

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

J u n e 2 0 2 4

San Vicente Creek

by Keith Mangold, FFMR Volunteer Naturalist

The story of San Vicente Creek begins with the birth of the Santa Cruz mountains. Approximately 90 million years ago, possibly near Acapulco, a hot plume rose slowly from the earth's mantle and began to cool and solidify. This granite mass, known as the Salinian Block, rose through ancient marine deposits and continued to rise, eventually becoming part of the Santa Cruz mountain range. Today, the locally exposed portions of the Salinian Block extend from below Monterey, through Montara Mountain, the Farallones, Point Reyes and Bodega Head as the mass continues to move northward along the San Andreas fault line.

The uplift has not been continuous. The coastal sedimentary rocks show that tens of thousands of feet of sediment were deposited and eroded as the rock mass rose and fell during its journey northward. Part of this movement was a consequence of being pushed by the Pacific plate, as large portions of the range were subducted under the North American plate. The movement along the fault line also triggered innumerable earthquakes which shattered the granite foundation underlying the Santa Cruz mountains and the coast side. As the Salinian Block plowed its way north, it split and fragmented leaving "islands" of rock, with fault lines that eroded to become streams. Formed and reformed by fault lines and geologic uplift, the map of San Vicente Creek reflects its turbulent origins.

The San Gregorio fault line runs ashore at Pedro Point in Pacifica and rejoins the active San Andreas fault line near Highway 35 and Alpine Road. The uplifted northern end of this contact between granite and sedimentary rock provided a perfect opportunity for a stream to form.

Originating in headwaters in the granite of Montara mountain, San Vicente Creek begins its southward journey towards the ocean. The upper reaches are a

rich watershed that has provided habitat for bobcats, grizzly bears, salmon, deer, mountain lions, elk and steelhead. The bobcats, deer, and mountain lions are still there.

Over seven thousand years ago, the Costanoans arrived and established a settlement near the mouth of the creek. They utilized the stream for salmon and steelhead, the ocean for saltwater fish, mussels, crab, abalone, chiton, snails, octopus, urchin, scallops, otters and seals, and the land for elk, deer, seeds, roots and berries. Archeological work on the nearby midden disclosed that the diet included waterfowl that thrived in the marsh covering much of the coastal terrace bordering the creek.



The prominent, upward-sloping Salinian Block formation can be seen here from the Point Reyes Lighthouse. Source: By Chevy111 - Own work, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=56989794>



San Vicente Creek's path from Montara Mountain to FFMR

In 1769, the expedition of the Spanish explorer Portolá passed Monterey on their journey north and discovered the San Francisco Bay. Journals written

continued on page2

Friends of Fitzgerald Marine Reserve

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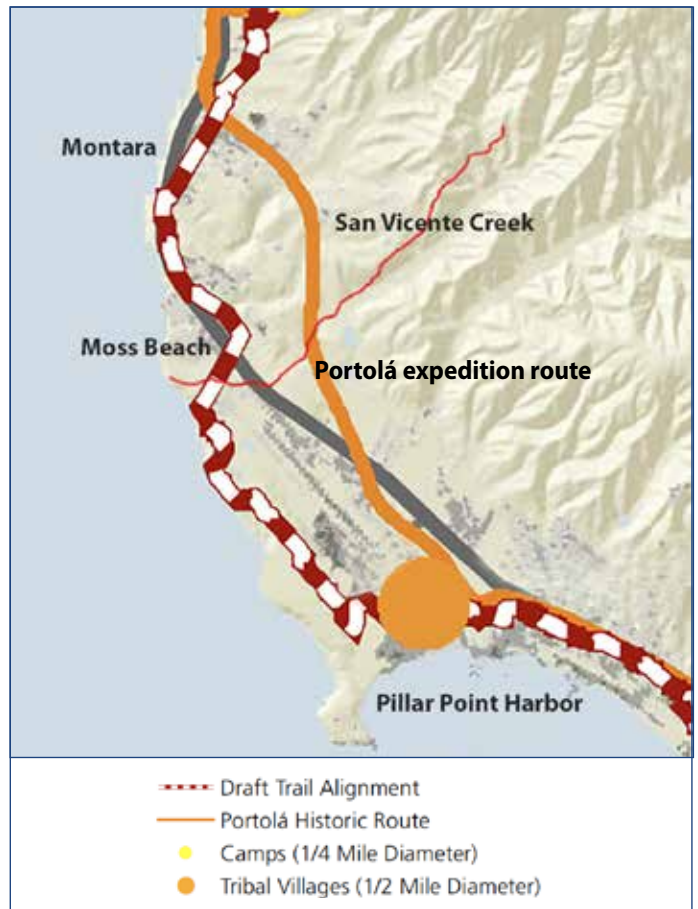
Rob Cala

San Vicente Creek *continued from page 1*

by Fray Juan Crespi of the Portolá expedition noted that they camped near the creek on October 30, 1769¹. In these journals he lamented the lack of trees (firewood) along the route, leading to speculation that centuries of the Costanoan practice of burning the area to increase grass seed production and grazing opportunities for deer and elk had eliminated any large trees in the area.

In 1776 the founding of Mission San Francisco followed the Portolá expedition. As the local native population was incorporated into the mission, the coastal lands became huge “asistencias,” lands used to supply the growing mission. While the light agriculture had a minimal effect on the watershed, in 1821 Spain's rule ended and Mexico subdivided the area into large land grants that resulted in more than 10,000 head of cattle roaming the plains and lower hills. Because of the lack of land transportation, the cattle were valued only for their hides and tallow. Rather than construct walls or fences, the rancheros branded their cattle and killed them in a mass “matanza” where the hides and tallow were distributed based on the cattle’s

brands. The cattle remains were left at the site, resulting in a huge population increase in the local grizzly bear population, to the extent that residents could not leave their homes at night. ➡



The overview map of the proposed Ohlone-Portolá Heritage Trail identifies the route between Ohlone villages that the Gaspar de Portolá expedition took through San Mateo County. Source: <https://www.smcgov.org/parks/ohlone-portola-heritage-trail-project>

We want to hear from you.

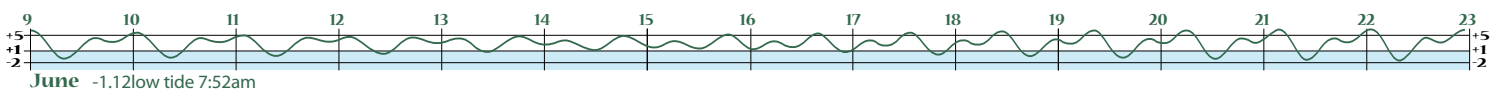
What do you like about the newsletter? What type of articles would you like to see in *Between the Tides*? What article could you write for us? Please contact the Editorial Board at: betweenthetides.editorialboard@gmail.com and we will be in touch. See you out on the reef!

The graph displayed across the page bottoms shows tides for 6/9/24 to 10/26/24 at Princeton Harbor. Where the date appears is midnight. Reefs are accessible for exploring at low tides during hours when FMR is posted as “Open.” Low tides at least +1 or below are best for tidepooling. See: <https://fitzgeraldreserve.org/lowtides>

The winter afternoon low tides change to morning low tides in March. There are almost equally low tides several days before and several days after the noted low tide dates.

The lowest tides this period at Princeton Harbor:

-1.12	6/9	7:52am	-.93	8/19	5:12am
-1.37	6/23	6:44am	-.32	8/30	4:04am
4th lowest tide of 2024			-.45	9/16	3:59am
-1.38	7/5	5:23am	-.33	9/21	8:21pm
-1.26	7/21	5:41am	.16	10/12	12:59am
6th lowest tide of 2024			-1.20	10/19	7:09pm
-.85	8/2	4:27am			



➡ By the 1850s much of the arable land in the area was planted in grain fields. Grain was shipped from the Denniston Wharf, which was located in the present Pillar Point Harbor.

By the time of the arrival of the Ocean Shore Railroad and its Moss Beach Station in 1907, most of the extensive marsh areas and threaded streams that had hindered Portolá's journey had been rerouted to the single creek channel that we see today. The former marshes that caused Crespi to lament the lack of firewood become flatlands bordering the current creek channel. They now contain housing and businesses and occasionally revert to their former flooded state.

Today, San Vicente Creek is frequently dry at the mouth during the fall and often polluted when it is running. Efforts to control pollution of the creek

The cattle remains were left at the site, resulting in a huge population increase in the local grizzly bear population, to the extent that residents could not leave their homes at night.

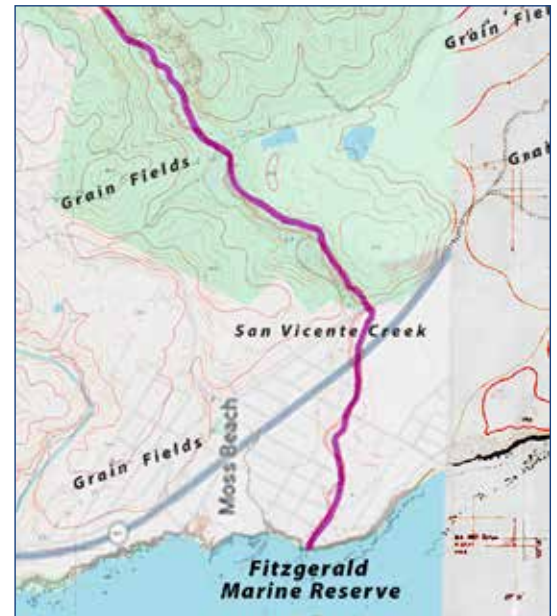
were highly successful during the efforts lead by the Resource Conservation District (RCD) back in 2010 that identified septic, horse and dog waste issues. The program included extensive testing and educational outreach that resulted in voluntary efforts that were highly successful in reducing the creek pollution. Unfortunately, the situation deteriorated in the following decade, until a

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combined RCD/San Mateo County project was started in 2017. This effort, which was highly focused on removing dog waste, also resulted in a large drop in San Vicente bacteria counts. However these counts have been increasing again in recent years. As a result, there is a “permanent” creek posting by the County of San Mateo at the creeks mouth.

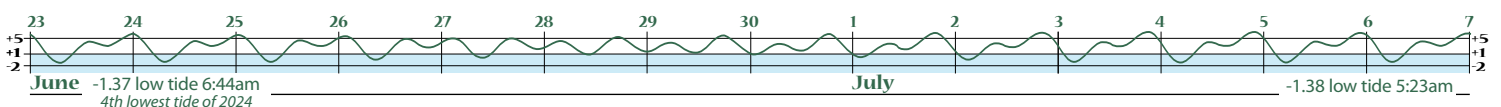
There has not been a steelhead run in the creek since before the 1950s. The creek hosted a significant population of red legged frogs as recently as a decade ago. The most important biologic effect of the mouth of the creek is probably the fresh water that enters during the rainy season, reducing the number of freshwater adverse creatures that would be trapped in the tide pools during low tides. The current downstream creek bed is primarily silt and sand and flow is intermittent, at best, during the summer and fall. The creek, with its pristine headwaters, still represents a great opportunity for restoration to a more biologically productive stream. ◆

¹ Bolton, Herbert E. (1927). Fray Juan Crespi: Missionary Explorer on the Pacific Coast, 1769-1774. HathiTrust Digital Library. pp. 225–226



By the 1850s much of the arable land in the area was planted in grain fields. Top: 1861 map underlays a current map. Bottom: 1861 map. Maps are not perfectly to scale with each other.

The creek, with its pristine headwaters, still represents a great opportunity for restoration to a more biologically productive stream.



A Message from Board President Ron Olson



A busy year:

14 new Volunteer Naturalists

Whale Fest 2024

Classroom presentations at Hatch and El Granada schools

Informational display at the HMB Library

Upcoming:

Summer Junior Ranger camp

4th of July Parade

Summer Fest at Coyote Point

Each year Fitzgerald Marine Reserve gets a little bit smaller due to coastal erosion. One would expect that with a slightly smaller park, there would be less for this “friends” group to do. Nothing could be further from the truth. FFMR has made its presence known beyond the park borders through various activities.

FFMR has completed this year's naturalist training class with 14 new graduates. Beyond receiving training for docent-led tours, these naturalists were made aware of the many other volunteer opportunities available.

This is the second year that FFMR has participated in the Earth Day activities at Linda Mar Beach in Pacifica: Whale Fest 2024 which provided a great sharing and learning experience for the community. Two of our newest naturalists, Deshan Yapabandara and Sharon Howell, staffed our information booth. Samples of baleen, whale bone fossils and photographs of our gray whale skeleton ignited a spirited interaction with the public.

In addition, FFMR continues to educate students at local schools. In classroom presentations at Hatch and El Granada schools, we presented materials to teach students about types of marine life and how they have made adaptations to help them thrive. At Sea Crest School, students were taught about the importance of plankton in

the food web as well as the effects that plastics have on the marine environment.

This year we worked closely with the Half Moon Bay High School Environmental Club in setting up an informational display at the HMB Library. The planning and design was done entirely by the high school students. Researching tidal zones in the display was a great learning experience for the group. Materials and exhibits for the project were provided by FFMR. The Environmental Club should be commended in an effort that made this engaging and educational experience a success.



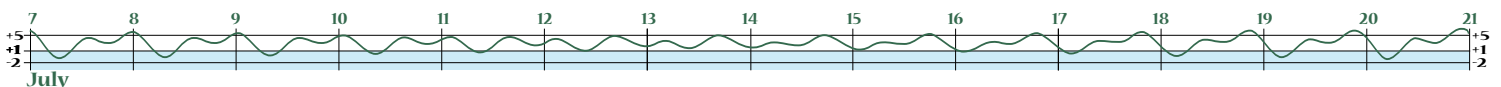
High School Environmental Club President Angel Chen introduced the new tide pool display at the HMB Library. Underwriting support was provided by FFMR.



Deshan, Sharon and Ron at FFMR's table at the Pacifica Whale Festival

This summer is filled with more activities. Plans are underway for the return of a summer camp at FMR. We and San Mateo County Parks will be working with non-profit agencies to provide a coastside experience for children in our county. We hope to use our new microscopes in our Visitor Center so that these young minds can experience a realm that is usually not seen.

Also, expect to see us at the July 4th Parade in Half Moon Bay again this year. Participants in the parade have as much fun as those attending.



We have also accepted an invitation to participate in Summer Fest at Coyote Point. Last year's event was impressive with over two thousand people sharing in a wonderful experience on a beautiful day. Music, dance groups, informational booths, kite flying and food trucks made for a family friendly atmosphere.

Even though many activities have taken us away from FMR, our strongest desire is to be near the ocean. Expect to see us along the bluffs, in the cypress forest, at the Visitor Center and at the tidepools. That is where you'll find us feeling closest to nature.

Come share it with us. ♦

From the National Marine Sanctuaries: Blue Carbon Toolkit (<https://sanctuaries.noaa.gov/education/blue-carbon.html>)

Blue carbon is the term for carbon captured and stored by the world's ocean and coastal ecosystems. Blue carbon ecosystems are nature's secret tool against climate change. Certain species play critical roles in blue carbon ecosystems. Across the globe, marine protected areas preserve blue carbon habitats and processes, and this toolkit specifically focuses on U.S. West Coast blue carbon habitats and processes.

This toolkit is designed for educators and communicators to use to teach others about blue carbon ecosystems. It includes:

- fact sheet
- infographic (see below)
- lesson plan
- links to webinars and supplementary resources

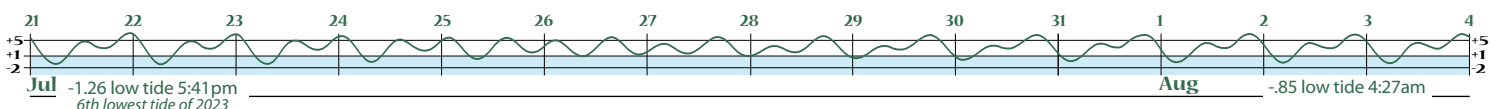


Fitzgerald Marine Reserve is located in the Monterey Bay Marine Sanctuary.

With more than 70% of the planet covered by water, coastal and ocean ecosystems play a significant role in the global carbon cycle by capturing, storing, and cycling 93% of Earth's CO2.

Over half of the world's biological carbon is stored in living marine organisms.

Blue carbon ecosystems can store three to five times more carbon per unit area than tropical forests.



2024 FFMR Volunteer Training Class

by Susan Evans

Congratulations to the class of 2024!!!!

Cesar Cardona, Sarah Cardona, Cynthia Giovannetti, Sharon Howell, Danielle Kraus, Rebecca Clapp-Lotham, Marina Luccioni, Suzanne McGoldrick, Emily Moreno, Devon Ponce, Christy Sturtevant, Kristen Tinetti, Jules Wyman and Deshan Yapabandara!!!!

So many thank yous go to the following who helped with the class: Teachers, Joseph Centoni, Nicole Thometz, Bill Kennedy, Irina Kogan, Jean Replicon and Tom Ciotti. Significant others: Elaine Reade (panel), Paul Gater (low-tide sheet), Linda Ciotti and Carol Ferguson (jackets), Karen Kalumuck (panel), Jody Stewart (computer) and Ron Olson (mentoring and baker extraordinaire).

And, finally, thank you to Danielle and Deshan for writing their class observations.

Saturdays became a highlight as I immersed myself in learning, exploring, and forming new bonds with classmates who shared my passion for nature.



The 2024 Volunteer Naturalist Class~Front: Cynthia, Marina, Cesar, Sharon, Danielle, Christy, Susan Evans (masterful coordinator of the training sessions) Back: Ron Olson (FFMR President), Jules, Devan, Sarah, Suzanne, Emily, Deshan Lunch at FMR



Nudis at Pillar Point



Jules & Marina



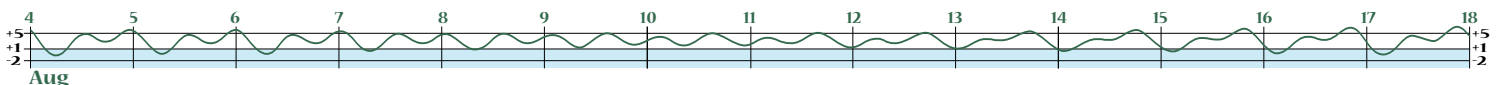
Sharon & Cynthia



Rebecca & Devon



Christy, Cesar, Jules, Joseph & Deshan



**Class Observations:
Deshan Yapabandara**

During my younger years, I often visited the Fitzgerald Marine Reserve, spellbound by the ever-growing beauty of the giant green anemones and vibrantly-colored Ochre stars with each return trip. One eventful day at the reserve in late 2023 I had the pleasure of speaking with a ranger who introduced me to the volunteer naturalist program offered by the Friends of Fitzgerald Marine Reserve. I knew I had to join the program.

Participating in the Fitzgerald Marine Reserve volunteer training has been an incredible experience. Every Saturday was filled with enlightening lectures and engaging activities that took place across the greater Half Moon Bay area. One of my most treasured moments from the program occurred on a beautiful sunny day at the reserve tidepools, which also happened to be my first visit to the tidepools with my naturalist peers. While exploring the tide pools, I came across a rock with a peculiar pink tint on its surface. As I approached, to my astonishment, I realized it wasn't a rock but an abalone! Sharing this discovery with my fellow volunteer naturalists solidified it as a core memory in my time at the reserve.

As I reflect on all my favorite memories from my time in the volunteer training courses, I can't help but think about how much time and effort went into procuring our resources and scheduling our guest speaker series. I couldn't be more grateful to Susan Evans, Ron Olson, Joseph Centoni, and Tom Ciotti for giving all of us trainees the best possible education to serve our FMR community!

**Class Observations:
Danielle Kraus**

I absolutely loved being part of the volunteer naturalist training program at FMR this spring. Saturdays became a highlight as I immersed myself in learning, exploring, and forming new bonds with classmates who shared my passion for nature. Our classroom sessions were a treasure trove of insights from seasoned experts covering a range of topics. Some of my favorite days were marine mammals, mollusks, and cnidarians.

The real thrill came when we took our knowledge to the field, venturing out to the marine reserve and into the tide pools every weekend. It was so exciting to spot my first nudibranch alongside my classmates and discover new creatures with each visit. Witnessing the ever-changing landscape of the reserve was equally captivating. I won't forget the time I stumbled upon the tidepools brimming with by-the-wind sailors, only to find them vanished just days later, leaving behind a few husks.

I'm so grateful to our program leaders, teachers, and the veteran docents whose guidance enriched our learning journey. Now, armed with so much new knowledge, I'm eager to return to the reef to help others cultivate a deeper appreciation for the natural world and its inhabitants. ♦

*As I approached, to my
astonishment,
I realized it wasn't a
rock but an abalone!*

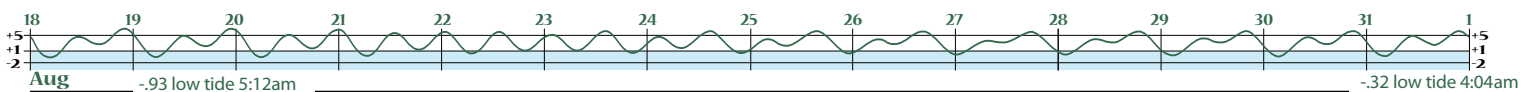
*The real thrill came
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These 5 class grads gathered at FMR on May 2nd for leading tours and/or shadowing: Devan, Deshan, Danielle, Cynthia and Rebecca



Geology with Irina



What's at the Visitor Center?

Part 2, the Sea Otter Pelts

see Part 1, History of the Visitor Center in the March 2024 edition

by Tom Ciotti

“This is the one who would eat all day yet never get fat, whose beauty would be its own undoing.” From the poem *The Innocent* describing the sea otter.

Without doubt the sea otter pelts are one of the star exhibits at the Visitor Center. Visitors are certain to ooh and ahh as they run their fingers through the luxurious fur of these pelts. With up to a million hairs per square inch the sea otter has the densest fur of any animal on earth. While that fur is critical to the otter's survival in the marine environment, it almost led to its extinction at the hands of humans.

All species of marine mammals evolved from various four-legged, fur-bearing land animals. Among the many challenges faced by animals making that transition is thermoregulation. Heat loss in water is 30 times faster than in air. So staying warm while living in the ocean re-

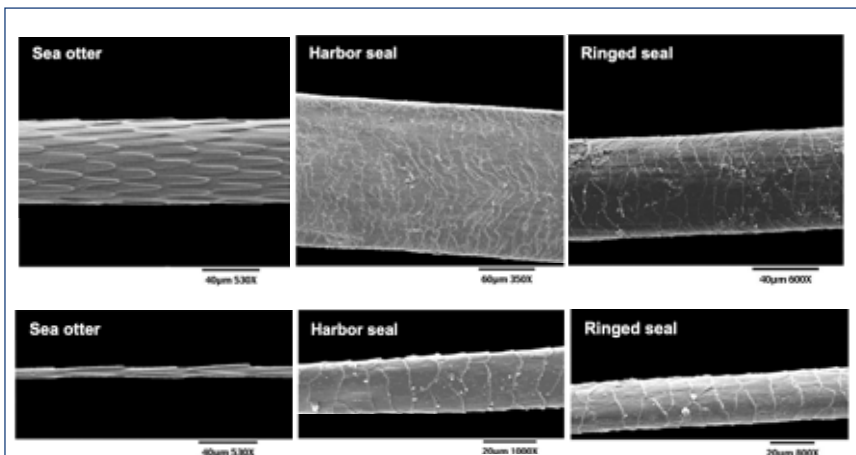
quired insulation adaptation. While the ancestors of other species such as the whales and seals basically did this by swapping fur insulation for blubber insulation, the sea otter's ancestors doubled down on fur insulation and increased their metabolism.

The doubling down involved not only increasing their hair density but also developing two different hair types—underhairs and guard hairs—which differ in function and structure. As shown in the illustration below multiple thin short underhairs grow from the same follicle as a single large long guard hair. The number of underhairs bundled with a guard hair varies significantly depending on body location and hence hair density varies over the otter's body. As shown in the photomicrographs at left the surfaces of both the underhair and guard hairs are covered with barbs or spikes. The underhair barbs allow those hairs to form a dense tangled air-trapping layer of fur over the otter's skin whereas the guard hair barbs cause the guard hairs to lay flat and firmly over the underhair layer

'The sea otter's fur provides it with excellent insulation, but only if the fur is kept groomed. During grooming the otter squeezes water out of its fur and blows air into the underhair layer. That air provides the insulation. Grooming also cleans the fur and distributes oil from the otter's skin through the fur to provide waterproofing. Since grooming is essential to keeping the otter warm and healthy, it spends about five hours per day grooming its fur. The otter also stays warm by generating heat via metabolism. This requires the otter to consume a relatively large amount of food—about a quarter of its body weight per day—and consequently to spend about 30%-40% of its day foraging for food. Foraging expends a lot of energy and sea otters spend about an equal percentage of time resting.

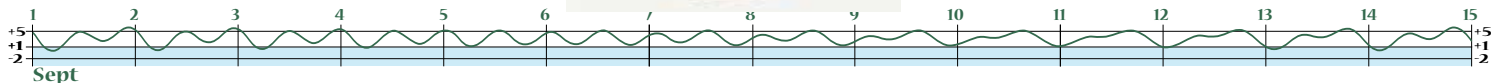
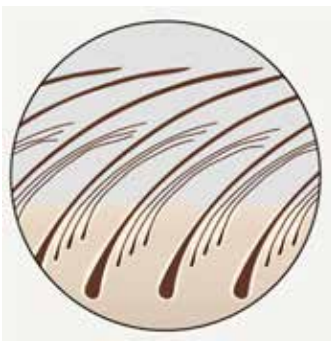
How did humans become an existential threat to sea otters? The historical range of the sea otter spanned the northern Pacific Ocean from the Kuril islands above the Japanese mainland, along the Siberian and Alaskan coasts and south along the North American coast to Baja California.

With up to a million hairs per square inch the sea otter has the densest fur of any animal on earth.



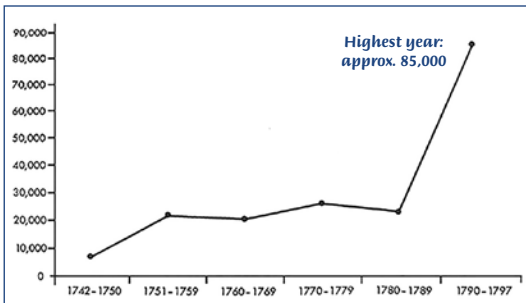
Micrograph of sea otter dorsal guard hair, top, and sea otter dorsal underhair, bottom, with comparisons with those of harbor seal and ringed seal. Note slightly different magnifications, indicated by the scale bars under each micrograph. Magnifications were matched as closely as possible, within the limitations of the microscope

Guard hairs and underhairs grow in clusters together from a single opening. The guard hairs extend out over the underhairs and create a protective canopy for them. For readability, three underhairs are shown for every guard hair in this illustration. Sea otters may have from 12 to as many 108 underhairs bundled with a single guard hair, depending on the location.

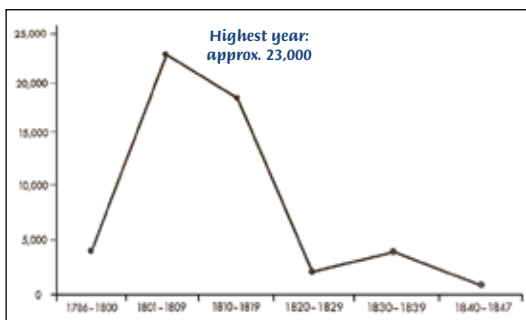


There is archeological evidence that indigenous humans in this range hunted sea otters for their fur for thousands of years. But humans didn't begin to threaten their existence until early in the 18th century. That is when commercial harvesting of sea otters from the islands above Japan by Russians with the assistance (often involuntary) of indigenous hunters started. That harvesting was fueled by high demand for sea otter pelts in China where they were considered "royal fur." The sea otter populations in the Kurils were soon depleted causing the Russians to move north and east in search of fresh sea otter hunting grounds, ultimately reaching and colonizing Alaska and establishing outposts as far south as California. This incursion of Russia into North America was a major factor in causing Spain to colonize California.

In the late 18th century the Asian sea otter pelt market was extremely lucrative causing hunters from other nations such as the United States and England to join the hunt for "soft gold." The two graphs below respectively show the number of sea otter pelts exported from the Russian North Pacific in the latter



Russian sea otter exports from the Russian North Pacific from 1742 to 1797. Data compiled by historian Ryan Tucker Jones.



California sea otter skin exports from 1786 to 1847. Data compiled by historian Adele Ogden.

half of the 18th century and the number of California otter pelts exported in the first half of the 19th century.

By the end of the 19th century the historical sea otter population, estimated at several hundred thousand, was reduced to just a few thousand. While their scarcity made hunting them uneconomical, it brought the species to the brink of extinction. In 1911 the United States, Great Britain (including Canada), Japan and Russia signed a treaty protecting the sea otter. Today sea otter populations along the California, Washington and Alaskan coasts are protected by the 1972 Marine Mammal Protection Act. These protections allowed the sea otter population to rebound during the 20th century. But it is still only a small fraction of its historical size.

The sea otter played a significant role in the economic and political history of the western coast of North America. And its near demise caused adverse changes in the marine environment of that coast that are still being felt today.

There are many more interesting and fascinating facts about this enchanting animal.

Come visit FMR, run your fingers through its fur and learn more about the "one who would eat all day and never get fat, whose beauty would be its own undoing."



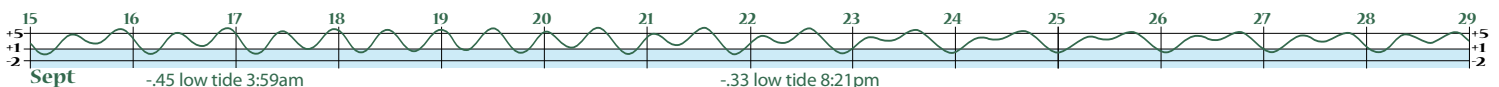
Sources, page 8: "The Innocent" by Guujaaw, Artist and a Hereditary Leader of Haida Gwaii; upper figure, "Fur versus Blubber: A comparative look at marine mammal insulation and its metabolic and behavioral consequences," Heather Liwanag, California Polytechnic State University, San Luis Obispo, December 2008; lower, "Fur Keeps Heat in and Cold Water Out- Otters," Kathryn Krupin, The Biomimicry Institute 2021

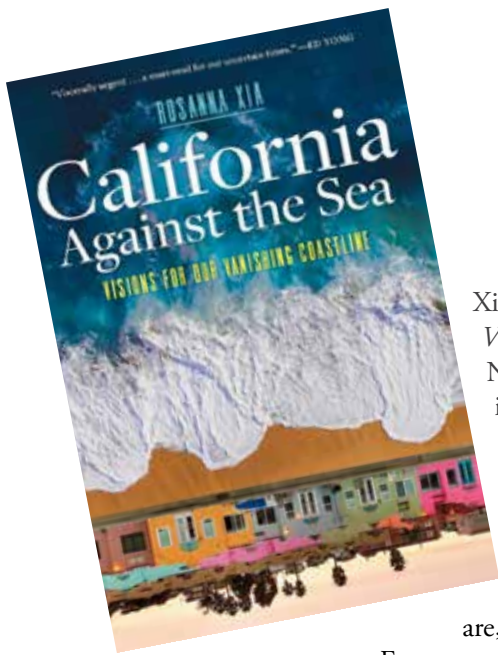


Watchful and protective sea otter mother holding baby on stomach, iStock - Credit: htrnr

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California Against the Sea: Visions for our Vanishing Coastline

Author: Rosanna Xia

Reviewer: Jody Stewart, "Between the Tides" Editorial Board Member

I recently finished reading Rosanna Xia's book, *California Against the Sea: Visions for our Vanishing Coastline*. Now, as I drive down Highway 1, taking in California's stunning coastline, I have an entirely different perspective on what it really means to live, work, and play next to the Pacific Ocean.

Xia's book is a tour de force of the many ways we have, and are, mistreating our treasured coastline. Even as some communities try to embrace the rising tides, others seek to hold it back. Going far beyond a discussion about warming seas, higher tides and stormy weather, Xia takes us on a journey along the coast, visiting different communities and characters along the way, highlighting the threats the sea presents as it moves out of "...a remarkable moment in history when the sea was at its tamest," a time when modern society decided to live right next to, if not on top of, the Pacific Ocean.

It started with simple settlements, accessible to all, then progressed to many high value exclusive coastal properties.

Now, though, the sea itself has entered a new age where human-caused climate change, combined with a natural cycle of environmental factors, has seen the Pacific Ocean roaring back at us, doing what it has always done, claiming the shoreline and, in many notable places, our coastal settlements. How we manage this new reality will define our coastlines future for generations to come.

Xia points out the limited options we have for adjusting to the rising seas. Seawalls and other barriers have hidden consequences, shifting the sand and how we experience our coastline. "For every new seawall protecting a home or a road, a beach for the people is sacrificed." This option also comes with its own complications, with many communities divided on the use of

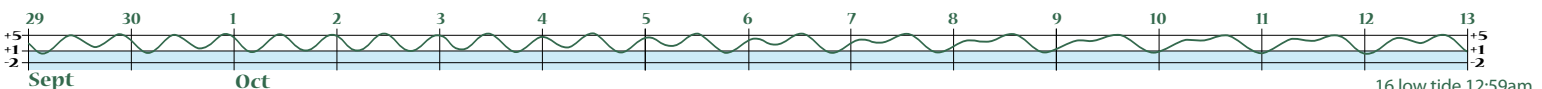
seawalls, assuming it is affordable in the first place. Other communities regularly "replace" sand lost, or choose to elevate roads and homes, attempting to retain their footprint as close to the sea as possible. Perhaps one of the most controversial options is what scientists and economists call "managed retreat": move back, relocate, essentially cede the land to nature." Xia notes that suggesting this option has seen "Mayors ousted, planning documents rewritten, and campaigns waged over the very thought of turning prime real estate back into dunes and wetlands." She also comments that "Many declared retreat un-American. To win, California must defend." For other communities, like Marin City, an historically Black town with a population that suffers poor health, poor housing options, and experiences severe flooding every time it rains, there are no real choices. There is no money to build walls or relocate people; and no help is coming any time soon. Inhabitants of Marin City are forced to live with whatever the rising tide brings.

Perhaps one of the most controversial options is what scientists and economists call "managed retreat": move back, relocate, essentially cede the land to nature."

There are also good news stories throughout the book, with inspiring people like Effie Turnbull Sanders, the California Coastal Commission's first environmental justice commissioner. A role designed to ensure that "at least one commissioner reflected the needs and values of historically underrepresented communities." Sanders helps planning officials, regulators and elected officials understand how California's coastal history has benefited some, while erasing others, including the Tongva, an Indigenous people of California from the Los Angeles Basin and the Southern Channel Islands. The Tongva were harassed, and pushed off the land by white settlers, land that would become Manhattan Beach.

My personal favorite, that I read about as I camped at San Simeon State Park over Christmas, took me by surprise. In a bold decision state transportation officials opted for a managed re-

Xia takes us on a journey along the coast... highlighting the threats the sea presents as it moves out of "...a remarkable moment in history when the sea was at its tamest"...



treat when they decided to move a stretch of coastal highway by Hearst Castle and the Piedras Blancas Light Station 400 feet inland. Realigning 2.8 miles of roadway at a cost of \$57 million dollars added 73 acres to the state park, created 3.5 miles of new coastal trails and 3 acres of wetland, leading to the return of elephant seals and their pups. An example where managed retreat was a win for everyone, including our marine life.

Xia's book is no dry climate change treatise. It is measured, well researched, and relatable. The story telling is excellent and relevant. Some stories inspiring, others deeply sad, ultimately though this book leans more to saying we do still have choices and options that can positively shape the future of California's coastline. This book opened my eyes to our changing environment, how we have and are shaping it, for better or worse.

About the author:

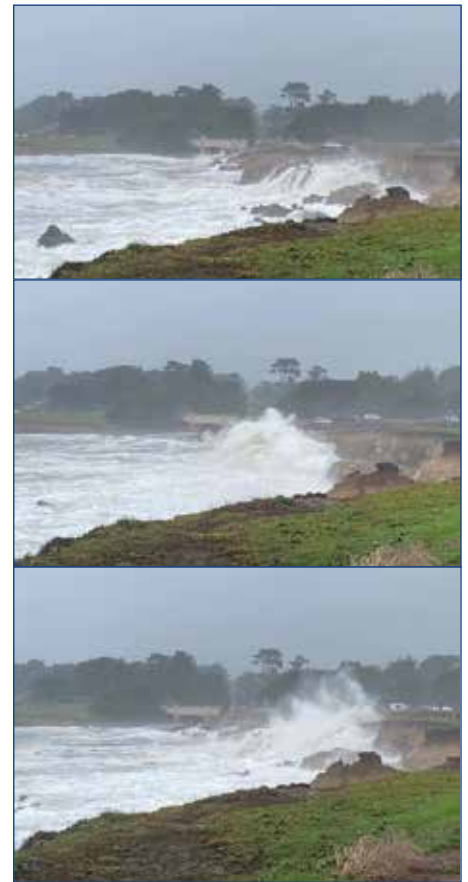
Rosanna Xia is an environment reporter for the Los Angeles Times, where she specializes in stories about the coast and ocean. She was a Pulitzer Prize finalist in

2020 for explanatory reporting, and her coverage of a toxic dumpsite in the deep ocean has been featured in the "Best American Science and Nature Writing" an-

thology. Her first book, "California Against the Sea," examines the future of our vanishing coastline in the face of rising water. ♦

Moonstone Beach Boardwalk in Cambria, Christmas 2023, when massive tides and waves swept away part of the boardwalk.

Photos: Jody Stewart



Xia has made a particular study of Pacifica, recently meeting there with local citizens.

LA Times article by Xia, July 2019: "Responding to just this most recent El Niño season has cost Pacifica \$16 million—no small change for a town whose \$36-million operating budget relies mostly on property taxes. Officials are still seeking funds to cover damage from 2016 and remain mired in an eminent domain battle over two of the buildings."

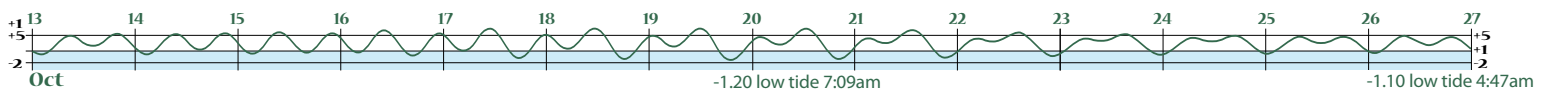


Along Esplanade Avenue in Pacifica, a walkway is all that's left of an apartment building. (Carolyn Cole / Los Angeles Times)

Excerpt from interview with Bluedot Living L.A. editor Robin Jones.

Rosanna Xia: As part of my research for the book, I was invited to join Chumash and Tongva women on a boat. I noticed a woman gesturing at the ocean, and I asked her what she was doing. She said, "Asking for permission to enter." Charles Sepulveda [a Tongva and Acjachemen assistant professor of ethnic studies at the University of Utah] talks about kuuyam, which means "guest" in Tongva. He poses a beautiful, interesting notion: What does it mean to see yourself as a guest of the land? When you're a guest, you don't eat everything in the home and leave a big mess. It's a subtle way of rethinking our relationship with nature.

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Tidepool at Mavericks

Our thanks to Steve Dalleske for the use of his stunning tidepool photo.

“You know that feeling you get (the angst) when you see an awesome picture, but there’s people in it, so you wait and wait and wait until they finally move along and you know you only have a few seconds until the next batch moves in. This is Mavericks Beach at low tide and it was a true miracle I was able to get this composition with no bodies in it.”



From this issue:

San Vicente Creek

Originating in headwaters in the granite of Montara mountain, San Vicente Creek begins its southward journey towards the ocean. The upper reaches are a rich watershed that has provided habitat for bobcats, grizzly bears, salmon, deer, mountain lions, elk and steelhead. The bobcats, deer, and mountain lions are still there.

Recently graduated Volunteer Naturalists

The real thrill came when we took our knowledge to the field, venturing out to the marine reserve and into the tide pools every weekend. It was so exciting to spot my first nudibranch alongside my classmates and discover new creatures with each visit.

California Against the Sea

...when they decided to move a stretch of coastal highway by Hearst Castle and the Piedras Blancas Light Station 400 feet inland. Realigning 2.8 miles of roadway at a cost of \$57 million dollars added 73 acres to the state park, created 3.5 miles of new coastal trails and 3 acres of wetland, leading to the return of elephant seals and their pups. An example where managed retreat was a win for everyone, including our marine life.

Sea Otter Pelts

While the ancestors of other species such as the whales and seals basically did this by swapping fur insulation for blubber insulation, the sea otter’s ancestors doubled down on fur insulation and increased their metabolism.

President’s Message

Even though many activities have taken us away from FMR, our strongest desire is to be near the ocean. Expect to see us along the bluffs, in the cypress forest, at the Visitor Center and at the tidepools. That is where you’ll find us feeling closest to nature.