

# 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  
December 2016

## Morris, The Very Lonely Gannet

by Mary DeLong

Fitzgerald Marine Reserve has had a rare visitor this year, a Northern Gannet. The Northern Gannet, *Morus bassanus*, is a species of booby and an Atlantic seabird that has never before been known to have been seen in the Pacific Ocean. Most likely the bird flew over the Arctic Sea in 2012 when the sea ice levels reached a record low.

Morris, as some birders have dubbed him because of his Latin name, was spotted at the Farallon Islands on April 25, 2012. In 2014 and 2015 he spent the breeding season on Alcatraz with the Brant's cormorants. According to Michael Pierson, a park ranger at Alcatraz, he is assumed to be a male because he has been seen displaying to the Brant's cormorants. The cormorants are not fond of him because he takes up valuable breeding space. Poor Morris, his love calls will not be answered.

Normally, Northern Gannets hang out in large colonies on rocky islands. In North America, the Northern Gannet breeds in only six well-established colonies: three in the Gulf of St. Lawrence, Quebec, and three in the North Atlantic off the coast of Newfoundland. In the eastern North Atlantic, it is distributed in 32 colonies from the coast of Brittany in France northward to Norway.\* The Northern Gannet is the largest of three gannet species. They can plunge dive at speeds of 60 miles per hour and penetrate the surface to 50 feet. They will forage offshore and winter at sea.

"This year the Northern Gannet has indeed been spending more time in San Mateo County than elsewhere. Even on the Farallon Islands, where it has most regularly been seen since it arrived in California, it has not been as regular as it has at Pillar Point," reports Alvarillo Jamamillo, a local bird expert. Information gleaned from CalBird, a database of sightings, shows it has been spotted on Devil's Slide Rock, Pedro Point, Año Nuevo and often at Sail Rock near Mavericks. This writer saw him at Fitzgerald Marine Reserve on August 10, 2016, at Ross Cove. He is very distinctive with black wingtips and a yellow face. Hopefully, visitors to the reserve will get a peek of him one day.

\*Cornell Bird Lab of Ornithology



*Northern Gannet in flight, Credit: Google Images*



*Northern Gannet with Brant's Cormorants, Credit Jack Sutton*

## Friends of Fitzgerald Marine Reserve

P.O. Box 669  
Moss Beach, CA 94038  
Phone: 650.728.3584  
[www.fitzgeraldreserve.org](http://www.fitzgeraldreserve.org)

### Board of Directors:

Joseph Centoni  
Linda Ciotti  
Tom Ciotti, *Vice President*  
Marsha Cohen  
Susan Evans  
Kathleen Hayes, *President*  
Roger Hoppes  
Bill Kennedy, *Secretary*  
Karen Madsen  
Dr. Tom Niesen  
Ron Olson  
Carol Preston  
Hope Suchsland, *Treasurer*  
Julie Walters

### Our Mission:

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

### Newsletter Editors:

Janet Pelinka  
Sasha Greenawalt

### Design and Production:

Martie Bateson Sautter  
Sautter Graphics and Print

### Webmaster:

Sandy Emerson

### Banner photo:

Rob Cala

# December 2017 Nudibranch Count

by Julie Walters

On Monday, November 14th, seven nudibranch enthusiasts, including five FFMR naturalists, took advantage of the -1.2 low tide at Pillar Point to see how many nudibranchs they could count within a 2-hour time frame. It was 100!

Fitzgerald docents have been conducting nudibranch counts since 2010. Depending upon the conditions, wave action, tide, number of volunteers, knowledge of volunteers and water clarity, we have seen anywhere from 32 to 900 nudibranchs within that 2-hour time frame.

For the first time in over three years, the Hopkins Rose (*Okenia rosacea*) was not the predominant species. This time the count was dominated by the cannibalistic nudibranch, Hilton's aeolid, or *Phidiana Hiltoni*. The second most common species was *Triopha maculata*, a beau-

tiful bright orange nudibranch that goes through some varying color changes. It appears that the Hopkins Rose population explosion has dissipated. Now, we are seeing mostly sea goddesses (*Doriopsilla albopunctata*) and Hilton's aeolid. There have also been reports of the Spanish Shawl (*Flabellina iodinea*) at Pillar Point, although we did not see one during our count. This species is moving northward, so keep an eye out for this vivid purple and orange beauty.



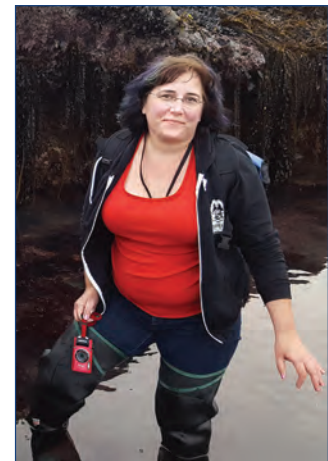
*Spanish Shawl (Flabellina iodinea)*

We had a total of 7 volunteers: FFMR naturalists Susan Evans, Karen Kalumuck, Anne-Ly Crump-Garay, Steve Slomka, Julie Walters along with Jean Repliicon who teaches

at Mission College and Brenna Green who studies nudibranchs at the California Academy of Sciences and San Francisco State. One of the highlights of the afternoon was being able to observe a green flash right after a beautiful sunset! ◆



Volunteers Julie Walters, Anne-Ly Crump-Garay, Steve Slomka, Karen Kalamuck, Jean Repliicon, Susan Evans



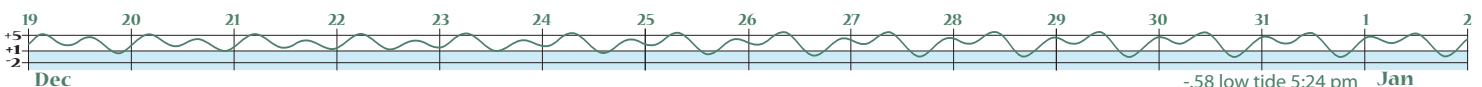
In the tidepool, Brenna Green

The graph displayed across the page bottoms shows tides for 12/19/16 to 5/8/17. 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. Some low tides aren't listed if they appear during the night. See: <http://fitzgeraldreserve.org/resources> and click on "Tides" for a more detailed tide chart.

*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 tide of 2017 will be May 27, -1.80 at 6:32 am*

The lowest tides this period are:

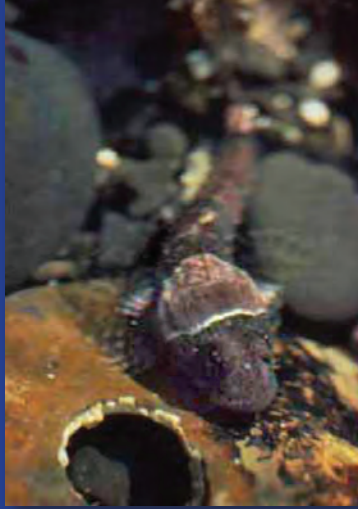
-.58	12/30	5:24 pm
-1.35	1/12/17	4:38pm
5th lowest tide of 2017		
-.55	1/28/17	5:02 pm
-.90	2/9/17	3:28 pm
.33	2/25/17	3:38 pm
-.39	3/9/17	2:35 pm
-.39	3/31/17	7:53 am
.11	4/15/17	8:05 am
-1.28	4/28/17	6:45 am







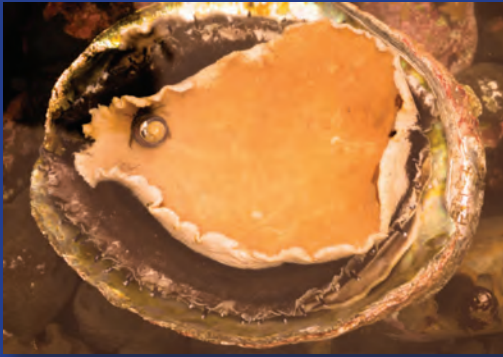
Sunflower Sea Star (*Pycnopodia helianthoide*) ♦ SCOTT SNOW



Sculpin ♦ MARY WICKSTEN  
Texas A&M University



Ghost Shrimp (*Lepidophthalmus turneranus*) ♦ SCOTT SNOW



Inverted Red Abalone (*Haliotis rufescent*)  
♦ STEVE SLOMKA



Hopkins Rose (*Okenia rosacea*)  
♦ JANET PELINKA

**We Want Your Photos**

We thank these wonderful photo enthusiasts for sharing their photos with the BTT community. Please send your submissions to: <http://jpelinka2@yahoo.com> We welcome photos from everyone: kids, amateurs and professionals!

Correction to September BTT: Photos of the Nudibranch and Ochre sea stars were by Tom Niesen



*Acanthodoris lutea*  
♦ SCOTT SNOW



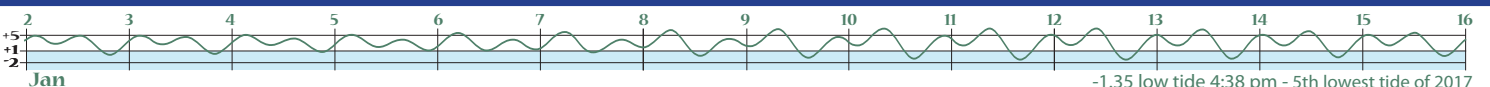
Leather Sea Star (*Dermasterias imbricata*)  
♦ SCOTT SNOW



*Triopha maculata*  
♦ SCOTT SNOW



Woody Chiton (*Mopalia lignosa*)  
♦ SCOTT SNOW





# Hello Friends of Fitzgerald Marine Reserve and Happy Holidays to All of You!

by Kathleen Hayes

*We're also working on a project to digitize the past three decades of Between the Tides newsletters to make them searchable by keyword and topic from our FFMR website.*

*We are now faced with the threat of drones flying overhead and spooking the seals all in the name of a good video.... [We] are working with the county to take steps to make the reserve a "drone-free" zone.*

As this year closes out, the entire board would like to thank all of you for all that you do to support our cause to protect our precious reserve and educate the public about the treasures it holds. We have had a blast this year providing tours to over 3000 school children, participating in community activities, granting scholarships to our local high-schoolers and protecting our harbor seals.

One of the things I would like to do as President of the Board of Directors is to bring technology into play to help us with our mission. This past year we made some strides on that front by making our *Between the Tides* newsletter available to you now in full color. We're also working on a project to digitize the past three decades of *Between the Tides* newsletters to make them searchable by keyword and topic from our FFMR website. This will allow us to bring the magic of our coast to all corners of the world, and we hope it will make our FFMR website the "go-to" location for anything relating to tidepools and sea creatures.

Along the lines of bringing tidepools to all, we are also exploring funding a project that will bring an app, specific to the Fitzgerald Marine Reserve, into the hands of anyone who wants to learn more about the reserve. We are still in preliminary stages of the project, but ultimately we

hope to help fund the efforts to adapt a free app in use at other marine protected areas by adding content specific to our reserve. I will keep you posted as the project progresses.

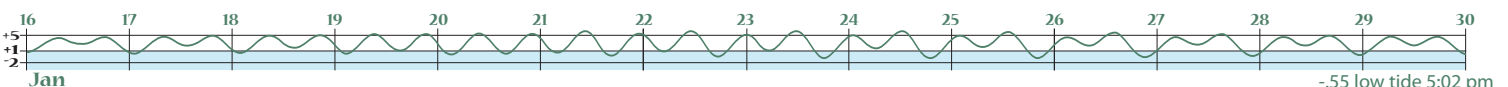
Sometimes technology can be a burden to the reserve and that is also something that we're working to address. As you know, we spend extensive volunteer hours seal-sitting to make sure that visitors stay a safe distance away from our harbor seals. And for the most part we are capable and successful, providing them with a safe and quiet space to haul out and rest. But we are now faced with the threat of drones flying overhead and spooking the seals all in the name of a good video. We are very much aware of this problem and are working with the county to take steps to make the reserve a "drone-free" zone.

These are just a few of the initiatives we have accomplished and we look forward to accomplishing much more in the upcoming year. If you have any ideas of your own on how we can improve the Fitzgerald Marine Reserve experience I am always open to suggestions and look forward to your feedback. Feel free to email me at [khayes2008@gmail.com](mailto:khayes2008@gmail.com)

Have a safe, fun-filled holiday!

Kathleen

*Left to right, bottom row: Linda Ciotti, Bill Kennedy, Karen Madsen, Tom Niesen, Hope Suchsland, Kathleen Hayes, Thomas Ciotti, Carol Preston, Ron Olsen; Top Row: Joseph Centoni, Barbara Dye (guest), Roger Hoppes, Marsha Cohen; Missing are Susan Evans and Julie Waters*



# 2016 Annual Volunteer Appreciation Luncheon



*Linda Ciotti gives Park Aide Bonnie MacCurdy special mention*

The sun was shining brightly on Saturday, September 17, when Linda Ciotti welcomed 47 FFMR naturalists and 13 guests who gathered at the Half Moon Bay Yacht Club for the annual appreciation luncheon of delicious barbecued ribs, sliced turkey breast, and all the fixings.

After lunch, Linda began presentations by giving special recognition to Park Aide Bonnie MacCurdy. Bonnie was

hired by San Mateo County Department of Parks in cooperation with FFMR with a primary responsibility of protecting the reserve's harbor seal population. Her presence has been a huge asset, and she has done an outstanding job helping to keep the seals safe and undisturbed. She also participated in this year's Junior Naturalist Summer Camp.

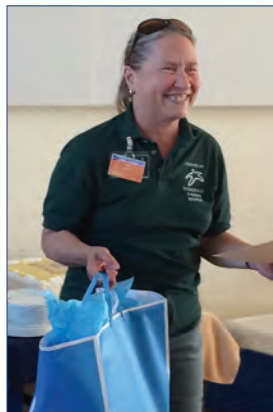
This year the Sea Star award went to Juliette Applewhite. This award is given to a naturalist from the most recent training class who has demonstrated a commitment to FFMR through enthusiastic participation. Juliette began volunteering as a Seal Sitter in 2015 and took the naturalist training class in 2016. She has conducted several tours and was a week-long counselor at this summer's Junior Naturalist Camp.

The Ginny Award is given to a long-standing naturalist in recognition of the many contributions that person has made to FFMR. This year the award went to Carol Davies, who has been a naturalist since 2010. Carol has been a steady and reliable tour leader, and has frequently participated in the July 4th Parades in Half Moon Bay, wearing a costume or engaging the kids with her harbor seal puppet. She has also helped with many community events in which FFMR was a participant. She enjoys roving, informing visitors about the reserve and using her harbor seal puppet to engage children and edu-

cate them about the harbor seals. This past tour season Carol logged in 99 hours!

The luncheon always ends with Linda passing out pewter pins to all of the naturalists. The featured animal is always a well-kept secret (even Linda's husband doesn't know what she has chosen). This year it was the ubiquitous acorn barnacle.

Special thanks to Linda Ciotti for chairing the event, to Hope Suchsland for handling the food and Carol Davies for securing the Half Moon Bay Yacht Club once again for our use and also for handling the beverages. ♦



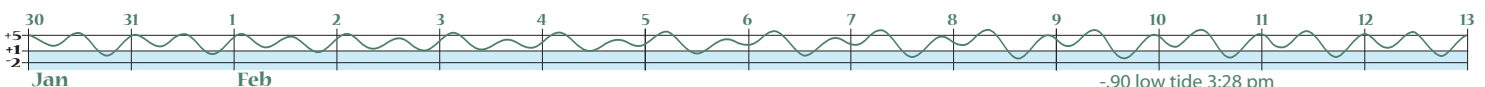
*Carol Davies receives the Ginny Award.*



*Juliette Applewhite receives the Sea Star Award.*



*It was a beautiful day at the harbor and a wonderful time was had by all.*





# From Tidepool to Lab, Creatures Help Human Kind

by Karen Kalumuck

*The simpler organization of our tidepool residents, their abundance, and their rapid and copious reproduction led to their being convenient choices for scientific study for the last 200 years, as well as today.*

Where do babies come from? What causes cancer? Why do we reject transplanted organs? These are not the typical questions asked by visitors to FMR, but scientific study of many of the tidepool denizens has provided us with insights and answers to these questions.

Through hundreds of millions of years of evolution, fundamental frameworks for living things have been maintained—we're all made of cells, we reproduce, we grow from a single cell into an adult. The simpler organization of our tidepool residents, their abundance, and their rapid and copious reproduction led to their being convenient choices for scientific study for the last 200 years, as well as today. Here, we'll look through the lens of scientific discovery at the significance of a few of our tidepool friends.

## Sea Urchins and Friends

Marine laboratories around the world have long used sea urchins, including our local purple urchin, *Strongylocentrotus purpuratus*, as model organisms to study basic life processes, such as fertilization and cell division. (Sea stars have also been used in the same sort of studies.) The animals produce tens to hundreds of thousands of eggs or sperm per individual. The urchin eggs, about the size of a human ovum (egg), are so clear that scientists could conduct experiments and see the results inside the cells through the microscopes of 150 years ago. By the mid-1800s scientists had identified human eggs and sperm. However, it was not clear how egg and sperm came together

to create a new individual. In 1875, the German Oskar Hertwig observed a sea urchin sperm enter an egg, and that the egg commenced to divide into two, four, eight, then many cells. Eureka! The mystery of fertilization was solved!

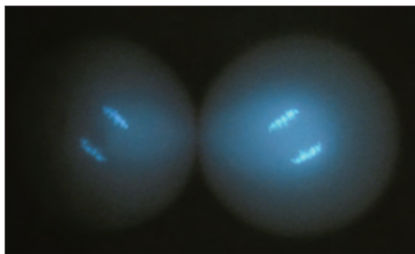
Building on this finding in urchins, scientists discovered that sperm and egg each contribute half the complement of chromosomes to a new individual, half from each parent, an observation that supported Gregor Mendel's theories of inheritance, as studied in peas. As late as 1980, however, it was still unknown what triggers one cell to divide into two; this was a key question in our understanding of life processes. In 1982, Tim Hunt and colleagues,

using biochemical analysis of large batches of synchronously dividing urchin embryos, discovered that the cyclical build-up and decline of a protein termed "cyclin" triggered cell division. Similar proteins were found to cause cell division in organisms from yeast to humans, a spectacular breakthrough in our understanding of life. For this work and its practical applications to human health and disease, Dr. Hunt and colleagues were awarded the 2001 Nobel Prize.

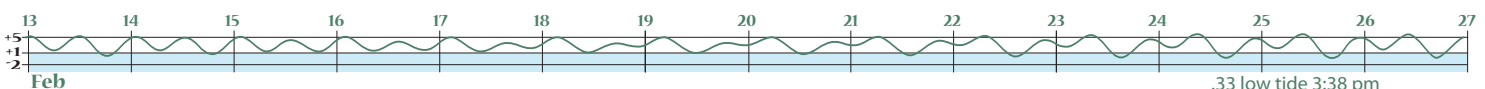
Urchins have not given up all of their secrets yet! Over 100 years of research and understanding provided a firm foundation for further research. The rapidly proliferating molecular and cellular technologies of the last 40 years were applied to urchins, and one of the biggest questions was "how does a single cell turn into an adult with lots of cells of different types" (e.g. in humans, blood cells, neurons, photoreceptors, muscle cells, skin cells, etc.). This work was begun in the 1960s and still continues today.

Along with work in other model organisms (and human cell lines), it's been firmly established that the turning "on" and "off" of genes, so that they make or don't make a certain product, in a highly orchestrated manner ultimately results in the transformation of a single fertilized egg into an adult. The *Strongylocentrotus purpuratus* genome was sequenced in 2006, and has been shown to have over 7000 genes in common with humans, and 70% that are similar enough to likely have similar functions. Manipulating the "on/off" switches in urchin embryos is shedding light on the gene's function in humans, including genes associated with human muscular dystrophy and Huntington's disease. The most frequently inherited dominant single gene disorder in humans, polycystic kidney disease, has been better understood by studying the comparable genes and proteins in sea urchins.

Basic research often leads to practical application, and here's one that involves cyclin, discussed above. One of the hallmarks of any cancer is uncontrolled cell growth. Cancer researchers have discovered clues to combating cancer by manipulating the normal division cycle of urchin embryos and observing the resulting chromosomal and molecular changes. Urchins have also been significant in studies of the immune system and as a window into exploring infertility in humans. Their embryos are used as a screen for environmental toxins and as a tool for the rapid assessment of water quality in coastal and marine environments worldwide.



*Two-celled sea urchin embryo showing chromosomes being pulled apart as it divides again. Chromosomes stained with a fluorescent dye.*



This is a pretty impressive resume for the kelp-eating echinoderm!

## Foul or Fair? Surprises in the Harbor

If you own a boat, probably your least favorite task is cleaning off the “gunk” that grows on the bottom. While it can look like a slimy, gooey mess, a closer inspection can reveal an immense wonderland of animals and plants that evoke shudders from some, and rhapsodic sighs from others. Pilings, floats, ropes and anything left in the water for even a short period of time will become substrates for growth. Despite the problems these critters can cause, their abundance and ease of laboratory culture has led to some of them being developed as model organisms for scientists, with some amazing results.

One of my favorite things to point out to visitors to FMR, when we are lucky enough to find them, is the colonial tunicates. Why? No one can quite believe that they, not the octopus, are humans’ closest invertebrate relative. The larval forms of both the colonial and solitary tunicates (both types commonly found as “fouling” organisms) have a notochord, or cartilaginous skeletal structure that supports the body, just like all vertebrates, including humans. When the tunicate larva picks a home site and settles down, it loses this structure and stays put for its entire life. In vertebrates, the notochord is the major longitudinal support; the nerve cord develops in front of it, and the vertebrae develop around it. There are striking similarities in the very early embryonic development of both the tunicate and vertebrates, and these are events that are more easily studied in tunicates.

*If the [Botryllus schlosseri] colonies recognize each other as “like me” they will fuse and grow together. If the colonies detect each other as “not like me” they will initiate an inflammatory rejection and form a barrier of scar tissue between them.*

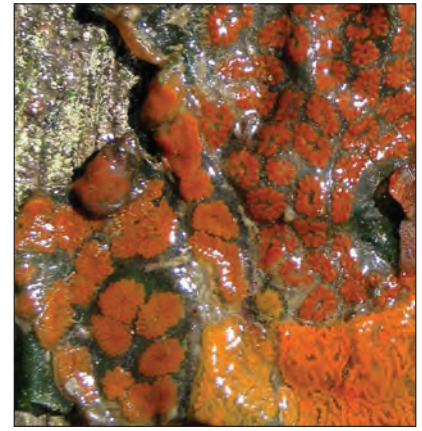
In the wild, *Botryllus schlosseri* colonies will expand and eventually touch each other. If the colonies recognize each other as “like me” they will fuse and grow together. If the colonies detect each other as “not like me” they will initiate an inflammatory rejection and form a barrier of scar tissue between them. This response is a rudimentary immune response, and resembles immune rejection in humans to transplanted organs. Researchers transplanted parts of colonies into other colonies, and documented the responses. Correlated with molecular techniques and

the sequencing of the *Botryllus schlosseri* genome, the genes responsible for these immune rejection processes have been isolated, and are informing comparable work on transplant rejection in humans. *Botryllus* is also used in the study of stem cells.

Also commonly found on the Coastside, the solitary tunicate *Ciona intestinalis* is a model organism for cardiac development. Its genome has also been sequenced, and by sequentially “knocking out” genes and observing the effects with live imaging, researchers have been able to define the gene regulatory networks that interact to form the functioning “heart” of the organism. These data have been used to help define comparable heart development gene networks in humans, helping scientists and physicians discover what can go wrong during the development of a human heart.

Another type of “fouling” organism is the colonial animal, the bryozoan. Extracts of *Bugula neritina* were refined into a host of related molecules termed Bryostatins. In clinical trials, Bryostatin 1 has been used for lung and prostate tumors, and non-Hodgkins lymphoma, and appears to be most effective in combination with other anti-cancer drugs. Results of a recent study have shown that Bryostatin 1 is effective in improving the function of an individual with severe, early onset Alzheimer’s disease. However, to obtain one gram of Bryostatin, one ton of raw bryozoans are needed as starting material! Scientists are having minor success in synthesizing the complex molecule. Keep your eye on this one.

The stunning beauty of the tidepools, with their amazing biodiversity of inhabitants and incredible adaptations, is unlike anything on earth! This article is but a tiny introduction to the wealth of secrets hidden in plain sight at low tide. Who knows how many more mysteries will be unraveled, and therapeutics discovered, by studying our tidepool friends, who are more similar to us than not. ♦

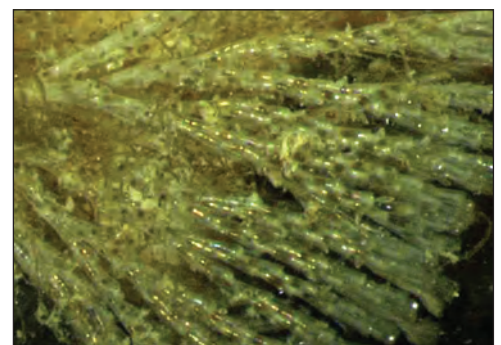


Botryllus colonies

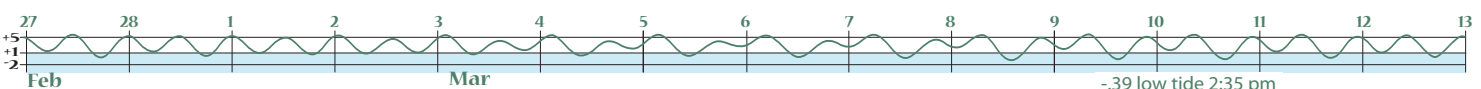


“Fouling organisms” including transparent, vase-shaped *Ciona*

*The stunning beauty of the tidepools, with their amazing biodiversity of inhabitants and incredible adaptations, is unlike anything on earth!*



*Bugula neritina; magnification approximately 40x*





# Revisiting Scholarships Awarded

by Susan Evans

---

*“The Bob Breen Memorial Scholarship...allowed me to be a part of an important coral study that tested coral growth rates with differing substrates, temperatures and levels of nutrients. I got to work with an Oceanographer I admire very much, and will continue working on this research when I am back in August!”*  
—Brenna Carroll

---

On the evening of May 28, 2015, FFMR awarded \$5000 scholarships to three HMB High School seniors. The recipients, Brenna Carroll, Pace Farbstein and Marianne Rogers, have now completed their first year of college and we decided to re-visit the students and ask them about their scholarships, college courses and future plans.

**Brenna Carroll:** Aloha! Currently my long term goals are to graduate with a BS in Global Environmental Science. Then go for a master’s degree in Biological Oceanography!

When I came to the University of Hawaii at Manoa last year, I met some great scientists who are currently working on very important ocean issues, mainly focusing on coral health. It was very inspiring to see these professionals focus their time and energy on the health of the reefs. This (along with my obsession with all things ocean) let me know that I’m going down the right path!

The Bob Breen Memorial Scholarship helped me more than I realized. It meant that I didn’t have to get a job in my first year, and this opened up a huge opportunity for me. It allowed me to be a part of an important coral study that tested coral growth rates with differing substrates, temperatures and levels of nutrients. I got to work with an Oceanographer I admire very much, and will continue working on this research when I am back in August! I plan on staying at UH Manoa until I finish my degree. After all, it is Hawaii!

Thanks! Brenna

**Pace Farbstein:** I will be entering my second year at the University of California at Santa Barbara, where I am pursuing a degree in Environmental Studies. Santa Barbara is truly the perfect fit for me as a student and as an adventurer.

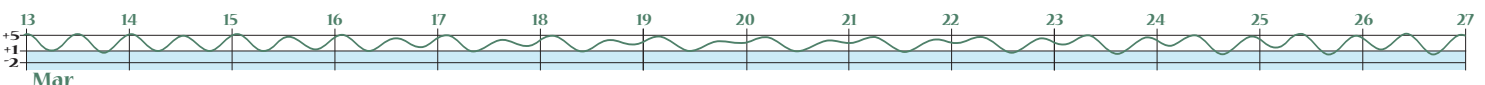
As a tour guide I am able to share with prospective students that my typical day consists of a lecture in the morning accompanied by a field study in the afternoon. Then I’m off to hockey practice just five minutes away from campus (and the beach) and finally a sunset surf session.



*The Scholarship students in 2015: pictured (left to right): Michael Breen, Pace Farbstein, Marianne Rogers, Brenna Carroll, Matt Breen and Half Moon Bay High School teacher Joseph Centoni*

Recently in my environmental class we discussed the future of safe and renewable energy. I have been intrigued by this concept ever since it was first introduced to me by my AP Environmental Science teacher Joseph Centoni. In this history of the environment class, the final essay was to pick two types of renewable energy sources and argue that one source is “greener.” I chose to address wind power and hydroelectric power and ultimately argued that hydrokinetic power, or power harvested from the movement of tides, waves and currents, would be the “greenest option.” Just days after submitting my essay a friend of mine showed me via Facebook the Perth Wave Energy Product in Australia. This project is the world’s “first commercial-scale wave energy array that is connected to a grid and has the ability to produce desalinated water.” I have been feverishly following the project since and am excited to see the outcome.

One of my favorite classes at UCSB has been Environmental Studies 25 or “Quantitative thinking in the environment.” This class allowed me to prepare data in a way that everyday





people can understand it, using Microsoft Excel software. One of the projects we conducted was to test if a hybrid car versus a regular combustion car would be more economically feasible at a given price for gasoline. Interestingly enough we found it was more cost-efficient to get the non-hybrid car. While I thought this was somewhat contradictory to hear in an environmental studies class, our professor told us that much of the current environmental practices we are trying to implement are not cost efficient and that is the struggle an environmental scientist faces every day.

The scholarship money I have received has allowed me not only to become aware of the environmental topics I find so fascinating but to also pursue those topics in a classroom or a laboratory. My dream job would be to work with universities to come up with new ways to employ green practices so that they can become exemplary institutions of sustainability. I will, without a doubt, be spending the next three years of my college career at UCSB and am excited to see at least 8 HMBHS Cougars become Gauchos. If anyone has questions about the UCSB Environmental Studies program or questions about UCSB, I would be delighted to help them.

Thank you again, Pace

**Marianne Rogers:** I'm not currently sure what I'd like to do for a career in the long term. I've been enrolled as an animal science major for my freshman year at Cal Poly; however I'm now in the process of switching to pursue a B.S. in biology with an equine minor instead. After multiple classes under both departments and many meetings with various helpful and informative professors, I feel the latter track will be more exciting for what I may like to do. I am fascinated with learning and researching ways to improve wildlife and marine conservation. I believe the biology degree will offer me information and research to improve the livelihood of wild animals and their coexistence with our ever-growing human population. Since I was a little girl I remember making huge exclamations like "I'm going to save the world when I grow up!" or "I want to save the tigers!" etc. Now it's really exciting to be learning about all the important details that might build up to such goals.

My favorite academic classes so far would be equine exercise physiology and biology: an

introduction to animal and plant form and function. I hold a strong adoration and respect for horses and the effects they can have on people's health and mental state. I ride and work with horses, so learning the science and biology behind their movements and coordination was very interesting and relevant to me. It was also quite applicable to human exercise, which intrigues me according to my personal healthy lifestyle habits. The professor was immensely knowledgeable, compassionate, always approachable and explained material in a deep but comprehensible way.

The biology class was wonderful, as it was taught by two professors who alternated to speak on their specialties, one for plants and the other for animals. Both are brilliant instructors and I thoroughly enjoyed the subject matter. I was so excited to learn about the functions and anatomy of so many living things. It's amazing to understand some of the less known facts and characteristics of species and individuals that determine what they're capable of in order to survive. I'm looking forward immensely to an ichthyology course on marine sharks and fishes I'm enrolled in for this fall.

Yes, I was very grateful to receive the scholarship money to help cover my academic tuition. It genuinely made a significant difference in allowing me to attend the university of my choice. I'm planning to attend for the next three years and to graduate in 2019. I really valued how friendly, informative and approachable all my professors were. They were obviously excited to share their knowledge and research with the students, and all of my surrounding peers were just as eager to receive it. I can't explain how invigorating it has been for me to be in a room with other students and professors, continuously building on one another's thoughts, questions and ideas. The environment feels highly conducive to learning and including all who are inspired to join. The classes are challenging and the professors are tough and fair, so I feel driven and motivated to push myself, and being surrounded by like-minded (and very intelligent people) has helped me do so.

Thank you again, Marianne

To all students: Good luck with all your future endeavors and please keep up the good work! ♦

---

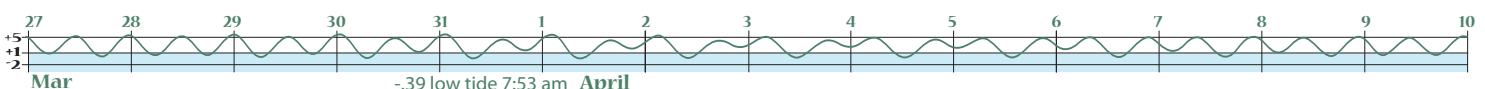
*"Recently in my environmental class we discussed the future of safe and renewable energy. I have been intrigued by this concept ever since it was first introduced to me by my [Half Moon Bay High School] AP Environmental Science teacher Joseph Centoni."*  
—Pace Farbstein

---

---

*"Since I was a little girl I remember making huge exclamations like "I'm going to save the world when I grow up!" or "I want to save the tigers!" etc. Now it's really exciting to be learning about all the important details that might build up to such goals."*  
—Marianne Rogers

---



## Spotlight on Barbara Dye



*John and Barbara Dye and Scout*

Barbara Dye was born in Boston into a family that loved to be outdoors. She and her four sisters loved family camping trips, exploring the open space where they lived in Natick, Massachusetts, and spending summers in Maine in the house her grandparents built on Brandy Pond. The family hobby was mineral collecting, and that inspired her to major in geology at Bryn Mawr College. At Bryn Mawr she met a Haverford student named John Dye, the love of her life, whom she married in 1971.

After their European motorcycle honeymoon, Barbara and John served as Peace Corps volunteers in Ghana, West Africa, where Barbara taught geology at the University and worked with a crew to locate clay for brickmaking. During their last year, they crossed the Sahara Desert from north to south, from Algiers to Agadez and back to Ghana.

Following their Peace Corps service, Barbara and John returned to the US where they welcomed three daughters, all named for queens, and in 1986 moved to the Palos Verdes Peninsula in LA County. Barbara was a docent at an interpretive center overlooking the migration route of the grey whale, was active with the PTA, wrote several guidebooks, worked as a Field Representative for Congresswoman Jane Harman, and was a founding member of the Palos Verdes Peninsula Land Conservancy. She also worked for five years as Environmental Project Manager for Ocean Trails, a residential and golf project on the bluffs of Palos Verdes, where she oversaw the restoration of over 100 acres of native habitat and the construction of parks and trails.

After Ocean Trails, Barbara became Executive Director of the Palos Verdes Peninsula Land Conservancy, working to fulfill the dream of protecting the remaining large open space areas on the Peninsula. Securing commitments from numerous government agencies for \$13 million, the organization raised \$4 million in local matching funds and the 2,000-acre Palos Verdes Nature Preserve came into being.

Several years after the Preserve was created, Barbara and John were ready for a new challenge.

They decided to join the Peace Corps again, and were invited to serve in Mexico. Barbara worked at the La Primavera Protected Area outside Guadalajara, in environmental education, and wrote a book about the geology of the park. She then was selected as Volunteer Leader for their final year in Mexico. When they finished their time in Mexico, they took a trip around the world, dubbed the “Dynamundo,” with stops in Africa and Asia.

In 2014 John and Barbara moved to the Coastsides, where they are very, very happy. Barbara’s docent training at FMR was the perfect way to start learning about the area. Barbara is already involved in the community—volunteering with the Coastsides Land Trust, Coastsides Democratic Club, Historical Association, and the Resource Conservation District. Barbara has also finally added birding to her love of the outdoors and has appreciated the help of local experts from Sequoia Audubon in helping her learn about local birds.

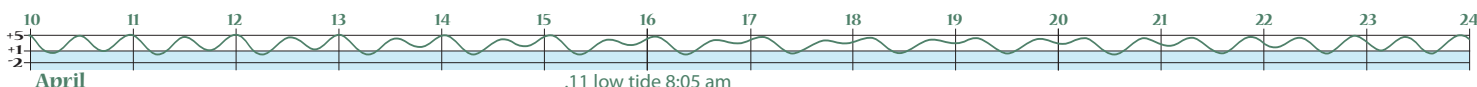
The Dyes spend a lot of time with their three

*Barbara’s docent training at FMR was the perfect way to start learning about the area. Barbara is already involved in the community—volunteering with the Coastsides Land Trust, Coastsides Democratic Club, Historical Association, and the Resource Conservation District.*

daughters. Katie and her husband Quinton have 15-month old twin boys whom Barbara babysits two days a week while her daughter teaches third grade in Burlingame. Nora leads a bicycle education organization in Oakland and is expecting a baby girl at the end of November. Torie manages the Los Altos Hills Community Barn and spends time with her dog, Pepper. Barbara and John also have a much-loved dog named Scout, adopted right after they moved to El Granada. Barbara very much enjoys giving tours at Fitzgerald and being involved in the wonderful community they have found here on the Coastsides.

Besides being actively involved in leading tours, Barbara maintains the FFMR membership list and writes letters acknowledging donations. ♦

*In 1986 they moved to the Palos Verdes Peninsula in LA County. Barbara was a docent at an interpretive center overlooking the migration route of the grey whale, was active with the PTA, wrote several guidebooks, worked as a Field Representative for Congresswoman Jane Harman, and was a founding member of the Palos Verdes Peninsula Land Conservancy.*





# An Enchanted Afternoon with Kathleen Dickey and Seaweeds

by Judy McCarthy

A whiff of ocean air greeted FFMR naturalists who gathered at Mary DeLong's place in Princeton for an Algae event organized by Susan Evans on November 13, 2016. Kathleen Dickey solidified the experience as she arrived with fresh, shiny seaweed specimens, feather boa and oarweed.

Kathleen is a multifaceted field biologist, crafts person and teacher who has been studying and collecting seaweed for more than thirty years. Deciphering patterns and observing the commonalities and differences between the plants is part of the everlasting joy she finds in the tide-pools.

Kathleen opened the discussion by saying, "Algae—So what is an alga? It's a simple non-flowering plant of a large group that includes the seaweeds. Algae [pl.] contain chlorophyll but lack true stems, roots, leaves, and vascular tissue." Showing us a Google Earth map of the California coast she discussed factors of temperature, currents and geology, all favoring upwelling and resultant nutrients and oxygen that support marine life.

With brown oarweed (*Laminaria*) in hand, Kathleen showed us algal anatomy, gently handling and describing the parts: holdfast, stipe and blade. We learned that more than 10,000 species of seaweed exist in the world. They are classified by color pigment—greens, browns and reds—each of which has a characteristic complement of photosynthetic pigments. Of these groups the red are the largest and most ancient (590 million

years old), and can be found in the deepest waters. She brought with her a collection of seaweeds for the class to examine and shared much more of her extensive seaweed knowledge. She also shared her beautiful and extensive reference card collection and also a seaweed matching game, both of which we were able to purchase.

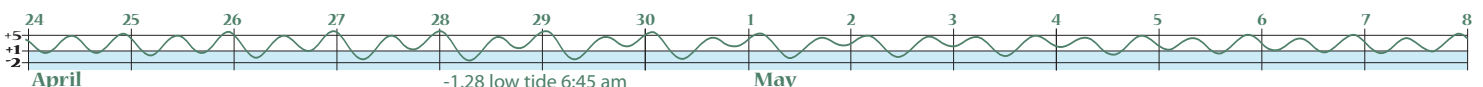
Kathleen's enthusiasm was contagious and we were excited to head to the beach with her for some hands-on experience.

Paul Silva wrote of M.M. Howard, a Victorian lady and astute seaweed collector in 1847 (in special seaweed issue of *Fremontia*) who named her poem,

## Ocean Flowers and Their Teachings

Oh, Call us not weeds, but Flowers of the Sea,  
For lovely and gay and bright-tinted are we!  
Our blush is as deep as the rose of the bowers,  
Then call us not weeds, we are Ocean's gay flowers.

At Phykos.org you can learn more about Kathleen, her tips on how to press seaweeds, her seaweed recipes, a visual of her flashcards, and links to learn more about the fascinating world of seaweeds. You can order her flashcards and a seaweed memory game by contacting her at Phykos.org. ♦





FRIENDS OF  
FITZGERALD  
MARINE RESERVE

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

Non-Profit Org.  
U.S. Postage  
PAID  
Permit No. 12  
Moss Beach, CA 94038

*An Enchanted Afternoon  
with Seaweed  
pg. 11*

## 2017 FFMR Training Class Schedule

This year's training schedule has been finalized. All naturalists who have taken the training in the past are invited to attend any or all of the classes to brush up on their tidepool knowledge. Please reserve a spot by sending an email to Susan Evans: susanmtnvw@aol.com.

Jan. 7	9 a.m.	Class Overview/Introductions Phyla Overview/Tides/Zonations
Jan. 14	9 a.m.	Marine Mammals
Jan. 21	9 a.m.	Echinoderms/Cnidarians
Jan. 28	12 noon	Arthropods
Feb. 4	9 a.m.	Algae
Feb. 11	12 noon	Mollusks
Feb. 18	Holiday	
Feb. 25	12 noon	Geology
March 4	12 noon	Worms/Bryozoans/Tunicates/Sponges
March 11	12 noon	Tidepool Ecosystems
TBD		Birds

All classes will be held at the Mormon Church (corner of Hwy. 1 and Calif. Ave.).

### 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)

Contribution Levels:

\$25     \$100     \$1000

\$50     \$500     Other \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

I want to double the value of my gift through my employer's matching gift program (please enclose the matching gift forms). City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Email \_\_\_\_\_