BETWEEN the TIDES

Friends of Fitzgerald Marine Reserve
June 2016

Changing of the Guard
by Tom Ciotti

Many of you will be surprised to know that the FFMR Board rigorously follows the terms of the FFMR bylaws respecting the election of FFMR Board members and officers. This adherence to the rules is due to the presence of Karen Madsen—a corporate governance lawyer—on our Board. She keeps us in compliance.

So, at the March 2016 Board meeting, per our bylaws, we elected Board members for an ensuing two year term and officers for an ensuing one year term. I am pleased to report that, with one exception, all then-current Board members agreed to serve another term and they were unanimously elected for an additional two year term. The exception is Kalla Rokoff, who resigned from the Board for personal reasons. Kalla will, however, continue to be an active volunteer. In addition, the Secretary, Bill Kennedy, and Treasurer, Hope Suchsland, agreed to serve an additional term and were unanimously elected to those offices. I had previously notified the Board that I would not continue as President. Fortunately, Kathleen Hayes stepped up and said she would be honored to serve as President and that being so, I said I would be happy to serve as Vice President. Kathleen and I were then unanimously elected to those offices by the Board. We are in good hands with President Hayes!

In stepping down from the Presidency I want to thank the Board members who served with me for their support during my tenure. Special thanks go to my wife and fellow Board member, Linda, without whose help, counsel, and guidance I could not have lasted for four years. During those years the Friends weathered some significant changes, including the implementation of the Marine Life Protection Act at FMR, the passing of Bob Breen, and changes in the leadership of the San Mateo County Parks Department and their staffing at FMR. While it wasn’t always fun, it was always rewarding.

It was an honor and privilege to be your President for four years. Thanks for letting me do so.

Between the Tides Goes Color

Now you can see your beautiful photos in color. The FFMR board of directors has enthusiastically endorsed the idea posed by Julie Walters that all future issues of BTT be in color. No more the black and white photos that were often difficult to decipher.

We would like to call on all of you to submit favorite photos that you have taken.

We hope to include as many as possible in future newsletters. Please limit your submissions to five, add a short description of what or where the subject is, and send them to: jpellinka2@yahoo.com

Special thanks go to my wife and fellow Board member, Linda, without whose help, counsel, and guidance I could not have lasted for four years.

We would like to call on all of you to submit favorite photos you have taken.
FFMR Scholarships

This year Friends of Fitzgerald Marine Reserve awarded three $5,000 scholarships to Half Moon Bay High School seniors who plan to pursue a career in the sciences. This year’s recipients were Claire Messina, Nicole Laughlin, and Virginia Dussell. The scholarship, named in honor of Bob Breen, FMR’s first ranger, has been awarded annually since 1999.

FFMR 2015 Expenses

At left is a chart of 2015 expenditures amounting to $37,500. All of the Friends of Fitzgerald Marine Reserve dollars come from donations from our generous supporters. Last year our expenses exceeded incoming donations by almost $8000. So you see how important it is that we sustain and expand our donation base if we are to continue our outstanding outreach programs. By making a donation you become a Friend and are helping to raise awareness of the exciting marine environment found at the reserve.

The graph displayed across the page bottoms shows tides for 6/20/16 to 11/7/16. 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.

Good low spring/summer tides are in the early morning. They change to evening tides in September. There are almost equally low tides several days before and several days after the noted low tide dates.

<table>
<thead>
<tr>
<th>Date</th>
<th>Tide Value</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/22</td>
<td>-.88</td>
<td>6:41 am</td>
</tr>
<tr>
<td>7/4</td>
<td>-1.35</td>
<td>5:16 am</td>
</tr>
<tr>
<td>7/20</td>
<td>-.73</td>
<td>5:42 am</td>
</tr>
<tr>
<td>8/2</td>
<td>-.77</td>
<td>5:00 am</td>
</tr>
<tr>
<td>8/18</td>
<td>-.41</td>
<td>5:13 am</td>
</tr>
<tr>
<td>9/17</td>
<td>-.58</td>
<td>5:44 pm</td>
</tr>
<tr>
<td>10/17</td>
<td>-.57</td>
<td>3:12 pm</td>
</tr>
</tbody>
</table>

The lowest tides this period are: 

-6/22 - .88 low tide at 6:41 am
-7/4  -1.35 low tide at 5:16 am
-7/20 -.73 low tide at 5:42 am
-8/2  -.77 low tide at 5:00 am
-8/18 -.41 low tide at 5:13 am
-9/17 -.58 low tide at 5:44 pm
-10/17-.57 low tide at 3:12 pm
The Fabulous, Colorful Nudibranchs

For years you have seen our beautiful nudibranchs exhibited as black and white photos in BTT, and perhaps you wondered why those “nudi nuts” were out on the reef in those chilly early hours. Seeing them in color, one may understand the attraction. Here are some of the more unusual creatures that were seen during the last survey. Many thanks to Donna Pomeroy and Robin Agarwal for letting us display their photographs. Not only are they expert photographers, they are extremely accomplished surveyors.

Aeolidiella olivae

Doto colombiana

Hermisenda crassicornis

Aeolidia papillosa

Dirona picta

Dendronotus venustus

Phidiana hiltoni

Dendronotus albus
An Unwelcome Symphony

by Janet Pelinka

The water around us, once referred to as “The Silent World” by Jacques Cousteau, has become a cacophony of sound that threatens the life of marine mammals. Continually confronted with toxic pollution, trash, ocean acidification and warming, ship strikes and downwind slaughter, they are also assaulted by a less acknowledged menace, that of noise pollution.

Marine mammals are acoustic animals. Just like us, they use sound to navigate, communicate, locate mates, find food, avoid predators and warn others of danger. Noise interferes with these natural activities and can cause temporary or permanent hearing loss, and serious injury. Noise-related hemorrhaging and tissue trauma have been known to cause mass stranding and even death. Yet to be determined is the detrimental effect of long-term stress. It is believed to cause physiological and reproductive problems, but not a lot is known about how sensitive marine animals are to it.

Sound travels faster and further in water than in air, and high intensity sound in the oceans may not dissipate for thousands of miles. That is very significant for blue whales that can communicate over a distance of 1000 miles. “Undersea noise pollution is like the death of a thousand cuts,” says Dr. Sylvia Earle, oceanographer, marine botanist, ecologist, writer, and former Chief Scientist at the United States National Oceanic & Atmospheric Administration. “Each sound in itself may not be a matter of critical concern, but taken all together, the noise from shipping, seismic surveys, and military activity is creating a totally different environment than existed even 50 years ago…” (Natural Resources Defense Council, 1999). And it is increasing at an alarming rate, doubling every decade for the past 60 years.

So what exactly is happening under the ocean surface?

Shipping

Modern-day supertankers carry 90% of world trade and create a low frequency noise that can travel thousands of meters with little reduction in amplitude. These frequencies create a “fog” of white noise that interferes with biologically important activities of baleen whales, dolphins, seals, sea lions and fish. The intrusion of shipping is so pervasive that, “If you could lay down under the shipping lanes at Great South Channel (off Cape Cod)...you would get the impression of being on the tarmac at Logan Airport”, says Christopher W. Clark who runs the Bioacoustics Research Program at Cornell University. The future will most likely see an increase in shipping traffic.

An expansion of the Panama Canal that will accommodate more and larger ocean traffic is nearing completion. This third canal will allow larger commercial ships to reach the eastern coast of the United States in a shorter transit than presently followed. Eastern states are already dredging and widening their ports to accommodate these behemoths. And a Chinese investor has been granted the go-ahead by Nicaraguan authorities to build an even larger canal through Nicaragua. Due to opposition by various groups and the slowing of China’s economy, little progress has been made on the proposed project. The following site shows an astonishing video of just how busy the world’s shipping lanes are: http://www.npr.org/sections/thetwo-way/2015/02/21/388025656/watch-global-shipping-around-the-world-in-1-40

Ocean Oil Exploration

To search for oil deposits in the ocean oil companies fire as many as 20 air-guns at a time. Each of these guns produce a pulse of 250 decibels that bounces off the ocean floor and is repeated every ten seconds. Surveys are usually conducted 24 hours a day and can continue for weeks.

Track Global Warming

An unfortunate consequence of climate change is the application of acoustic thermometry to monitor the advance of global warming. This process uses pulses of 195 decibels.

Farmed Fish

Devices called “Ringers” are used in aquaculture operations like salmon farms; they emit a 190-decibel sound to scare away seals and porpoises that might feed on penned fish.

Military

Sonar is used by military vessels during exercises in routine activities. The pulses emitted by sonar systems can saturate thousands of cubic
Amplitude of Sounds In Air In Water

<table>
<thead>
<tr>
<th>Sounds</th>
<th>In Air</th>
<th>In Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>whisper at 1 meter</td>
<td>20 db</td>
<td></td>
</tr>
<tr>
<td>normal conversation</td>
<td>60 db</td>
<td></td>
</tr>
<tr>
<td>painful to human ear— even with hearing protection, can cause permanent damage</td>
<td>140 db</td>
<td></td>
</tr>
<tr>
<td>jet engine</td>
<td>140 db</td>
<td></td>
</tr>
<tr>
<td>fishing trawler</td>
<td></td>
<td>158 db</td>
</tr>
<tr>
<td>avoidance behavior in migrating gray whales</td>
<td></td>
<td>136 db</td>
</tr>
<tr>
<td>blue whale moans</td>
<td></td>
<td>165 db</td>
</tr>
<tr>
<td>supertanker</td>
<td></td>
<td>190 db</td>
</tr>
<tr>
<td>ocean exploration</td>
<td></td>
<td>190-250 db</td>
</tr>
<tr>
<td>Low Frequency Active Sonar</td>
<td></td>
<td>230+ db</td>
</tr>
<tr>
<td>20kg TNT</td>
<td></td>
<td>279 db</td>
</tr>
</tbody>
</table>

The decibel scale for measuring sound follows a logarithmic scale and the actual power of sound increases very quickly. A ten decibel increase in sound represents a ten times increase in volume while a 20 decibel increase represents a 100 times increase in volume; a thirty decibel increase in sound represents a 1000 times increase in volume. Sound also travels faster and further in water than in air. High intensity sound in the oceans may not dissipate for thousands of miles.

rules governing this type of pollution, the International Ocean Noise Coalition, an alliance of over 150 groups working for international regulation of ocean noise, is calling for action. Some conservationists feel that harmful activities should be restricted in biologically sensitive habitats; new and less harmful technologies should be developed. They would like to see limitations placed on seismic exploration for oil, gas and wind farms. U.S. authorities are now considering allowing multiple companies to survey the same areas. In contrast, Norway has instituted multi-client surveys where many companies work together so that only one survey is made. There are countries and industries that are making attempts to reduce noise produced by various activities. However, since the ocean noise overlaps borders and occurs in international waters, conservationists feel there is a great need for international rule.

One thing is certain, if you stop making noise, it goes away.

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**Explosives**

The military, scientific researchers and the oil and gas industry all use underwater explosives that produce extremely high noise levels in a sudden burst. They are used for demolition, seismic exploration and equipment testing. The military strikes ships with explosives to test their durability. These actions can permanently damage hearing structures.

**Proposed Solutions**

The harmful effects of undersea noise have recently gained the recognition of some government bodies. While there are still no international
Given that this was my first year leading the training class, I soon realized that everything seemed to require extra effort. The planning, executing and graduating of the class definitely takes extra time and I applaud Linda for her many years of steadfastly leading the training class.

My training team was exceptional. We met at my house in August, 2015 for our first planning session. The team was: Linda and Tom Ciotti, Joseph Centoni, Karen Madsen and Ron Olson. Almost everyone volunteered to contact a speaker to determine their availability on a certain date. Tides were studied to map out appropriate class times and visits to the reef.

Our second meeting was in December. Karen volunteered to do sign-ups and had spoken with Bob Powers about his bird lecture. Joseph offered to teach five classes. Linda had contacted Tom Niesen and he would once again do his annual talk and fun exploration at the harbor. I had reached Jean Replicon who agreed to teach mollusks and Irina Kogan who would again treat us to an enthusiastic geology talk. Karen Madsen and Kris and Michael Liang offered to again give a very thorough marine mammal lecture. Joni Mauer would
On the pier, Brent Tietjen made a discovery.

Joseph Centoni and his phylum sorting game with Wendy Kwok, Bonnie MacCurdy and Juliette Applewhite.

Twelve students started on Jan. 9, 2016, and two more joined us the following week. I brought back the unannounced pop quiz for the class which met with a wide range of acceptance. Some students appreciated being kept on their toes, others had the occasional wince when they received their graded quiz the following week!

Special thank yous go out to all our wonderful speakers, especially to Joseph Centoni for teaching five classes and escorting us to the tidepools after each of his phylum classes. Ron Olson deserves special thanks for classroom setup each and every week and responsibly transporting and testing our sometimes unpredictable projector. Ron also was most generous in helping with class activities on the reef.

Thank you also to Patti Miller for binder copying and Paul Gater for the low tide sheet.

After hours? days? weeks? of grading final exams, I was most pleased to announce that all final 12 students had received a B+ or better on their exams. (Two students had to drop the class due to work commitments but planned to take the class in 2017.) I congratulate: Vasa Endicott, Sandy Smith, Bonnie MacCurdy, Patricia Kan, Wendy Kwok, Kim Villegan, Brent Tietjen, Charles Halterman, Juliette Applewhite, Mary Larenas, Regan Goodin and Margaret Burns on becoming our new volunteer naturalists at FMR for 2016!

THANK YOU one and all for being an outstanding group!!

Graduates, l-r: Margaret Burns, Vasa Endicott, Bonnie MacCurdy, Brent Tietjen, Mary Larenas, Juliette Applewhite, Sandy Smith, Charles Halterman, Wendy Kwok, Regan Goodin (missing Kim Villegan and Pat Kan)

Brent Tietjen made a discovery. Margaret Burns, Regan Goodin, Pat Kan and Irina Kogan (geology instructor) find humor in the tide pools.
Beyond Words
What Animals Think and Feel
by Carl Safina reviewed by Judy McCarthy

This book’s cover photograph shows female elephants in Kenya helping a newborn to its feet for the first time. This loving care depicts what animals think and feel, and perhaps suggests what Carl Safina thinks and feels, and perhaps what we, too, think and feel.

Do not miss reading this book. Traveling with Carl recalls, for me, the excited learning on a field trip, as I stretch to hear each comment and to see wildlife nuances through his eyes. The author’s vivid images of animals in their native habitats, along with his scientific yet tender-hearted analyses, invite us to absorb the freshness of his descriptions and renew our own thoughts about our relationship with animals.

You walk with Carl and devoted researchers who for decades have followed their chosen animals. And so, with this dedication begins Safina’s Beyond Words What Animals Think and Feel:

“For the people in these pages who watch and truly listen, who tell us what they are hearing in other voices that share our air, and in the silence.”

The book is divided into four parts: Trumpets of Elephants, Howls of Wolves, Whines and Pet Peeves and Killer Wails.

In Trumpets of Elephants, Carl travels in the Amboseli National Park in Kenya, with Cynthia Moss, a researcher who has spent 40 years with the elephants and knows and respects them as individuals. Initially, Carl says, “They struggle to survive, and to keep their children safe.” He explains that he is there to learn and see how they are like us; “What do they have to teach us about ourselves?” Then he writes: “What I don’t see coming is: I have the question almost exactly backwards.” He goes on to reset his perspective to see who the animals are, not how like us they are. And he poetically writes, “The grazing elephants trail a train of egrets…they plow through the grassy sea…soft tom-tom footfalls...And, mostly, the quiet ways of ample beasts. Wordlessly they speak of time before human breath.” We see through Carl the elephant family connections and behaviors, tenderness and loyalties.

And we also see the families’ roaming space shrinking to island reserves. In 40 years the Kenyan human population has quadrupled, while elephant numbers have dropped by four-fifths. The killing of an estimated 30,000–40,000 elephants per year means an elephant lost every 15 minutes. Carl Safina understates, “I’m fond of civilization, but, what’s the plan?”

In the Howls of Wolves, we enter the aptly-named chapter, “Into the Pleistocene” of Yellowstone Park. Carl pairs up with Rick McIntyre, who has seen wolves every day for 15 years. He tells us who each wolf is by its life story. Rick remembers “a perfect wolf,” #21, who was among the first litter of pups born in Yellowstone in 70 years. Rick says, “He was fierce and defended his family, but never killed a defeated opponent.”

Wolf packs are identified by name: Lamar Valley, Druid Peak, Junction Butte, etc., and individually by number: #820, #005 and #06, etc. Wolf pack members cooperate along definite lines of alpha dominance as to den sites, pupping and food-sharing, hunting for mates, and submissive postures. Packs come together and fall apart, forming new groups, sometimes through fierce conflict and with tragic outcomes.

We learn about two other wolves, father #755 and daughter #820, whose lives change as #755 loses brother and mate and #820 is driven away by her own sisters. They barely survive this pack transition, wandering alone in extreme cold. Two years later #755 was sighted and had found a mate. As wolf researcher Doug Smith, says, “Wolves are tough...very tough.” Not so fortunate was the female #820, who was eventually lost to radio reception, wandered into the town of Jardine, and was shot despite her conspicuous research collar.
Yellowstone National Park’s straight-lined boundaries may have been originally drawn to include the tourist appeal of geysers and perhaps not with animal habitat terrain in mind. Winter cold sends hungry elk, bison, and wolves to unprotected lower elevation valleys in Montana and Wyoming where they are in danger of being shot. Though the Endangered Species Act covered wolves due to threatened extinction, they have been eliminated in 95% of their range and are still being shot in Wyoming. Recently, a federal judge voided Wyoming’s wolf-management plan, but the battle continues.

The Whines and Pet Peeves section treats particular issues and is better read in its entirety.

Killer Wails takes Carl Safina to the Pacific Northwest, where he meets researcher Ken Balcomb, who lives on a slope overlooking Haro Strait and the world’s largest dolphins—killer whales. Speakers on Ken’s windowsill stream sound from a nearby array of underwater microphones, called hydrophones, via OrcaSound.net. Ken tells Safina that the “resident killer whales are fish eaters and eat salmon; they’re usually chatterboxes, very vocal.” Each killer whale family’s elder decision-making matriarch has memorized the family’s survival manual, maintaining knowledge of the region. Vocal calls play a big part in social organization, and all whales use certain common calls. There are also other calls used only by members within a pod. “Each resident produces between seven and seventeen discrete calls,” says Balcomb. “To sum up: killer whales maintain a complex social structure characterized by lack of aggression among free-living killer whales. They synchronize breathing among family members, touch continuously as they swim along, and indulge in full body contact, and no one seems subordinate or second-class.” Imagine that. And, surprisingly, killer whales have been known to protect, warn and guide lost kayakers safely to shore.

Beyond Words by Carl Safina carries themes of seeing the who of animals, that we are one, and that our relationship begs for revision. Does anyone wonder why we are not more urgently conserving the animals? Does it not matter if they are decimated? Are they not a valuable part of our life’s richness? I think they are. I myself favor stewardship and mutualism. Live and let live. Just let them be. This author, Carl Safina, may be well known to you, maybe as host of the ten-part PBS series, Saving the Ocean, or by his articles in The New York Times, National Geographic, Audubon, or perhaps for his many books on turtles, and birds, for awards and fellowships galore, but he was new to me. His writing gives me hope in knowing that out there is someone who shares appreciation for the animals, respects their lives and values their ongoing presence on the this earth.

Dead Whales Do Tell Tales

presentation by Sue Pemberton

Who knew you could tell the cause of death of an animal from its whiskers? This was one of the many fascinating facts we learned from our May 14 continuing education event with Sue Pemberton of the California Academy of Sciences. Sue heads to the beach when a dead whale, dolphin, or porpoise washes ashore and needs to be assessed. She takes samples of the bone, blubber or tissue, feces, teeth or baleen, and stomach contents. She then does a forensic study to ascertain the cause of death.

That could be a ship strike, indicated by broken bones and signs of hemorrhaging, or an attack from another animal identified with bruising, teeth marks or rake marks. If it is a gray whale and the tongue is missing, but the rest of the body is intact, it is most likely due to an orca whale attack. Analysis of brain tissue may reveal the cause of death to be due to domoic acid poisoning sometimes associated with man’s use of fertilizers. In addition to Sue’s talk, docents made art prints of marine animals.

Thanks to Julie Walters for organizing the event and to Judy McCarthy for use of her clubhouse.

“What do they have to teach us about ourselves?” Then he writes: “What I don’t see coming is: I have the question almost exactly backwards.” He goes on to “reset” his perspective to see who the animals are, not how like us they are.
Hello to all of the Friends of Fitzgerald Marine Reserve,

Talk about a tough act to follow! I have recently had the pleasure of taking the reins from Tom Ciotti and now serve you as the President of the Board of Directors. Most of you know me by now but for those who do not, I thought my first order of business should be to share a bit of my background with you.

I am a Bay Area native, born and raised in Fairfax, over in Marin County. I am currently a Montara resident where my 11-year-old daughter is attending her final days at Farallone View Elementary School before graduating to middle school in Half Moon Bay.

My family and I moved to Montara four years ago upon return from a seven-year sojourn in the rainforests of Costa Rica, where we ran a 15-room boutique hotel and a 60-seat bar and restaurant on the southern coast. We decided to move to Costa Rica upon the birth of our daughter with the goal of having a job where we could be with her all day, every day. So, like all level-headed, first-time parents, we sold all our worldly belongings and allowed ourselves only one suitcase worth of goods as we cast off on our new adventure.

On days when I was not intimately involved in the day-to-day challenges of running a resort in a foreign country, I spent my free time volunteering at Lily’s school. I soon realized that there was little to no science curriculum at the school, so I offered to create a program that I named Eco Scouts. My Eco-Scout program took place each Wednesday for two hours. The classes focused on one particular facet of nature each month and around that theme I built games, science experiments, workbooks and arts and craft activities.

The rainforest provided us with endless opportunities to study photosynthesis, wildlife, water cycles, marine life and more.

By the time Lily turned seven we decided to return home to the U.S. and naturally gravitated right to the coast. Transitioning back into the technology-driven world of the U.S. was tough for Lily. She was raised without cellphones, movie theaters, television or electronics of any kind. She had spent seven precious years outdoors immersed in wildlife and I wanted her to continue that trend. So I pursued the opportunity to join the docent training program at Fitzgerald Marine Reserve hoping that she and I could spend our weekends together, outside, at the reserve.

The training program was fabulous and soon I was ready to volunteer. However, I work full-time as the VP of sales at a technology company in Los Gatos and was never able to answer the call to lead tours during the week. I really wanted to contribute in some way so I approached Linda and Tom Ciotti with the idea of re-starting the Junior Naturalist Program that had been created years ago under Bob Breen. When I explained to Linda and Tom that I had three years of experience creating content focused on nature and marine life it was easy for them to say yes and soon the program was under way!

2016 marks the third year of Junior Naturalist Camp and the first year that I will not be personally running it. I will still create the materials and work with the team to map out a fabulous week of fun and learning but the demands of my current job do not allow me to spend a week at the reserve.

I found myself faced again with a longing to want to do more for the reserve and for the Friends and when I found out that Tom’s term in office was nearing an end, it seemed like a natural fit for me to jump in as president and contribute as much as I can from yet another different perspective.

During my tenure as President of the Board of Directors I hope to learn more about programs the other MPAs in California have created, as well as share with them what we’re accomplishing at our reserve. I look forward to attending our continuing education classes (last month’s whale event was fantastic!) and I hope to participate in Bio Blitzes, beach cleanups and whatever else we come up with to educate and protect the reserve. If there is anything in particular you would like to see from me during my time serving on the board please do not hesitate to reach out to me! I can be reached via phone at 415-481-1981 or feel free to email me at khayes2008@gmail.com.

Thank you!

Kathleen

FFMR’s new Board President, Kathleen Hayes

FFMR at Cal Academy of Sciences Oceans Week

Kathleen leading tours during Oceans Week.
This was the first count in two years where the Hopkins Rose did not dominate our nudibranch count. For the May 8th count, the *Phidiana hiltoni*, a carnivorous nudibranch, was the most commonly seen, with a total of 192. This was also the first count where we did not see any sea lemons!

A new record was set with over 900 nudibranchs spotted over a 2 hour time frame.

The low tide was a wonderful -1.5 and conditions were perfect. The seas were calm, the temperature was in the high 50s and it was partly cloudy with minimal wind.

FMR docents included: Sandi Meyer, Susan Evans, Jan Pelinka, Sasha Greenawalt, and Julie Walters.

Other contributors: Donna and Kevin Pomeroy, Robin Agarwal, Jean Replicon and Doug Mason.

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**Nudibranch Count: New Record**

_by Julie Walters_

<table>
<thead>
<tr>
<th>Common name</th>
<th>Species</th>
<th>Total</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shag rug</td>
<td>Aeolidia chromosoma</td>
<td>1</td>
<td>Seen by Doug Mason</td>
</tr>
<tr>
<td>Olive’s aeolid</td>
<td>Aeolidia papillosa</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Modest cadlina</td>
<td>Anteaeolidiella oliviae</td>
<td>12</td>
<td>Less common</td>
</tr>
<tr>
<td>Dark spot cadlina</td>
<td>Cadlina modesta</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Graceful aeolid</td>
<td>Cadlina sparsa</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Yellow head aeolid</td>
<td>Cuthona flavovulta</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Shiny aeolid</td>
<td>Cuthona fulgens</td>
<td>7</td>
<td>Less common</td>
</tr>
<tr>
<td>Orange-face cuthona</td>
<td>Cuthona laguae</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>San Diego dorid or ring spotted dorid</td>
<td><em>Doriprismia albo</em></td>
<td>154</td>
<td>2nd most common</td>
</tr>
<tr>
<td>Colorful dirona</td>
<td>Dirona picta</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Sea goddess</td>
<td>Doriopsilla albopunctata</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Monterey dorid</td>
<td>Doris montereyensis</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Hammerhead doto</td>
<td>Doto amyla</td>
<td>80</td>
<td>Big increase</td>
</tr>
<tr>
<td>3 lined</td>
<td>Flabellina trilineata</td>
<td>38</td>
<td>Big increase</td>
</tr>
<tr>
<td>Heath’s dorid</td>
<td>Geitodoris heathi</td>
<td>2</td>
<td>Didn’t see as many this count</td>
</tr>
<tr>
<td>Hermissenda</td>
<td>Hermissenda opalescense</td>
<td>86</td>
<td>Split into 2 groups</td>
</tr>
<tr>
<td>Cockerell’s dorid</td>
<td>Limacia cockerelli</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Hopkins Rose</td>
<td>Okenia rosacea</td>
<td>120</td>
<td>3rd most common</td>
</tr>
<tr>
<td>Sea lemon</td>
<td>Peltoxoris nobilis</td>
<td>0</td>
<td>1st time no Sea lemons were seen</td>
</tr>
<tr>
<td>Hilton’s aoelid</td>
<td>Phidiana hiltoni</td>
<td>192</td>
<td>Most common find</td>
</tr>
<tr>
<td>Sea clown</td>
<td>Triopha catalinae</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Spotted dorid</td>
<td>Triopha maculata</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>901</td>
<td></td>
</tr>
</tbody>
</table>

(l to r): Docents: Susan Evans, Sandi Myer, Sasha Greenawalt, Jan Pelinka, Jean Replicon and Julie Walters.
Upcoming Continuing Education Event
for Fitzgerald Docents

Talk on Citizen Science and book signing by author Mary Ellen Hannibal
Sunday September 18th, 4:00-6:00pm
Location: Princeton. Email with address will be sent after you RSVP.
RSVP to Julie Walters at Juliebw2@gmail.com or Karen Kamumuck at kkalumuck@gmail.com

To protect nature and open space, conservation has historically put its arms around special areas and limited human impacts therein. But as Mary Ellen Hannibal explains in her most recent book, *The Spine of the Continent*, this approach does not adequately safeguard nature, and species are still going extinct in protected areas at an accelerated rate.

The answer is connectivity—both across the landscape, by establishing corridors between protected areas, and within the landscape, by supporting historic interactions between plants and animals.

Hannibal’s presentation will also draw on her forthcoming book, *Citizen Scientist: Searching for Heroes and Hope in an Age of Extinction*, which describes how the grassroots activism—which Fitzgerald Marine Reserve docents have been a part of—is providing big data for a new kind of nature protection. This book is a personal, historic quest to understand how we got here and to find the best way forward. ◆