The focus for day two was on Plants of the Reserve, introduced by Ranger Katherine through an activity explaining the ways the Ohlone People used the native plants in the area. After a Native Plant Scavenger Hunt, the Junior Naturalists were trained in restoration techniques by Ranger Michelle Laskowski and Park Intern Jana Ng. They then employed these techniques enthusiastically: pulling invasive weeds, flagging native plants, and mulching along the Dardanelle Trail, where natives had been introduced a few years before. Be sure to check out their great work the next time you visit the reserve.

In order to take a closer look at plants, the Junior Naturalists built portable microscopes out of paper and tiny spherical lenses. They worked carefully for over an hour punching out pieces and making complicated folds and tucks to create their very own Foldscope. Thanks to Tom Ciotti who secured for us these amazing field microscopes from Foldscopes (<https://www.foldscope.com/home>) that the campers could wear around their necks and magnify specimens up to 140x!

Wednesday’s focus was on understanding the importance of Marine Protected Areas (MPAs). The Junior Naturalists painted scenes of animals protected by MPAs onto cork trivets and fabrics. They participated in an MPA Scavenger Hunt as they explored the tidepools. During Ranger Power Hour, Ranger Katherine led Bird Olympics, in which the Junior Naturalists figuratively competed against birds—racing peregrine falcons, trying to stand on one leg longer than a Great Blue Heron, and more. Rangers Rob





Cala and Miranda Holeyton showed them whale and MPA videos on the large monitors in the Visitors Center, while I taught groups about MPAs using maps and materials provided by [california-mpas.org](http://california-mpas.org).

Taking advantage of the morning's high tide, day four started off with campers using plankton nets to collect plankton at the bottom of the ramp. Assisted by the Foldscopes Community Outreach team, campers then used their paper microscopes to view plankton! Naturalists Glenn Gulteban and Karen Kalumuck also helped groups to use a traditional compound microscope to examine the plankton. The Half Moon Bay Review's coverage of Plankton Day can be viewed here: [http://www.hmbreview.com/talkabout/environment/junior-naturalists-become-fitzgerald-friends/article\\_febc3932-7223-11e7-9d3d-370773558f5c.html](http://www.hmbreview.com/talkabout/environment/junior-naturalists-become-fitzgerald-friends/article_febc3932-7223-11e7-9d3d-370773558f5c.html)

During the afternoon of Plankton Day, the Junior Naturalists put their engineering skills to work as Ranger Katherine led a "Design a Plankton" challenge. The campers worked in groups to build plankton that would sink slowly, like real plankton that employ a variety of adaptations to fight against gravity to stay in the euphotic (sunlit) zone of the ocean.

On the final day of camp, the Junior Naturalists created beautiful hanging jellies from paper lanterns. Then they received their official Junior Naturalist certificates, as well as Junior Naturalist badges and an official animal pin like those awarded to the naturalists each fall. The final afternoon was spent with Ranger Rob learning how to use compasses. The Compass Challenge guided the Junior Naturalists to special locations all over the reserve until they found a buried treasure at Seal Cove. The campers enjoyed the treasure (i.e., candy), sun, sand, and tidepools before the final goodbye.

Huge thanks go out to Ron Olsen, Juliette Applewhite, Brent Tietjen, Allison Adams, Debbie Landman, and Charlotte Gerzanics, who served the entire week as the group leaders for our

six groups of Junior Naturalists. They ensured the camp was a success and flowed smoothly. Thanks also to Linda Ciotti for handling camper registration, recruiting the volunteers, and for assisting with setup and cleanup each day. Thanks to FFMR President Kathleen Hayes for being part of the planning committee and planning some of the week's crafts and activities. Lastly thank you to Ranger Katherine Wright for dealing with all the legal paperwork, planning the Ranger Power Hours, coordinating other Rangers, leading songs with guitar, and being a fantastic co-leader with me! ♦

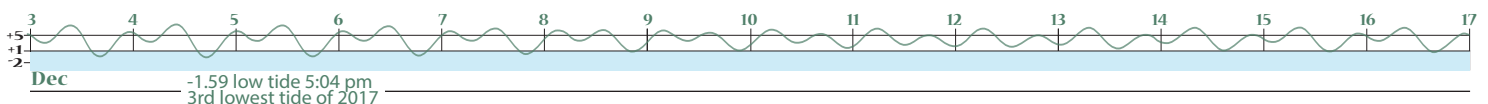
--- Congratulations to Casey for leading yet another successful camp, and this one during her ninth month of pregnancy! ---



*Ellie was the first to find the buried treasure using her compass.*

*below left: Everyone worked hard to build their Foldscopes. below right: Ranger Katherine Wright played guitar and led the group in ocean-themed songs.*

*bottom left: Using plankton nets at high tide was a big hit. below right: The campers worked for over an hour on native plant restoration and many wanted to return to their tasks after lunch.*



# Colors We Cannot See

by Lauren Anderson

<sup>1</sup>synesthesia: the production of a sense impression relating to one sense or part of the body by stimulation of another sense or part of the body

<sup>2</sup>cyborg: a fictional or hypothetical person whose physical abilities are extended beyond normal human limitations by mechanical elements built into the body

<sup>3</sup>tetrachromats can see colors that most people cannot—up to 100 million, estimates suggest, which is 100 times that of the average human. Most people have three cells, or receptors, in their retinas, but tetrachromats have a fourth receptor, which may be what allows for their heightened color perception

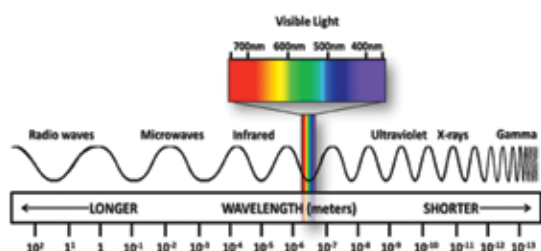
The mantis shrimp can perceive both polarized light and multispectral images; they have the most complex eyes in the animal kingdom. Human eyes have color receptors for three colors (red, green, and blue); the mantis shrimp has receptors for sixteen types of color, enabling them to see a spectrum far beyond the capacity of the human brain. Seriously, how cool is the mantis shrimp: [mantisshrimp.uchicago.edu](http://mantisshrimp.uchicago.edu) What might they be able to see that we cannot? What are we missing?

—Inspired by Tess Moran, Class of 2016.

When I was about twelve, I read a book called *A Mango-Shaped Space*, by Wendy Mass. The novel follows a young girl, Mia, as she is diagnosed with synesthesia.<sup>1</sup> I absolutely loved this book, primarily because of the descriptions of how Mia saw colors when she heard sounds or looked at letters and numbers. At one point, Mia gets acupuncture, and sees clouds of color around people for days after. While nothing in the book suggests that Mia can perceive any colors outside of the normal spectrum of human vision as the mantis shrimp can, *A Mango-Shaped Space* captivated me because I felt that I was blind to something in our world.

Mia's descriptions of music particularly fascinated me. The shapes and colors she associated with different instruments seemed to me a tangible representation of the way I've always felt about music. At times in orchestras, we talk about the color and the texture of the music, and most musicians understand the difference between a bright color and a soft one, but I'd never heard anyone tell the orchestra to be "less red," for example.

It was similar to the way I felt in chemistry the first time I was shown a diagram of the electromagnetic spectrum. This picture showed me, again, just how limited my eyes were:



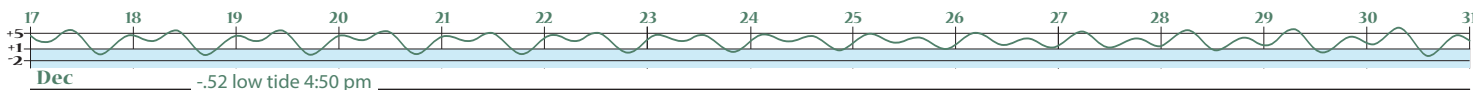
The visible light portion is .0035% of the spectrum! It absolutely blew me away that radios and x-rays and the color green are all the same kind of wave. I tried to imagine what microwaves might look like, what color they might be, but of course I can't imagine a color I've never seen. My psychology textbook claimed that our brains cannot create faces from scratch, so every face we see in our imagination or dreams is a composite of features we've seen on other people, regardless of whether we remember seeing them or not. →



Peacock Mantis Shrimp (*Odontodactylus scyllarus*) photo: Silke Baron

Mantis shrimp aren't shrimp at all; they're stomatopods, distant relatives of crabs, shrimp and lobsters. There are about 550 species found in shallow, sub-tropical and tropical waters. A difference in the appendages divide mantis shrimp into two main types: those that impale their prey with spear-like structures and those that smash prey with a powerful blow from a heavily mineralized club. Pound

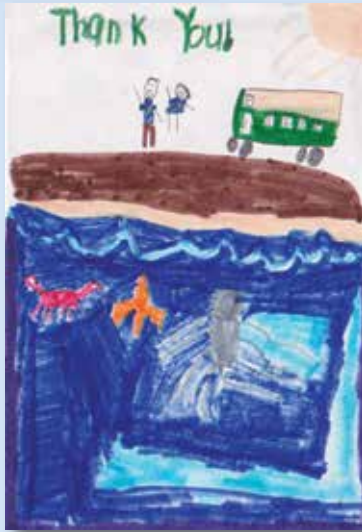
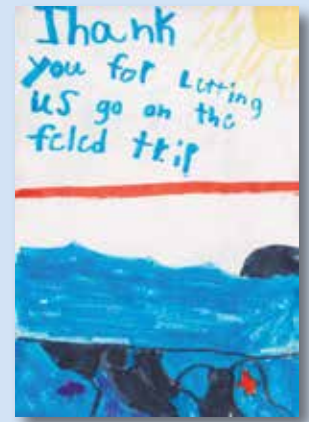
for pound they are one of the strongest animals in the world and strike with lightning speed. They can learn and remember well, and are able to recognize individual neighbors by visual signs and individual smell. Scientists are studying the mantis shrimp eyes in an attempt to build small cameras that can see cancer cells at very early stages. ♦





## Thank You Letters

A few of the wonderful, artistic thank-you notes from students at Lorenzo Manor Elementary School in Hayward. FFMR offers funding for transportation to the reserve each year.



While this claim is disputed, trying to visualize the ultraviolet spectrum felt like trying to create a new face—my brain simply did not have the information to do so. The best I could do was impose the standard rainbow onto the spectrum like infrared cameras do. I again had the overwhelming sense that I was missing something amazing, that it was right there in front of me, and I couldn't reach it.

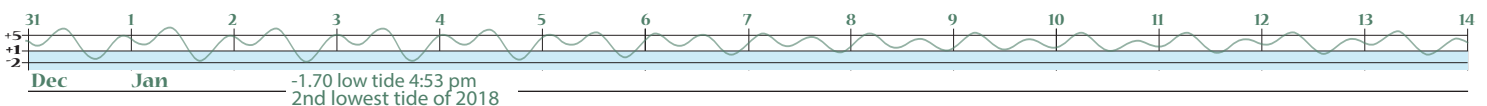
Neil Harbisson, who calls himself the first cyborg,<sup>2</sup> has pushed the limits of what humans can see. Harbisson was born with a condition that didn't allow him to see any color, but in 2004 he had an antenna implanted into his brain that translates colors into sound frequencies. By memorizing the sounds, he can "see" colors. His antenna also has pitches for portions of the infrared and ultraviolet spectrums, and he "sees" those colors in the same manner as red, green, or purple. Does this count as seeing? As far as I know, Harbisson's antenna doesn't change his visual perception of the world.

What about people who have four types of color receptors? Researchers estimate that up to 12% of the female population are tetrachromats,<sup>3</sup> but the vast majority don't use the fourth type of cone cell. Many tetrachromats might not even know that their vision surpasses normal limits, because color is a subjective experience. There is no way, for example, to prove that I see red the same way my mother does.

All of these experiences, from *A Mango-Shaped Space* to people with what is essentially a hidden superpower, show that there is indisputably a set of experiences that I am missing. And I will never know what Neil Harbisson or Mia or tetrachromats can see. Like Mia said in the novel, "All those people in their black-and-white worlds—they have no idea what they're missing." ♦

The article was written for a college application. Lauren will be attending Brown University this fall.

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# Enthusiastic Docent, Jeanette Hyer



Jeanette, Camila and Arturo



Jeanette and Numi

*...one day, I chaperoned my daughter's class trip to FMR and fell immediately in love with that underwater garden!*

I grew up in Connecticut, and even though the state has a nice long coastline, I was rarely exposed to the ocean as a youth. After going even further inland to attend the University of CT, I then high-tailed it to NYC for work and some more education. There I met my husband Arturo, and that's where my two daughters were born. In 2000, we all relocated to the Bay Area, to work at UCSF.

I work on eye development, specifically the morphogenesis of the visual organ itself (lens and optic cup and muscle), and how all the different parts are derived and aligned to make vision work. I use a developing chick embryo as a model system for this work. It's a bit esoteric, but we have described how the anterior parts of the eye cup (the iris and the ciliary body) are specially derived from the neighboring light sensing portions, and how the central and peripheral retina have different origins/histories in the developing embryo (which might tell us why the central is sometimes specifically targeted in some retinal degenerations). I find it very thrilling to try and pick apart the mechanisms working to create this complicated organ. A visual sense is one of those wonders of evolution; it is such an advantage that every organism got some kind of eye and the variety is simply amazing. Ironically, I can't put in contact lenses, take out an eyelash for someone, or watch any eye surgery because human eyes make me faint; I'm not a medic so it hasn't hindered me professionally.

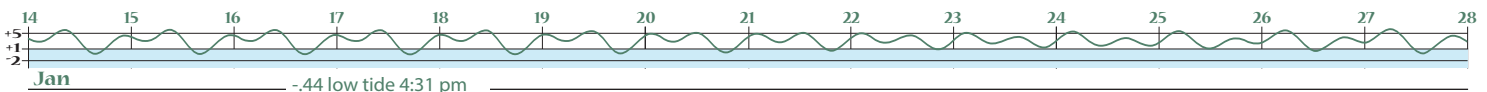
When we first moved to California, we lived for about two years in San Francisco, in the inappropriately named Sunset District. After many, many months of looking, we eventually found a house on Kings Mountain, basically up the hill from the ocean. Our address is usually a mile uphill from where the marine layer reaches. Because it seemed so promising, gardening is a big hobby of mine. Alas, it may be sunny, but it's not that warm, and the only things that do really well are chards/kales and plum trees. Lots of my summer weekends are spent turning plums into jams, tarts, juices, dried fruit bars, and wine (not successfully yet with the wine).

I discovered the marine reserve serendipitously. Even though FMR was just down the road, as new Californians we were not experiencing much work-life balance and did not get out much to explore around the coastsides. Then one day, I chaperoned my daughter's class trip to FMR and fell immediately in love with that underwater garden! I somehow found that the Friends offered an amazing naturalist class, there was an available space, and before I knew it I got a huge amount of information on my adopted "backyard."

That was maybe six years ago by now, and being a docent for school field trips is still my favorite part of the FMR duties. It is really a privilege to share our local treasure with the next generation, and even though many of them might seem distracted and not paying attention, you cannot predict what will stick in their minds to burst out later when they are fully formed. Every single visit reveals something amazing, whether it is thousands of by-the-wind-sailors on the beach or mating season for kelp crabs; it's all there waiting for a visit. These kinds of field trips are indelible experiences for the school kids and might be the only time they get to the ocean, especially if they have parents who don't like sand (as mine didn't). In every school group there is at least one kid, and usually ten, who are thrilled by the freshness of the ocean and all the little mini-worlds that are created on the reef, and it is always a great feeling to be able to help reveal some of the secrets to them.

I also really enjoy our group of like-minded, fun-loving salty naturalists. We have the best docent times! No stuffy museums for us! Lots of fresh air and sea breezes seem to keep us all in the best of spirits, with something for all to sink their teeth into.

I don't get to FMR nearly as often as I would like to. Each January 1st my resolution list has "Get Thee to the Tidepools" as the first item. However, this year I sent my youngest off to college, and now the hours of the day seem to be expanding, not contracting, so I am optimistic that I can get to that resolution in a meaningful way. ♦





# Identifying Anemones at Fitzgerald Marine Reserve

by Sasha Greenawalt and Janet Pelinka

It is not difficult to find an anemone because some form of this animal is almost always nearby. While they may look like plants, most anemones are carnivorous and use fighting tentacles to sting their prey and defend their territories.

Often referred to as a flower, the **giant green anemone** (*Anthopleura xanthogrammica*) is probably the most easily discovered in the tidepools because of its size and bright green color. It can measure as much as 10 inches across and 12 inches high. Algae live inside the anemone and provide nutrients and oxygen in exchange for a safe home. This species can live for as long as 100 years, and has been used as the source of a heart stimulant for vertebrates.



photo: Monterey Bay Aquarium

The most ubiquitous anemone in the reserve is the **aggregating anemone** (*Anthopleura elegantissima*). Individuals measure only one to two inches in diameter, but colonies of this animal can carpet large rocks or line a crevice.



photo: Google images

When it closes its pale green tentacles (with pink or purple tips), it covers itself with bits of shell and looks like a strange, soft, rocky lump. This creature usually reproduces by cloning (less often by broadcast fertilization). Look closely and you may find that a “no man’s land” separates families with unlike DNA.

Sometimes confused with the giant green anemone is the **sunburst anemone** (*Anthopleura sola*). While it is also usually green in color, it can be distinguished by the sunburst pattern of radiating lines on its oral disc. Found in mid to low intertidal and shallow zones, this animal lives as long as 50 years in solitary existence. Oddly, hermit crabs have been observed to walk all over this anemone without provoking an attack from its stinging tentacles.

The **brooding anemone** (*Epiactis lisbethae*), has only recently been recognized as a distinct species. It has white pinstripes over the entire animal, grows to three inches across and can carry several hundred young in five rows on its column. It grows its eggs in the digestive cavity. The young exit through the mouth and attach themselves to the middle of the parent’s column. They have a free-swimming larval stage.

The pinstripes on the **proliferating anemone** (*Epiactis prolifera*) are found only on its base. Much smaller than the brooding, it grows to slightly more than one inch. Fertilized eggs are expelled onto the disc inside a mucus sack and moved to the column where the young hatch (as many as 30 in a

*continued on page 12*



photo: Google images



photo: Google images

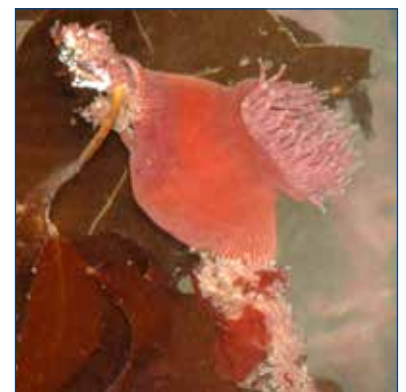
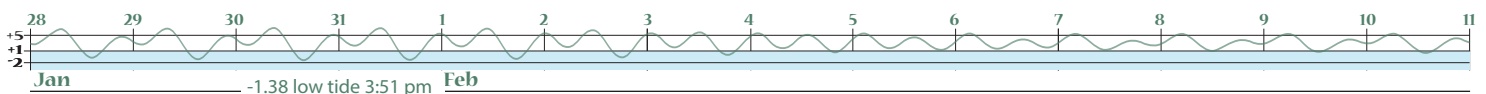


photo: Dave Cowles



Have you heard/seen thousands of birds in a feeding frenzy around Pillar Point? Thanks to an article in *Bay Nature* by HMB resident Donna Pomeroy, here's what was happening: <https://baynature.org/article/ask-naturalist-many-birds-beach-one-time/>



Not surprisingly, seabirds and a fishing boat are attracted to the same school of fish off Half Moon Bay. (Photo by Donna Pomeroy)



A feeding frenzy on the beach in Half Moon Bay (Photo by Donna Pomeroy)

**Anemones** continued from page 11

single row) and develop for three to four months. All young begin as females and become hermaphrodites.



photo: Kirt Outbank (2007)

The **beaded anemone** (*Urticina coriacea*) grows up to four inches across, with short red and grey tentacles with white bands. Found in the low intertidal zone, this species usually is attached to a rock below the sediment with only the oral disc exposed. The tentacles, which occur in 4 whorls, are stubby, blunt and banded, often in red and grey. Not much is

known about the diet of this species although it is thought to be a predator like other anemones. Its chief enemy is the leather star.

Also found buried in sand and gravel is the **moonglow anemone** (*Anthopleura artemisia*). Measuring up to three inches in diameter, only the disc and bright pink, orange, green or blue tentacles with distinctive white bands are noticeable. At low tide their presence is marked



photo: Alison Young, California Academy of Sciences

by a bump or a puckered hole in the sand. These solitary animals are known to attack other animals that are nearby. They can divide by cloning. They get their name from the luminous quality often exhibited by their tentacles. ◆

## Friends of Fitzgerald Marine Reserve

Membership Secretary, P.O. Box 669, Moss Beach, CA 94038, or through our website: [www.fitzgeraldreserve.org](http://www.fitzgeraldreserve.org)

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