BETWEEN the TIDES

Friends of Fitzgerald Marine Reserve

September 2026

Land Birds at Fitzgerald Marine Reserve

by Donna Pomeroy, FFMR Volunteer Naturalist

As a companion to the article I wrote in 2024 focusing on the marine birds at Fitzgerald Marine Reserve, this article will focus on the land birds in and around the reserve. The Moss Beach neighborhood around the reserve is incredibly productive for birds, hosting many species seeking food and shelter in the native and non-native plantings. There is such a diversity of flowering plants, that many birds are able to forage for food even in the dead of winter. Many vagrant birds have been spotted here over the years and the homeowners have gotten used to seeing people walking around with binoculars around their necks. At this date, 286 species of birds have been seen at FMR. About 100 of them occur regularly, leaving 186 species which are considered rare or uncommon.

At this date, 286 species of birds have been seen at FMR.

The allure of finding a rare bird brings birders to the reserve. Vagrant birds, as exciting as they are to find mostly during migration or wintertime, make up only part of the species mix here. The regularly occurring birds that winter or breed here are reason enough to draw in people interested in birds. This includes much-loved birds such as the ***Chestnut-backed Chickadee***, the ***Pygmy Nuthatch***, and ***Song Sparrow***. Also seen frequently are ***California Scrub Jay*** and ***Steller's Jay***, ***Anna's Hummingbirds***, and ***Bewick's Wrens***. A pair of ***Red-shouldered Hawks*** have made the reserve their home for years and have built their nest near the bridge into the cypress grove. From late fall to early spring, the area teems with the colorful yellow and black ***Townsend's Warbler***, along with the attractive ***Golden-crowned Sparrow***, ***Hermit Thrush***, and ***Ruby-crowned Kinglet***. These species migrate north for the breeding season but are replaced in spring by the beautiful yellow ***Wilson's Warbler*** with its jet black cap, and the ***Swainson's Thrush*** with its hauntingly beautiful song, and ***Allen's Hummingbirds*** who find FMR perfect for their breeding needs.

Allen's Hummingbird

Besides the high number of regularly expected species in and around FMR, this area has attracted an unusual number of vagrants. These temporary visits can last from one day to a whole season, but most are only here for a day or so often during fall migration. They include a number of warblers, vireos, and other eastern North American birds who are embarking on their first southern migration and have fouled up migration patterns hard-wired in their brains. These

California Scrub Jay

Chestnut-backed Chickadee

Pygmy Nuthatch

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Friends of Fitzgerald Marine Reserve

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

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

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New Volunteer Naturalist Mentorship Program

As a part of the 2026 coursework, incoming naturalists had the option to partake in a new long-term mentorship program. The program matches new docents with other new and veteran docents who rove the reef to discuss tour interpretation best practices and gain experience identifying tidepool critters. The groups will meet four times between completion of this year's course and the end of 2026. We hope it will be a good way to remain in touch with newly added naturalists, building on their skillset, before tour season ramps up again.

Tommy, Brandt, Aster, and Scott taking a look inside the surge. Bottom l to r: White Dendronotus (rare sighting), Brittle Star, Chitons and Sea Star

Our first event was in mid-June. We encountered some special organisms. We're looking forward to subsequent events.! ◆

The Between the Tides Editorial Board Needs your Help!

In her President's message, Karen Kalumuck has written about the wide range of volunteer work that is done at FMR. One of those activities is the production of the newsletter that you're reading.

Editorial Board members Jody Stewart and Kaua Hermosura have stepped down since the last issue of Between the Tides. Jody was a member of the original Editorial Board that was set up 4 years ago, while Kaua was a more recent addition. We thank both of them for their time and effort on the newsletter

The current Editorial Board, Kathy Barton, Sarah Carter, and Paul Gater will continue rotating as Editors alongside our graphic designer Martie Sautter. We need additional help with planning each issue of Between the Tides, working with authors and finalizing content. Maybe you have great proof-reading skills or the ability to help authors refine their articles. Whether a professional in the field of writing/editing or a complete amateur with an interest, we welcome all!

We expect Editorial Board members to attend a quarterly planning meeting. The time commitment outside this meeting varies depending on how much each person is able to contribute. If you prefer not to join the Editorial Board, but would still like to help, we welcome your interest.

If you're interested in learning more or are ready to join the fun and challenge of creating a newsletter please contact sarah.carter@fitzgeraldreserve.org ◆

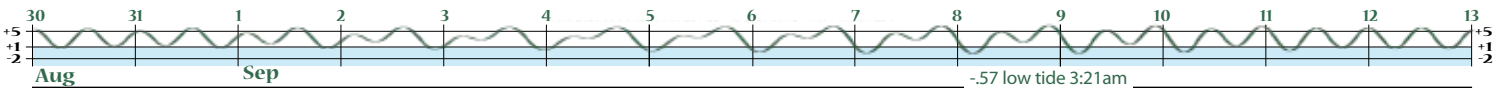
The graph displayed across the page bottoms shows tides for 8/30/26 to 1/16/27 at Pillar Point Harbor. Where the date appears is midnight. Reefs are accessible for exploring at low tides during hours when FMR is posted as "Open." Low tides at least +1 or below are best for tidepooling. See: https://fitzgeraldreserve.org/lowtides

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.

KING Tides are Coming: See page 7

The lowest tides this period at Pillar Point Harbor:

-.57	9/8	3:21am	-.67	11/9	4:51pm
.33	9/23	3:20am	-1.77	11/25	5:20pm
.6	9/26	5:16pm	-.80	12/8	4:25pm
-.27	9/30	8:26pm	-1.90	12/24	5:10pm
-.17	10/11	6:08pm	-.65	1/6	4:22pm
-.1.17	10/28	7:21pm			



Land Birds *continued from page 1*

can be difficult identifications at times, since immature birds are wearing their more cryptic-looking winter plumages. Birders are excited to find one of these vagrants and unusual looking birds should not be overlooked. Unfortunately, when these birds continue on their westward way, they quickly run out of land and most don't swim well. An exception to this is our long-staying local celebrity ***Northern Gannet*** (nicknamed Morris after the Latin name Morus bassanus) can sometimes be seen from FMR as it moves back and forth between roosting on the breakwater at Pillar Point Harbor and its favorite roosts on the Farallone Islands. It is most often seen from the vantage point at the harbor at the end of Johnson Pier when it is loafing or preening atop the breakwater just opposite the pier. The best viewing times are late morning, as it needs to fly out to sea to find food every morning. It is easy to miss seeing the bird if it chooses to land on the back of the breakwater or if it is hanging out at the Farallones. Unfortunately, there does not seem to be a regular pattern, but since this is probably the only Northern Gannet in the Pacific Ocean and it has been here for over a decade, it is worth a few visits to look for it. Northern Gannets are native to the northern Atlantic and it is thought that this one crossed through the Northwest Passage while it was open.

Twenty-nine species of warblers have been seen at FMR, including the five warblers which are regularly found here and another 24 species of eastern vagrants. The five species normally found here include two resident (found year-round), ***Orange-crowned Warbler*** and ***Common Yellowthroat***; two which are here all winter, Townsend's Warbler and ***Yellow-rumped Warbler***, and one which is only found during the breeding season, ***Wilson's Warbler.***

FMR is a great place to see sparrows. Five of the nine regularly occurring sparrows are here year-round, ***Song Sparrow***, ***White-crowned Sparrow***, ***Dark-eyed Junco***, ***Spotted Towhee***, and ***California Towhee***. The other four are only here in winter, when sparrow numbers explode, including ***Golden-crowned Sparrow, Fox Sparrow***, the secretive ***Lincoln's Sparrow***, and the much less common ***White-throated Sparrow***. Besides our locally breeding ***White-crowned Sparrows***, we host two other subspecies of White-crowned Sparrow present only during the winter season.

Many of the birds wintering here come to escape the frozen north where food resources like seeds are covered in ice and snow and insects, a staple of many birds' diets, are waiting for spring before they hatch. Food resources like seeds or insects and spiders are available for these birds to eat here in winter, since we have such a mild climate. By springtime, which is the breeding season, these food resources are much more abundant in the north and our wintering birds leave. At the same time, there are birds migrating here from the south where it may be too warm or dry for them to find favorable breeding sites.

The hedges along the parking areas and bordering Lake Street are outstanding spots to find these sparrows, as well as other species. Look up in the trees to see the nuthatches and chickadees or warblers. The cypress grove itself is somewhat barren of birds, but the riparian habitat adjacent to it can be excellent. There is much to enjoy and appreciate about this magical place. ◆

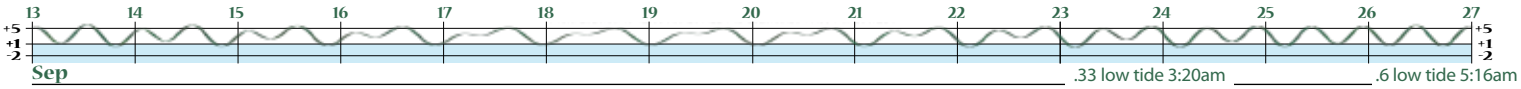
Northern Gannet

Red-shouldered Hawk

For more information on Donna, check out her marine birds article in the September 2024 Between the Tides.

Wilson's Warbler

Townsend's Warbler



Volunteer Spotlight on Jean Replicon

by Paul Gater, FFMR Volunteer Naturalist, Editorial Board member

Editor's Note: This issue highlights the invaluable work of our Volunteers. The Editorial Board of *Between the Tides* plans to introduce you to more of these key players in the issues to come.

Editorial Board member Paul Gater met with the newest member of the Friends of Fitzgerald Board of Directors, Jean Replicon, to learn about her background and why she volunteers with us.

Jean is emeritus professor at Mission College, Santa Clara, where she leads students on 'immersive' field trips as part of Marine Biology and Tropical Ecology courses. These trips visit many places in the Bay Area including Año Nuevo Reserve, Elkhorn Slough and Fitzgerald Marine Reserve. She says "Students do prep work for the field trips so they know a lot about the species they might expect to see at FMR. We see more organisms as a group than as individuals and on our last visit we recorded 58 different species at the Reserve! The students learn much more from studying the organisms in their habitats rather than as exhibits in an aquarium."

Jean also leads Tropical Ecology field studies programs in Costa Rica that are open to the general public. "Participants learn about techniques used in Tropical Ecology, such as species identification, how to estimate biodiversity, setting up camera traps for wildlife, light traps for insects, and conducting forestry surveys. In the tropics, two nearby forest plots can vary dramatically in their species composition despite close proximity."

She says "I knew about the Reserve having lived in Moss Beach for 32 years. I developed a love of the ocean from growing up in Florida and visiting Sanibel Island. There's always something different and new to see at the ocean and especially in the tidepools." As a regular visitor to the Reserve, Jean wanted to give back through volunteering with the Friends and this led to her teaching the mollusk class during the Naturalist Training Program. "I brought samples into the classes and applied the principle from my teaching at Mission College that students learn best from hands-on experiences. And it was good to meet the incoming docents. They're fun people to hang out with!"

The Board of the Friends decided it would be beneficial to include an educator as one of the Board members. Jean was asked to fill that role by past President Ron Olson. "I knew about the Board and joined late last year. I've learned about our need for more docents as we don't have enough for all of our tours. I'm already getting involved with recruitment of people for the 2027 Training Class. I'm putting together a presentation so we can talk to other groups about the Reserve, the Friends and our volunteer program."

As a Board member, Jean has gained a broader knowledge about other activities happening at the Reserve including the Reef research project led by Karen Kalumuck and the Seal Ambassador program. She is also involved with the popular Plankton Paloozas. "I've seen first-hand how much work is done by so many volunteers at the Reserve," she says.

We ended our conversation with a couple of easy questions!

What is your favorite 'critter' at FMR?

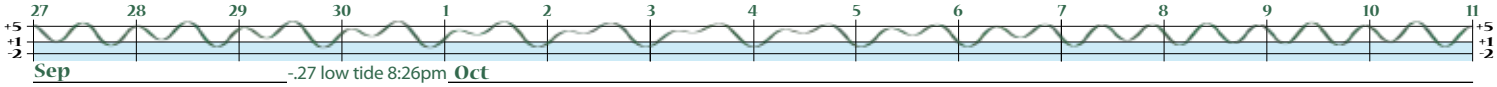
I do like the sea urchins… and the students like to see them! But my favorite is the Goose-necked barnacle that you can find living in the mussel bed.

Goose-necked barnacles; photo Tom Page, public domain

How do you spend your 'spare' time.

I'm outdoors a lot and obsessed with iNaturalist. I enjoy photography and I'm part of a social biking club.

Welcome aboard Jean! ◆



Message from President Karen Kalumuck

Lately, I've been reflecting on time. Time and Volunteering. Time is a slippery concept —it's a measurable period, a non-spatial continuum of past, present and future, and, among other things, leisure. Last year FFMR Volunteer Naturalists donated 3,627.5 hours of their leisure time toward the fulfillment of our mission, *"…the promotion of educational and experiential activities for students, visitors and researchers."*

As an all-volunteer organization, FFMR's existence is tied to donations of time, as well as money. Time is perhaps the most personal, and most non-renewable resource of all. While each volunteer's motivation for being a part of FFMR is as unique as they are (see Interview, page 4), their contributions to our organization are utterly priceless.

What drives us, the FFMR Volunteer Naturalists, to do what we do? We give our precious time away to an organization's mission, without any expectation of compensation. Why? What do volunteers gain from their volunteering experience with FMR?

FFMR Specific Volunteering

A recent survey of FFMR Volunteer naturalists revealed a host of experiences that individuals found personally rewarding. A few include: Witnessing the awe of a child seeing the ocean for the first time; Guiding ecology students as they discover the inhabitants of the reef; Developing long time friendships with fellow nature lovers; Helping to protect our coast by engaging and educating visitors; and Nurturing and sharing a passion for life long learning.

FFMR's 3600+ hours of donated time include clearly visible activities. Beyond being a tour leader, there is roving on the reef, being a Seal Ambassador, and staffing the Visitor Center. Each of these positions would benefit from more attention from volunteers. Volunteer hours also include "invisible," behind-the-scenes functions. These include planning and executing our annual Training Course, creating this very newsletter, and conducting special events such as Plankton Paloozas and Research Surveys. Additionally, volunteers accomplish the extensive list of tasks required to run a small non-profit, ranging from Fund Raising, to Communications.

FFMR Volunteer Drive

FFMR currently includes over 100 volunteers on our rolls. However, fewer than half participated in any volunteer activity in 2025, and the number of those who frequently volunteered was even lower. On average, there are about 2000 students each year on our guided tours for school groups. Staffing these tours during our busy season this year presented a challenge for us to provide a sufficient number of volunteer guides per group. Without the volunteer guides, these tours would not be possible for school groups.

This is FFMR's most pressing need. Guides must be physically able to navigate the 100 stairs to the reef, and the often slippery and always uneven reef rocks. Roving guides are necessary when the reefs are full of visitors of all ages, principally to answer questions but also to protect all the creatures in the tide pools.

To address our need for new volunteers, FFMR is embarking on its first ever Volunteer Recruitment Drive. The kick-off will coincide with an exhibition, "Protected Landscapes," a solo show of the work of Margaret Niven at M. Stark Gallery in Half Moon Bay (opening Sept. 13). Her beautiful paintings of trees include some of the Cypress Tunnel at FMR. Margaret, also a master-print maker, is creating small prints of her paintings to be sold at the gallery for $20 each, with all proceeds going to the Friends of Fitzgerald Marine Reserve. FFMR extends our sincerest thanks to Margaret, and to Marianna Stark, the owner of M. Stark Gallery, for their generous outreach to us.

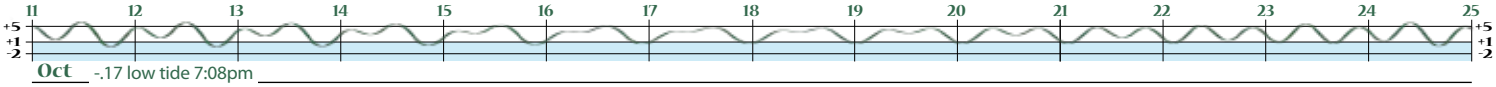
Additionally, we will be visiting a host of Coastside clubs and organizations to promote volunteering with FFMR and inviting locals to attend special events at FMR to discover the fun of being an FFMR volunteer.

Invitation

Our next Training Class will begin in January 2027 and is required for volunteer naturalist guides and reef roving. Other "visible" volunteer roles such as Seal Ambassadors and Visitor Center staff are taught through "on-the-job" learning at any time of year. We welcome people of all abilities and interests to join us in any of our many volunteer activities. I hope that I have convinced you to spend some of your leisure time as an FFMR volunteer; we would love to welcome you on board! ◆

You can see the need for Volunteers to help manage large crowds who can overwhelm the tidepools and the creatures in them.

How much more fulfilling is a visit to the tidepools led by a Volunteer who can help you see and understand the marvels living there.



Oct -.17 low tide 7:08pm

The Tides at Fitzgerald Marine Reserve

Part 1: Why Are There Two Tidal Bulges?

by Eric Bing, FFMR Volunteer Naturalist

You may have wondered about this while watching the water rise and fall at Fitzgerald: why do we usually get two high tides, a little more than twelve hours apart, rather than one? Most people picture the Moon's gravity pulling ocean water toward it, which explains a bulge on the side of Earth facing the Moon. But that doesn't explain the second bulge, the one on the far side facing away from the Moon. If the Moon is pulling water toward itself, why would water pile up on the opposite side of the planet too?

If tides were simply about gravity pulling on water, the Sun should dominate: it pulls on Earth nearly 180 times more strongly than the Moon does.

It turns out this puzzle has a close cousin. If tides were simply about gravity pulling on water, the Sun should dominate: it pulls on Earth nearly 180 times more strongly than the Moon does. And yet, when it comes to tides the Moon wins, its tidal effect is roughly twice the Sun's. Something other than raw gravitational strength must be driving the tides, and that same something explains both puzzles at once.

The key is that the Moon doesn't pull on all of Earth equally.

The Basic Picture

The key is that the Moon doesn't pull on all of Earth equally. It pulls hardest on the ocean water closest to it, slightly less strongly on Earth's center, and least strongly on the water on the far side. That difference in gravitational acceleration, not the overall pull itself, is what produces the two-sided tidal effect.

On the near side, the Moon pulls the water away from Earth's center slightly more strongly than it pulls Earth's center. On the far side, the Moon pulls Earth's center toward itself more strongly than it pulls the far-side water. Relative to Earth's center, the water is therefore displaced outward on both sides. One side is pulled ahead; the other is left behind.

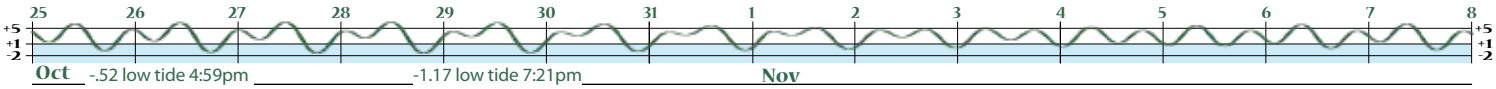
In the simplest model, these two tidal bulges remain roughly aligned with the Moon while Earth rotates through them. A lunar day, the time required for a location on Earth to return to the same position relative to the Moon, lasts about 24 hours and 50 minutes. That is why the two high tides are, on average, about 12 hours and 25 minutes apart.

Real tides are more complicated. Continents, the depth and shape of ocean basins, and local coastal geography distort the idealized bulges and affect when and how high each tide arrives. That is why Fitzgerald's two daily high tides, and its two low tides, are usually unequal.

Falling Toward Each Other

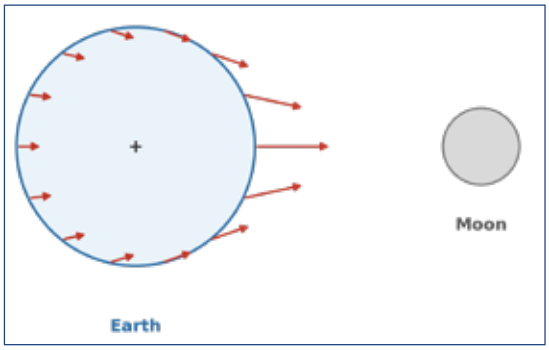
Here's a way to picture two tidal bulges that also explains why the critical factor is not gravity's overall strength. Earth and the Moon aren't just sitting there with the Moon tugging on us—they're orbiting their shared center of mass, which means both bodies are constantly pulled by gravity toward that center, together.

Now imagine the near-side water, Earth's center, and the far-side water as three separate points, all falling toward the Moon as part of that orbit. The near-side water, being closest, feels the strongest pull and falls fastest. Earth's center falls at a middling rate. The far-side water, being farthest, feels the weakest pull and falls slowest. Relative to Earth's center, the near-side water surges ahead, and the far-side water lags behind—bulging out on both sides of the planet, in opposite directions, for the same underlying reason: they're all falling toward the Moon, just at different rates.



Why Gradients Matter More Than Gravity

This is where the Sun/Moon puzzle from the opening paragraph resolves. Tides aren't driven by how hard something pulls on Earth overall, they're driven by how much that pull changes across Earth's diameter. Scientists call this changing pull a tidal force, to distinguish it from gravity itself.



The Moon's gravitational pull on Earth, exaggerated to show how it weakens with distance. The near side feels the strongest pull, the far side the weakest—the seed of both tidal bulges.

Gravity weakens with the square of distance. But the change in gravity across an object, the gradient, weakens even faster, with the cube of distance. Double the distance and the tide-generating effect falls to about one-eighth. The Sun is so far away that even though its overall gravitational pull on Earth is enormous, that pull is nearly uniform across our planet; there isn't much difference between the near side and far side from the Sun's perspective. The Moon, much closer, has far weaker gravity overall but that gravity changes noticeably across Earth's diameter, because Earth takes up a larger share of the distance to the Moon. That steeper gradient is what makes the Moon the primary driver of our tides, despite the Sun's far greater pull.

Two Bulges, One Cause

So the two tidal bulges aren't two separate phenomena, they're two faces of the same gradient. Whether you picture it as the Moon pulling near-side water away from Earth's center (and Earth's center away from far-side water), or as three points falling toward the Moon at three different speeds, you land in the same place: gravity's difference across Earth, not its overall strength, drives what we see twice a day at Fitzgerald.

That difference isn't constant throughout the year, some seasons bring dramatically lower tides than others, and some of the best low tides happen when nobody's around to see them. That's a story of its own, and one we'll dig into with fourteen years of Fitzgerald tide data in our next issue. ◆

About the author:

Eric Bing joined FFMR as a docent in 2022. Around FFMR, you might know him as the person who dresses up as Velella velella for the July 4 parade. You may also know him as the guy who runs the FFMR Discord group (the messaging platform for the FFMR community). When he's not out on the reef he does software security and plays with computers. ◆

...you land in the same place: gravity's difference across Earth, not its overall strength, drives what we see twice a day at Fitzgerald.

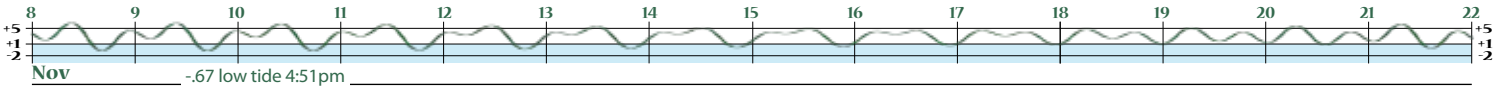
Look for Part 2 in our December Between the Tides!

King Tides are Coming!

November 24-26, 2026 • December 23-25, 2026 • January 21-22, 2027

The highest tides and the lowest tides occur on approximately the same dates. And there are **two** high tides and **two** low tides in a 24-hour period. If you've read Eric Bing's article on these pages, you'll understand why. Below are the **King Tides (bold red)** for this year and their associated **lowest tides (bold black)** of the winter.

Nov 24	**H +6.87**	**9:08am**	**Dec 24**	**H +7.22**	**9:39am**
Nov 24	L -1.64	4:31pm	Dec 24	L -1.90	5:10pm
Nov 25	**H +6.96**	**9:50am**	**Dec 25**	**H +7.04**	**10:30am**
Nov 25	L -1.77	5:20pm	Dec 25	L -1.72	5:58pm
Nov 26	**H +6.87**	**10:36am**	**Jan 21**	**H +7.11**	**8:43 am**
Nov 26	L -1.68	6:12pm	Jan 21	L -1.63	4:07pm
Dec 23	**H +7.17**	**8:50am**	**Jan 22**	**H +7.09**	**9:36am**
Dec 23	L -1.86	4:22pm	Jan 22	L -1.56	4:51pm



Winter 2026 HPAI Outbreak at Año Nuevo Reserve

by Patrick Robinson - Director, Año Nuevo Reserve

Año Nuevo hosts the best-studied northern elephant seal colony in the world.

Within 24 hours, the laboratory testing confirmed what many of us had feared: Highly Pathogenic Avian Influenza (H5N1) had reached northern elephant seals at Año Nuevo.

Researchers at UC Santa Cruz have been studying the northern elephant seal population at Año Nuevo Reserve for more than 50 years across three generations of lead researchers. Professor Beltran currently leads the research program and was contacted a couple of years ago by disease experts at UC Davis' Center for Pandemic Insights regarding their interest in Highly Pathogenic Avian Influenza. This grew into a formal collaboration involving disease surveillance in the pinniped and seabird populations at Año Nuevo Reserve.

In late February this year we noticed something unusual. A handful of recently weaned elephant seal pups appeared to have various neurological symptoms—lethargy, tremors, and difficulty moving. Some seals died within hours. We collected swab samples from these seals and the Beltran Lab team drove them to UC Davis for immediate testing. The UC Santa Cruz stranding program, along with the campus veterinarian, conducted several necropsies that same day to collect tissue samples from these animals. Within 24 hours, the laboratory testing confirmed what many of us had feared: Highly Pathogenic Avian Influenza (H5N1) had reached northern elephant seals at Año Nuevo. It was the first confirmed outbreak of H5N1 in marine mammals in California.

Getting a swab. Photo: Frans Lanting for Beltran Lab/UC Santa Cruz

Avian Influenza Background and Outbreak Response

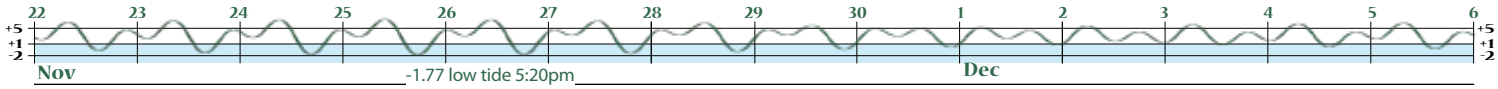
For several years, H5N1 has spread across wild bird populations around the world, spilling over to an increasing number of mammals. In 2023, an outbreak in Argentina killed more than 95% of southern elephant seal pups in some colonies. Those events fundamentally changed how marine mammal researchers viewed the virus.

Año Nuevo hosts the best-studied northern elephant seal colony in the world. We recognized that an outbreak at Año Nuevo was possible and that we should be prepared. Developing sampling protocols with UC Davis prior to the outbreak proved to be invaluable because we could quickly pivot the research program to monitor the outbreak in a comprehensive and safe manner.

Once the outbreak was suspected, the pace of work accelerated dramatically. Field teams carefully documented every sick animal while minimizing disturbance and protecting themselves from potential exposure. Samples from deceased seals were rapidly collected and transported for diagnostic testing. Data flowed continuously between field crews, veterinarians, wildlife disease specialists, and state and federal agencies. We supported a growing public interest with press conferences, websites, webinars, and docent trainings. The news spread around the country and media requests flowed in. At the same time, the virus was spreading into new species—we discovered small spillovers into the sea otter and sea lion populations.

Closing the Park to Protect Wildlife and Visitors

One of the most visible consequences of the outbreak was the temporary closure of the elephant seal viewing area from February 21, 2026 through the end of March (the end of the guided walk season). Each winter, tens of thousands of visitors travel to Año Nuevo to witness the elephant seal breeding season. Closing the viewing area was disappointing for visitors and for those of us who love sharing these animals with the public. However, reducing human activity



around the colony served several important purposes. It provided researchers room to safely monitor sick animals, minimized disturbance during a sensitive period, and reduced opportunities for people to come into contact with infected wildlife. Guided tours were canceled for the remainder of the breeding season while monitoring continued. We appreciate the State Park officials for their rapid response; this was the first breeding season closure in the State Park's ~60 year history!

Recording observations. Photo: Frans Lanting for Beltran Lab/UC Santa Cruz

A Difficult Season—But Not the Catastrophe We Feared

Watching any wild animal suffer is difficult, especially a species that many of us have spent our careers studying. Despite the uncertainty, we were cautiously optimistic.

Of the ~1,200 weanling seals at Año Nuevo, we estimate less than 10% died from the disease. Also, the outbreak primarily affected recently weaned pups, while the vast majority of adult seals remained healthy. Most breeding females had already departed on their post-breeding migration before the virus appeared in the colony and none of the adult females remaining at the colony were symptomatic. Although every mortality matters, the outbreak never reached the catastrophic levels observed in parts of South America.

Año Nuevo was the epicenter of the outbreak and there were only a small number of detections in marine mammals outside of this area. The farthest north detection was well south of Fitzergald Marine Reserve. Why the outbreak remained relatively limited at Año Nuevo is a question scientists are now working to answer. It is possible that the strain of virus at Año Nuevo was less transmissible than strains found elsewhere. There are many research questions that will be addressed in the coming months and years.

Why Long-Term Research Matters

Events like this underscore the value of maintaining long-term ecological studies. Without decades of continuous monitoring, we would have had little baseline for recognizing and understanding the abnormal behavior and the impact to the population. Instead, we could quickly determine that what we were observing was outside the normal range of variation. We now have the unprecedented opportunity to study an H5N1 outbreak earlier than any other outbreak and better understand the lasting consequences in our local populations.

Looking Ahead

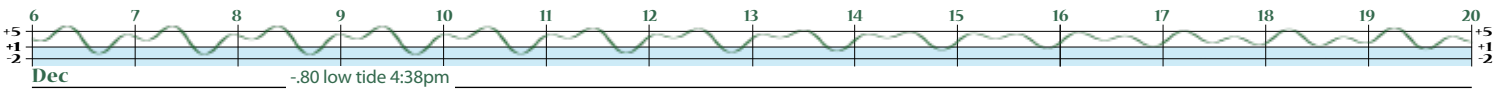
As the elephant seal molting season wraps up for the year and the seals venture off to sea on their foraging migrations, we are hopeful that the upcoming winter breeding season will be less eventful. You can follow along with us using our real-time elephant seal webcam https://www.parks.ca.gov/?page_Id=31947

Avian influenza outbreaks tend to be seasonal with a peak in the winter. We will continue our routine virus surveillance in seabirds and pinnipeds at Año Nuevo. At a broader scale along the central coast, researchers from the Beach Watch program, the Marine Mammal Center, and the stranding networks will be monitoring the beaches for unusual mortality events and will provide samples for testing at UC Davis.

Long-term research, cross-institution collaborations, and the stewards of our coast all help us to better understand, appreciate, and care for our unique habitats. ◆

(note: written collaboratively with AI)

Why the outbreak remained relatively limited at Año Nuevo is a question scientists are now working to answer.



~ On the Reefs ~
UC Berkeley Postdocs

In March, a group of postdoctoral fellows from UC Berkeley studying quantum physics visited Fitzgerald. They expressed heartfelt gratitude for an unforgettable experience! "Our group was blown away by the wonders of the tidepool ecosystem, and we could not have asked for better guides! Your passion and knowledge were contagious, and you expertly introduced us to the incredible diversity of life in this unique environment."

Cynthia Giovannetti, Naturalist at Fitzgerald said the students "were really engaged in learning about the reserve and intertidal species. As we circled back to the sand I pointed out spotted a Gumboot Chiton, a great way to leave the intertidal zone! During the walk back one of the guests told me they never would have known about the animals we discovered today had I not pointed them out. That was awesome, moments like this are why I keep volunteering!"

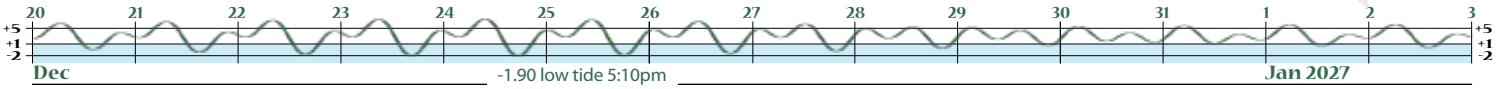
FFMR Naturalists Visit the Marine Mammal Center

FFMR Group on Observation Deck with Tour Guide Angel Christenary

FFMR President, Karen Kalumuck, organized a 'behind-the-scenes' tour of the Marine Mammal Center in Sausalito for a group of 16 volunteers. The group included several people from this year's training class. It was a rainy and chilly Sunday afternoon in April but the group enjoyed a highly informative tour led by AngelNoelle Chrisentary, one of the employees at MMC. We learned that MMC is the largest hospital for marine mammals in the world and looks after 'patients' rescued anywhere along the 600 miles of coastline from Mendocino to San Luis Obispo.

MMC is currently taking care of a Northern elephant seal that was rescued in Alaska and has created a quarantine area for patients, mainly harbor seals, arriving with avian flu. We saw the kitchen where 'fish smoothies' are made for pups who haven't been weaned and had a chance to watch from the observation deck as a pup was being fed with this culinary delight.

MMC has a volunteer pool of over 1400 people. We finished the tour by agreeing to stay in contact and hope to have a reciprocal visit by MMC staff and volunteers to FMR in the future. ◆



2026 Half Moon Bay High School FFMR Scholarship Recipients

The Friends of Fitzgerald Marine Reserve honors the vision of Bob Breen by reaching out beyond our park border to promote environmental preservation. A part of this is the annual awarding of scholarships to three Half Moon Bay High School students studying marine biology or ecology.

We're delighted to announce the 2026 FFMR scholarship recipients: Ian Ehrhardt, Athena-Tyche Lodwick, and Javier DeBode. They have told us more about their interests in marine sciences, their plans for college, and other tidbits.

FFMR President Karen Kalumuck showcases Ian Ehrhardt, Javier DeBode and Athena-Tyche Lodwick

Ian Ehrhardt will be attending Western Washington University in the fall where he is leaning toward majoring in Environmental Science or Marine Science. WWU has a new Marine and Coastal Science (MACS) joint degree program; he is also looking forward to taking a variety of courses, exploring what WWU has to offer. After college, Ian will likely pursue a career in environmental/marine conservation.

Ian grew up near the coast and has spent time exploring tide pools and beaches. He remembers staying up late to view bioluminescent surf, discovering thousands of sand dollars washed up on SF's Ocean Beach during a storm, a family vacation to the Galapagos Islands, and visits to Fitzgerald. Over time, he has developed a deep appreciation for the complexity of marine life and the importance of protecting it. For his senior exit project Ian reported on local efforts to save keystone species: the Central Coast's federally endangered coho salmon and threatened steelhead trout populations.

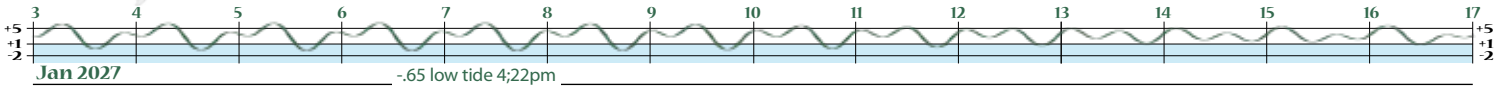
Since receiving the scholarship, Ian has learned more about Bob Breen's life and legacy. He is grateful for the support as he continues his education and is excited to keep learning and contributing to the protection and understanding of marine environments.

Javier DeBode will be attending UC San Diego where he is planning to study Marine Biology. He is considering working on a research vessel after college. Alternatively, he would like to do field work. Javier has always been interested in the ocean, especially when he would visit the Monterey Bay Aquarium with his family as a child. Upon taking Mr. Centoni's Marine Ecology class he was further inspired to study and learn about our aquatic ecosystems. He plans to spend a lot of time at the tidepools on our coast, observing many different creatures!

Athena-Tyche Lodwick will be attending University of British Columbia and is planning to study Conservation and Environmental Science. After college she hopes to work with habitat restoration. Athena got interested in the ocean from going to the tide pools with her family when she was young. She has always appreciated animals of all kinds, which was the gateway to getting her interested in Marine animals.

Congratulations Ian, Javier and Athena! We can't wait to see what the future holds for you. ◆

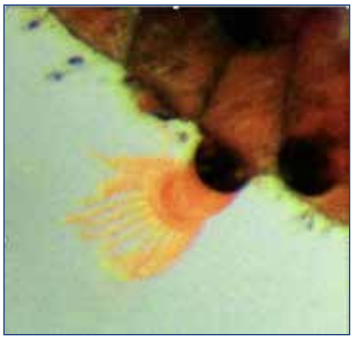
Bob Breen is a legend with all those associated with Fitzgerald Marine Reserve. In 1969 he became Fitzgerald Marine Life Reserve's first Supervising Naturalist back in the day when people would descend on the tidepools to gather buckets of marine life to haul away and motorcyclists would roar up and down the cliffs. He had his work cut out for him! He spent 35 years helping to make the Reserve the protected treasure it now is. In 1999 friends and admirers established the Bob Breen Scholarship Award in his honor.



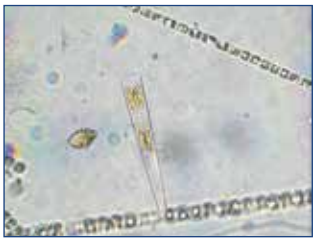
Plantkon Palooza and Dock Creatures

We had a terrific turnout—an eclectic crowd of locals and visitors from other states and countries—and had lots of fun on July 25th and again on October 3rd at the Fitzgerald Marine Reserve Visitor Center. Join us for a future "Palooza"when Friends of Fitzgerald Volunteer Naturalists explore plankton collected in Pillar Point Harbor and dock organisms collected on pier pilings there. You'll see microscopic plankton and learn about their role in the health of marine ecosystems, and the importance of plankton to life on earth! View limpets and candy-striped worms and skeleton shrimp up close! See colonial bryozoans and tunicates up close! Connect plankton to the great whales that roam the oceans! Join us for some hands-on fun!

Check here for future dates: https://fitzgeraldreserve.org/exploring-plankton



Lophopore tentacle



Licomophora

Chaetoceros

Striped kelp fish

Worthy Shag Rug Nudibranch

The FFMR Squib –a rather distant cousin to the Squid, possibly the 350th species of 10-armed cephalopods within the order Teuthoidea

FFMR Squibs (a rather distant cousin to the Squid!)

Horsetail Ferns

On our website: Creature Feature, Horsetail Ferns, *by Karen Kalumuck*

- seen at FFMR nearly year-round
- evolved approximately 360 million years ago—older than the dinosaurs!
- most of us notice the green, bottle-brush like plants but what appears initially is the asparagus-like fertile stem packed with spores, see photo at right which contains both stages
- read more on our website: **https://fitzgeraldreserve.org**

New Leaf Envirotokens: The New Leaf Envirotokens contest gave FFMR a place on the Envirotokens Board in-store July 1–Dec 31. In the past this has raised thousands for FFMR. So don't forget to ***ask*** for a token when you shop and drop it in the FFMR Slot! *Thanks.*

Junior Naturalist Camp led by the San Mateo County Park Rangers was enjoyed by 30 3rd–6th graders for 4 days in July.

The third Marine Algae Workshop was held by FFMR Volunteer Naturalists in July. You can see some of the beautiful pressed algae examples at the Visitor Center.

Friends of Fitzgerald Marine Reserve

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

Contribution Levels:

❑ $25 ❑ $100 ❑ $1000

❑ $50 ❑ $500 ❑ Other _____

❑ I want to double the value of my gift through my employer's matching gift program (please enclose the matching gift forms).

Name _____

Address _____

City _____ State _____ Zip _____

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