



The Pinniped Press
A Newsletter by and for Noyo Center for Marine Science Volunteers
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Volunteer Opportunities

Whale Festival is coming up in March. We will need volunteers for all sorts of activities we will be doing to celebrate our migrating grays going by. So, keep your calendar open for March, more information will be coming.

Spanish speaking volunteers are often needed for events, outreach, translating, educational tours, and as docents.

The Events Committee is looking for new members. We plan fun and educational events, fundraisers, and other ways to support the Noyo Center. We do outreach at a variety of local events or at local businesses. We will be holding a planning meeting for 2024 on Saturday, January 13 at 10 am at the Marine Field Station.

For more information on volunteering contact: wendi@noyocenter.org

Reminder:

All volunteer hours are now being recorded solely by yourselves via VicNet.

- You should record all meetings (enter under the program, for example “Crow’s Nest” if you attended a CN docent’s meeting or Discovery Center if you attended a DC docent’s meeting).
- You should enter all your travel time, data entry, etc. as volunteer time for the Noyo Center into VicNet.
- Please round volunteer hours to the nearest half hour.
- At this point, please don’t schedule yourself for upcoming events; just record the hours you have already spent volunteering.

Important Numbers

The December Pinniped Press listed the wrong numbers to call for live and dead marine mammals. Please note the correct ones below.

Who to call when you find:

- A live marine mammal: call The Marine Mammal Center at (415) 289-7325
- A dead marine mammal: call Sarah Grimes, Noyo Center Stranding Coordinator, at: (707) 813-7925
- An injured bird: call The Bird Rescue Center at: (707) 523-2473
- Most other wildlife: call Sonoma County Wildlife Rescue at: (707) 526-9453

Oceans as Carbon Sinks

Jim Rolfe

One of the largest unknowns about the role that oceans play as a carbon sink is our lack of understanding of exactly how the greenhouse effect interacts with oceans. Currently it's estimated that 25% to 30% of the CO₂ released by the burning of fossil fuels is soaked up by oceans. However, long term research data reveals that climate change is altering this absorption rate in unexpected ways. If there is less carbon absorption and more CO₂ left in the atmosphere, then we could be compounding the problem and increasing the warming to Earth's greenhouse effect.

The National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) have been researching this puzzle in the North Atlantic and across the Pacific for the last 30-years. Their data show how far we are from understanding the dynamics of CO₂ exchange between the ocean and atmosphere. They started out wanting to know if the ocean was keeping up with the current amount of CO₂ being released into the air but found that people aren't the only cause of changes in the ocean's carbon cycle. The data show that natural cycles in weather and ocean currents also changed the rates at which oceans will soak up and vent CO₂.

For eons, the world's oceans have been sucking CO₂ out of the atmosphere and releasing it again in a steady inhale and exhale. Seawater takes up CO₂ through the photosynthesis of phytoplankton, but also by the simple chemistry of CO₂ dissolving in seawater to create carbonic acid. Carbonic acid releases hydrogen ions, which then combine with carbonate in seawater, to form bicarbonate, which doesn't easily escape the ocean.

As we burn more fossil fuels and CO₂ levels go up, the oceans naturally absorb more of it to stay in balance, but at a price. The reaction lowers the water's pH, making it more acidic, and if surface temperatures rise, CO₂ leaks out of the ocean much like a soda pop going flat on a warm day. As carbonate gets used up, it is usually restocked by upwelling of deeper, colder waters, which are rich in carbonates dissolved from limestone and other rocks. But the warmer the surface water becomes, the harder it is for winds to mix the surface layer with the deeper layers, and the ocean stratifies (settles into layers). Without the infusion of fresh carbonate-rich water, the surface water saturates with CO₂ which causes more of it to be released. Warmer surface waters also support less phytoplankton, which slows the CO₂ uptake from photosynthesis, adding to a feedback loop.

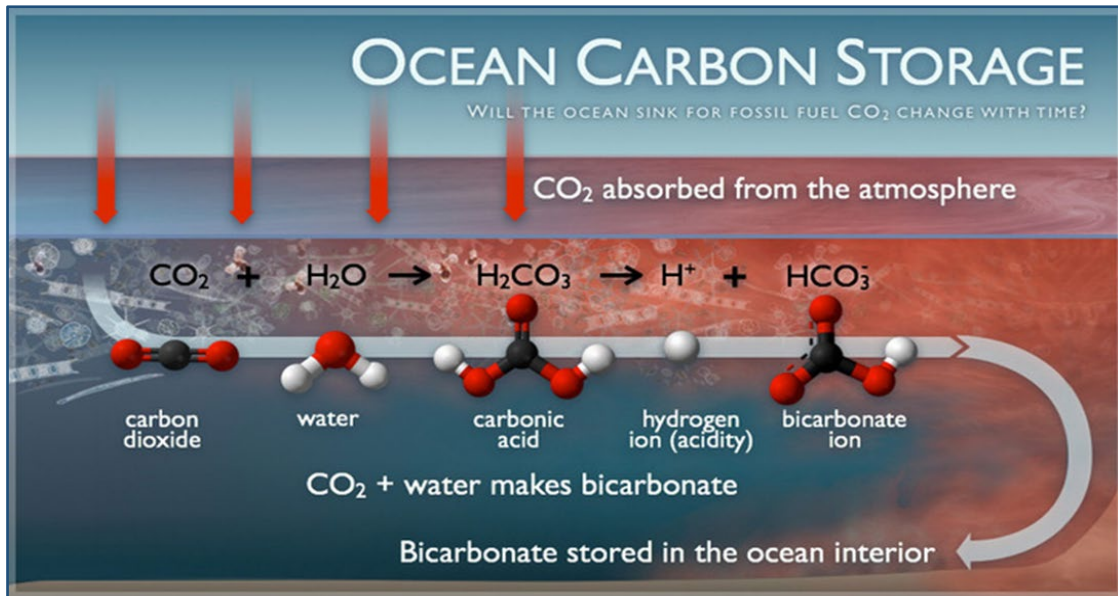


NOAA crew members aboard the R/V Roger Revelle retrieve a water sampling rosette from the frigid waters of the Southern Ocean. As the device is lowered into the ocean, electronic instruments measure salinity, temperature, and depth. Each of the white bottles collects seawater at different depths for detailed chemical analysis in the onboard sea water lab.

Photo: Brent Longworth 2008

<https://earthobservatory.nasa.gov/features/OceanCarbon>

Oceans as Carbon Sinks - continued

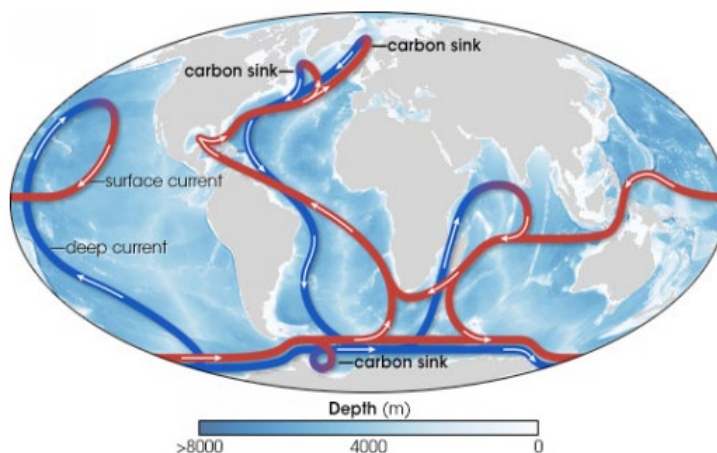


For further explanation of this complex dynamic go to:

[Seawater Carbon Chemistry](#)

Identifying the rates at which oceans absorb human-made CO₂ allows NOAA to calculate what is known as the “global sensitivity” of ocean carbon uptake relative to the increase in atmospheric CO₂. Over a 20-year study period, North Atlantic researchers found a 15% decrease in global sensitivity as atmospheric CO₂ increased. The data suggest that the reason for the weakening is two-fold, with roughly half of the decrease attributed to the reduction of the ocean’s acidic buffering capacity. The second half is attributed to the weakening of the Atlantic Meridional Overturning Circulation (AMOC). Uncertainty remains as to whether this weakening of the AMOC is a natural fluctuation, or a result of ocean warming in the North Atlantic global ocean circulation, leading to decreased transport of carbon from surface waters to deeper global ocean currents where it can be stored for centuries.

Similarly in the Pacific equatorial area, researchers found that ocean carbon venting increased between 1997 and 2004, which coincided with a shift in the Pacific Decadal Oscillation (PDO) from a warm phase to a cool phase during which trade winds and upwelling of deep colder water were stronger. The stronger upwelling brought by the cyclical “natural” cool phase of the PDO enhanced the escape of CO₂ to the atmosphere much like smoke escaping from a chimney. After 30 years of data, NOAA researchers realized they did not yet understand all the complexities of the ocean’s carbon cycle.



The global oceans are connected by deep flowing currents (shown in blue) and surface currents (in red). Carbon from the atmosphere enters the ocean depths in areas of deep-water formation primarily in the North Atlantic, Western Pacific, and the Antarctic shelf. Where deep currents rise toward the surface, they can release “fossil” CO₂ stored for centuries. See: <https://earthobservatory.nasa.gov/features/OceanCarbon>)

Oceans as Carbon Sinks - continued

Since the ocean generates 50% of the oxygen we breathe, absorbs 25% of all carbon dioxide emissions and captures 90% of the excess heat generated by CO₂ emissions, it serves not only as ‘the lungs of the planet’ but also as the largest buffer against the impacts of climate change. Here are a few reasons we need to safeguard the ocean as our best ally for climate solutions.

- Ocean habitats such as seagrasses and mangroves, along with their associated food webs, can sequester CO₂ from the atmosphere at rates up to four times higher than terrestrial forests can. This ability to capture and store carbon makes cultivating algae highly valuable in the fight against climate change.
- Coral reefs are one of the most ecologically and economically valuable ecosystems on the planet. They cover less than 0.1% of the world’s ocean yet support over 25% of marine biodiversity and serve up to a billion people with coastal protection, fisheries, and sources of medicine, recreation, and tourism revenues.
- Marine Protection Areas (MPA) are areas of the ocean set aside for long-term marine conservation and offer one of the best options to maintain the ocean’s health. Today, MPAs cover 6.35% of the ocean, about ten times as much as in 2000. Expanding MPAs globally is critical to protecting ocean ecosystems in the fight against climate change.
- The ocean is an incredible source of renewable energy. Off-shore wind and tidal/current energy derived from natural sources don’t emit CO₂ or methane gas that contribute to global warming.

For further study:

Surface Ocean CO₂ Atlas: <https://socat.info/>

Quantifying the Ocean Carbon Sink: <https://www.ncei.noaa.gov/news/quantifying-ocean-carbon-sink>

Peer Review Carbon Sink Data: <https://www.carbonbrief.org/scientists-solve-ocean-carbon-sink-puzzle/>

Deep Sea Mining—An Option?

Dobie Dolphin

In order to transition away from fossil fuels as quickly as possible, there is a need for large quantities of critical minerals to power zero-emission technologies such as electric vehicles, solar panels, storage batteries and wind turbines. The ocean is increasingly viewed as an abundant source of these minerals including manganese, nickel, copper, cobalt, silver, gold, and rare earth elements.

Three types of deposits hold most of these minerals:

- Polymetallic nodules, also called manganese nodules, which are lying on the seabed.
- Sulfide deposits around hydrothermal vents
- Ferromanganese crusts, which are rich in cobalt and manganese and line the sides of ridges and seamounts.

In a region called the Clarion-Clipperton Zone (CCZ), between Mexico and Hawaii, at depths between 4 and 5.5 kilometers, an estimated 21 billion metric tons of polymetallic nodules could be picked up by mining robots. Nodules grow 1-10 cm every million years, so the nodules that would be harvested are about 10 million years old.

Imagine driving on a dirt road behind a big truck, on a windy day, and you can get an idea of the sediment plume created by a robotic vehicle driving along the seabed, loosening polymetallic nodules. The nodules and accompanying sediment are then vacuumed up and pumped through a pipe to a vessel on the surface. On board the ship, nodules are separated from the slurry, and the wastewater is released back into the water column.

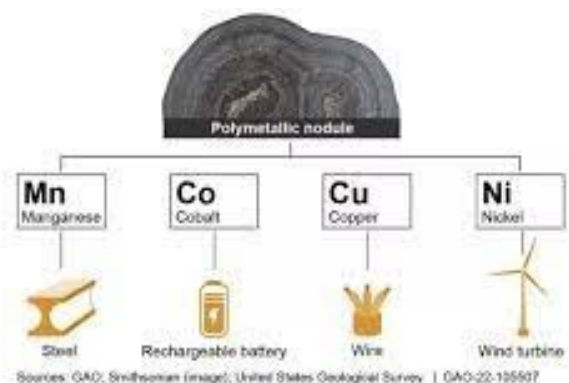
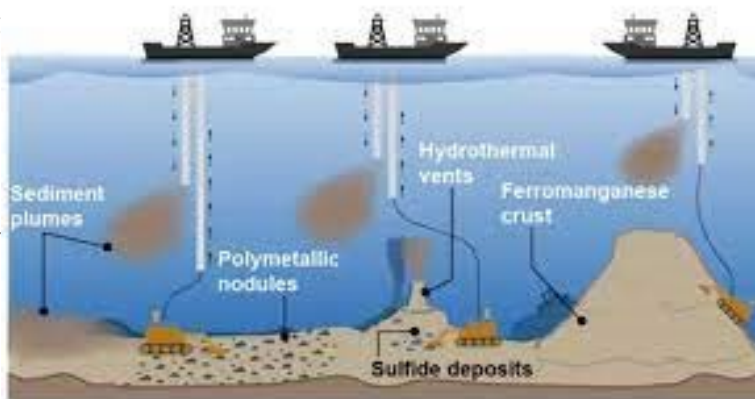


Figure 1. Cross-section of a polymetallic nodule, approximately 1 to 4 inches in diameter, showing the critical minerals that can be found within the nodule, and their applications

Deep Sea Mining—An Option? - continued

Hydrothermal vents are underwater oases, providing habitat for many creatures that are not found anywhere else in the ocean. More than 300 new species have been identified since the first vent was discovered in 1977. These vents are the only places on Earth where the ultimate source of energy for life is not sunlight. Bacteria in the vents use hydrogen sulfide as their energy source instead of sunlight. The bacteria in turn sustain larger organisms in the vent community. Extraction of sulfide deposits around hydrothermal vents would destroy vent habitats and kill the associated organisms.



Source: GAO analysis of peer reviewed journal articles. | GAO-22-105507

Retrieving cobalt and manganese from the slopes of undersea ridges and seamounts involves drilling and cutting into the crust, breaking up the materials, and transporting the pieces to the surface in a similar system.

Deep-sea mining will cause significant disturbances to the marine environment, including direct damage to benthic fauna, habitat destruction, pollution from sediment plumes and wastewater discharge, and noise and light pollution. Fish, marine mammals and other pelagic organisms would be affected.

Who Decides?

The United Nations Convention on the Law of the Sea (UNCLOS), adopted in 1982, is an international agreement that establishes rules governing all uses of the oceans and their resources. As of May 2023, 168 countries and the European Union are members. The only major power that is not a party to UNCLOS is the United States.

The International Seabed Authority (ISA), an autonomous international organization of 36 members, established under UNCLOS, has the mandate to ensure the protection of the marine environment from harmful effects that may arise from deep-seabed related activities. Its job is also to manage seabed minerals in international waters on behalf of “mankind as a whole” and it has the exclusive right to issue contracts for exploring and retrieving minerals.

Critics of the ISA say that its dual role as mining regulator and custodian of the seabed environment is contradictory, and that the body has been leaning too far in the direction of corporate interests. They also say it lacks transparency and accountability, claims it denies. A Vancouver-based start-up called The Metals Company (TMC) is pushing to start mining the CCZ in 2024, in partnership with the Pacific Island nation Nauru.

Currently, there is no regulatory framework in place which would allow for large-scale commercial mining in international waters. Individual countries can mine in their Exclusive Economic Zone, which is 200 miles from shore, but many lack the available funding and technical ability. Also, desired minerals are not abundant in those depths.

Deep-sea mining can start on a commercial scale as soon as the international legal framework that will govern it – the Mining Code – is finalized by the ISA and subsequent mining exploitation licenses are granted.

After failing to reach an agreement in November 2023, the ISA now has until 2025 to finalize regulations that will dictate whether and how countries could pursue deep-sea mining in international waters. Meanwhile, the ISA has entered into 15-year contracts for the exploration for polymetallic nodules, polymetallic sulfides, and cobalt-rich ferromanganese crusts in the deep seabed with 22 different contractors. Nineteen of these contracts are for the exploration of polymetallic nodules in the Clarion-Clipperton Zone.

Researchers do not fully understand the consequences of deep-sea mining, and for that reason an increasing number of countries have renounced the exploitation of the deep sea. At the beginning of the ISA’s annual meeting, 23 countries opposed deep sea mining, ranging from a conditional moratorium to a ban on all exploitation of deep sea beds. The European Commission also called for deep-sea mining to be prohibited until scientific gaps have been properly filled and deep seabed mining can be managed “to ensure no marine biodiversity loss nor degradation of marine ecosystems.” The U.S. Congress has introduced federal legislation to proactively ban the mining of critical minerals in our own Exclusive Economic Zone while calling for a moratorium on mining efforts on the international seabed.

Deep Sea Mining—An Option? – continued

Additionally, major companies, as well as banks and financial institutions, have taken a stand against deep-sea mining. This includes car manufacturers BMW, Volkswagen and Volvo, global electronics corporations Samsung and Philips and technology giant Google, which have publicly committed not to purchase minerals from the deep seabed.

We've already seen the environmental destruction done by terrestrial mining companies including deforestation, erosion, contamination of streams and wetlands by toxic wastes, an increase in noise level and dust, and an adverse effect on the health and well-being of nearby communities.

Fossil fuel industry's offshore drilling operations release toxic pollution into the air and water and oil spills decimate marine ecosystems and wildlife. These are damages that we can see with our own eyes. How will we know what's going on thousands of feet under the ocean?

Resources:

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Robbins, Chris & Leonard, George, (2023, August 9) "Concerns with deep sea mining," *Ocean Conservancy*, <https://oceanconservancy.org/blog/2023/08/09/concerns-deep-sea-mining/>

Ashford, Oliver & Baines, Jonathan & Barbanell, Melissa & Wang, Ke, (2023, July 19) "What we know about deep sea mining—and what we don't," *World Resources Institute*, <https://tinyurl.com/3v7vu5bp>

Monitoring Red Tides, Part 2: Mussels

Linda Francis

I met Sarah Grimes at the parking lot to the Enchanted Trail. The timing of our meeting was driven by the tides as Sarah was looking for a minus tide at a reasonable hour and today was one of those days. She arrived with two interns in tow. Both Sherlyn Flores and Madison Nelson-McDaniel are seniors at Noyo High School, with plans to study biology at Mendocino College. Later Esme Plascenia would be joining us.

After a brief introductory chat, we all headed down the Enchanted Trail, truly an enchanting tree-tunnel trail leading us to the Haul Road. We walked north to a beach with lots of tide pool rocks and crevices, now exposed by the lowering tide which still had about an hour to reach its final ebb. The ocean was particularly unruly with waves of varying sizes, so Sarah left us on the beach as she headed out to gather about 35 mussels, leaving us standing guard ready to yell if a big wave was headed her way, which we had to do but only once.

Once Sarah was back, we worked together shelling the mussels, not an easy task, then removing the byssus, and finally putting the meat into a jar for shipment to the CA Department of Public Health (CDPH) for analysis, all done to prevent people from consuming mussels harboring paralytic shellfish poison (PSP) and domoic acid poison. Poisoning occurs when naturally occurring toxins rise above certain levels, aka red tides.

To understand why these toxins accumulate to dangerous levels in mussels it helps to know a bit about mussels.

Adult mussels are sessile, that is they stay in one place and inhabit both intertidal and subtidal areas. They are usually found clumped together on wave-washed rocks, attached to the rock by their byssus. Byssal threads are extremely tough, strong, and elastic, and exist to secure the mussel to the rocks so it stays put as tides ebb and flow. It turns out these byssal threads have been recognized as superior bonding agents. Indeed, a number of studies have investigated mussel "glues" for industrial and surgical applications. Byssal threads have even provided insight into the construction of artificial tendons, but I digress.



Noyo High School interns Sherlyn Flores and Madison Nelson-McDaniels with Sarah Grimes heading down the Enchanted Trail

Monitoring Red Tides, Part 2: Mussels - continued

The mussel's external shell is composed of two hinged halves or "valves." The valves are joined on the outside by a ligament and close, when necessary, via strong internal muscles. Mussel shells carry out a variety of functions, including support for soft tissues, protection from predators, and protection against desiccation.

Mussels are filter feeders; they are like a small living pump. They draw in water with a siphon that flows water over its gills, giving the mussel oxygen. Little flaps called palps pull microscopic plankton and debris out of the water and push this food into its mouth. The food is then digested by the stomach and then goes on into the intestines. One mussel can filter up to 15 gallons of water in a single day. So, with a red tide, high amounts of PSP toxic poisons filter through and accumulate in the mussel. These toxins don't harm the mussel, so the level in their tissue just continues to increase until the bloom subsides. When the number of toxin-producing algal cells in the ocean return to lower levels or disappear, the mussel will eventually flush the toxins from its systems. This can take several days to several months or longer before they're safe to eat again.

There's a long-accepted old wives' tale we should only eat shellfish when there's an 'R' in the month. According to the rule, we should only indulge in delicious oysters, clams, and mussels from September through to April and stop eating them completely between May and June. The CDPH says the annual quarantine is normally in effect from May 1 through October 31 encompassing more than 99 percent of all blooms. But the CDPH may begin the quarantine early, or extend it, if the results of their monitoring indicate the presence of dangerous levels of biotoxins outside of the normal quarantine period.

The peak period for the toxins coincides with the most desirable growth conditions for the [naturally occurring phytoplankton](#) producing these toxins. These algae usually occur at very low concentrations and pose no problem. However, when the algae "bloom" the concentration of the toxin-producing species can increase dramatically. The increased number of algae becomes a greater food source for mussels. As the mussels filter and eat the toxic algae, they accumulate biotoxins in their tissues. When these mussels are eaten, the PSP toxins affect the central nervous system, producing a tingling around the mouth and fingertips within a few minutes to a few hours after eating a toxic mussel.



Sarah explaining the work to Esme, Madison, and Sherlyn.

These symptoms are typically followed by loss of balance, lack of muscular coordination, slurred speech, and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

This critical monitoring is what Sarah, Sherlyn, Madison, Esme and I were doing that day on the beach as we opened the mussels, removed the indestructible byssus, and tossed the meat in a jar. Sarah then takes the jar, freezes the contents and sends it off to the California Department of Public Health in Richmond, where they will toss the meat into a blender to look for toxic levels of PSP. The results are posted [HERE](#).

Monitoring Red Tides, Part 2: Mussels – continued

If the levels are toxic, they will post signs on beaches or warnings in various media to not eat mussels, such as this one recently posted in Mendocino County:

Shellfish Safety Notification: Sport-Harvested Bivalve Shellfish from Mendocino County

Date: September 7, 2023

Number: SN23-009

Contact: CDPHpress@cdph.ca.gov

“Dangerous levels of paralytic shellfish poisoning (PSP) toxins have been detected in mussels from Mendocino County. The naturally occurring PSP toxins can cause illness or death in humans. Cooking does not destroy the toxin. The California Department of Public Health (CDPH) is advising consumers not to eat sport-harvested mussels, clams, or scallops from Mendocino County.

This shellfish safety notification is in addition to the annual mussel quarantine. The annual quarantine applies to all species of mussels harvested for human consumption along the California coast, as well as all bays and estuaries, and will continue through at least October 31.”



Interestingly, these alerts do not apply to commercially sold mussels, clams, scallops, or oysters from approved sources. Shellfish sold by certified harvesters and dealers are subject to frequent mandatory testing to monitor for toxins.

Meanwhile back on the beach, the sun was starting to set, so we loaded up the bucket, tools, and jar of mussels, tossing their shells back into the ocean. As we headed back to the Enchanted Trail, I reflected on what a lovely afternoon it'd been doing beneficial work making a difference. If you want to participate, Sarah is always looking for helpers with the mussel collection. If interested reach out to her at 707 813-7925 or keep an eye out for announcements in the various Noyo Center publications.

Sea Palm (*Postelsia palmaeformis*)

Peggy Martin

“What are those things out on the rocks that pop right up after getting flattened by the waves?” I get that question or similar several times a year as I complete bird surveys along the Mendocino-Fort Bragg coast. When I arrived here from southern California, I was also puzzled by the bobbing action on some distant offshore rocks. I learned that they were called sea palms. Okay. Similarity noted. But my interest was not tweaked until Coastal Clean-up Day when I came upon a couple sea palm clumps that had washed up at Noyo Harbor Beach in Fort Bragg. My attention was drawn to the lovely corrugated ‘leaves’. “Beauty exists, even in unlikely places.” Now I wanted to know more.

Sea Palm (*Postelsia palmaeformis*) is an annual kelp seaweed/alga that resembles miniature palm trees. *Palmaeformis* literally means having the shape of a palm tree! This type of brown seaweed is found on the rocky coast of western North America from Hope Island, British Columbia to San Luis Obispo County, California. It is the only known species in the genus *Postelsia* and is found along outer shorelines that are subjected to extreme wave action. High wave action may increase nutrient



Sea Palm, 2023 Noyo Harbor Beach:
Peggy Martin

Sea Palm – continued

availability and move the blades, allowing more sunlight to reach the organism. In addition, constant wave action can remove competitors such as mussel. It can form dense stands during the summer in rocky habitats pounded by surf and is one of few types of algae that can survive and remain erect when out of water.

Postelsia inhabits the mid- to high intertidal areas and is commonly found within the beds of California mussel (*Mytilus californianus*), with which it appears to have a complex relationship. Its distribution is patchy, but *Postelsia* can be abundant where it does occur.

Postelsia palmaeformis has a small, stout, and densely branched holdfast which may look like a root system but does not transport nutrients or water. They exist solely to anchor the plant to the substrate and support the hollow cylindrical stipe. The top of the stipe has numerous branches, each of which carries a single, narrow, drooping blade (the seaweed 'leaves'). A single organism can have more than one hundred blades. Additional blades can be produced through the splitting of pre-existing blades. The blades are covered with longitudinal grooves that contain sporangia (where asexual spores are formed).



Sea Palm Blades, 2023 Noyo Harbor Beach:
Peggy Martin

The spores develop (through mitosis) and in late spring are released at low tide. They pass down the blade's grooves to drip onto nearby rocks, mussels, or barnacles, adhering quickly to the substrate using a secreted "glue" made up of polysaccharides (sticky sugars). Most spore dispersal is limited to distances of 1 to 5 meters. Fingerlike appendages called haptera grow to become the holdfast, which further moors the seaweed to the substrate. The spore develops into gametophytes: male (which produce sperm) and female (which produce eggs). Fertilized eggs develop into a new sporophyte (adult form). Within a clump of *Postelsia palmaeformis*, the individuals are siblings. Young Sea Palms are greenish in color but as they mature the color becomes more olive brown.

The sea palm has no circulatory system like land plants. The stipe is merely a firm hollow tube, used only for support of the organism and to hold the blades up over other organisms so they receive more light for photosynthesis. It thickens as it grows and even forms growth rings. It is resilient and flexible and must be thicker than a tree of equal height in order to support itself and allow the seaweed to bend and bounce back with the constant wave action.

Postelsia palmaeformis blades are considered a delicacy and a good source of minerals, trace elements, complex carbohydrates, and polysaccharides. Seaweed tends to carry 10-20% more nutrients than other vegetables. It can be purchased fresh or dried and has a sweet-and-salty taste, and noodle-like texture, which is a nice complement to vegetables, stir-fries, rice, soup, salad, or pasta dishes. Although the sea palm blades can regenerate if properly cut, it is susceptible to overharvest so recreational harvesting is prohibited and to harvest sea palms in California you *must* have a commercial seaweed harvesting license.

Perhaps the biggest threat to the sea palm is the increased frequency of marine heatwave (MHW) events associated with climate change. Because *Postelsia* appears to be particularly vulnerable to MHWs, and the events are predicted to increase in frequency and intensity, harvesting regulations in California are currently under review.

Some Fun Facts and Warnings:

- Even before Europeans invaded the area, the sea palm was known by the natives of California under the name Kakgunuchale.
- In 1852, *Postelsia* was first described scientifically by Franz Josef Ruprecht from a specimen found near Bodega Bay, California.
- Seaweed creates structure and habitat that provide shelter and food for numerous marine creatures.
- Seaweed takes in nutrients and gases directly from the ocean water through their blade cell walls.

Sea Palm Facts and Warnings – continued

- [Raven’s Restaurant](#) at Stanford Inn in Mendocino serves a signature Sea Palm and Root Vegetable Strudel.
- Seaweed has an extraordinary capacity to absorb trace minerals, metals, and other elements from sea water, but they may also have high levels of undesirable elements, such as lead, cadmium, arsenic. So, they should probably be eaten in moderation.

Their tough resilience allows sea palms to thrive where waves crash and currents surge the wildest. They can take the waves, but people cannot: If you find yourself near sea palms, you should move to a safer location.

Resources:

Richelle E. Goodrich. *Smile Anyway: Quotes, Verse, and Grumblings for Every Day of the Year*. 2015.

Sea Palm *Postelsia palmaeformis* <https://sanctuarysimon.org/dbtools/species-database/species-info-ajax.php?SID=76>

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Oregon State Parks Oregon Tide Pools. *Inhabitants of Oregon Tide Pools: Sea Palms*. <https://oregontidepools.org/index.php/species-guide/communities/sea-palm>

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Volunteer Highlight: Mary Meline and Royce Peterson

Linda Francis

Mary grew up in Saratoga, moving to Chico at 17 to go to Chico State. She married at 22 and started her first business as an interior designer. After having kids, she started a wallpaper hanging business as it gave her the flexibility needed to be there for her kids and get the paper hung.

At thirty-seven Mary went into teaching where she had a plethora of teaching experiences including special education, Junior High, fifth grade and sixth grade, but it was those 10-year-old fourth graders who stole her heart in the small school in Durham, just south of Chico. Overall, she taught for 24 years.

Meanwhile Royce grew up as an Army kid living here and there ending up in Yuba City for High School. They met when Mary was teaching his son’s best friend and had been married for 22 years. Royce’s business was the dismantling of old buildings where he discovered and recovered the great old wood which he turned into various pieces of furniture.

Mary has two sons. Blake is 38 and lives in Fort Bragg and Logan, 42, lives in Chico with his wife and three kids—a four-year old daughter and two-year-old twins (a boy and a girl) who are the light of Mary’s life, so she is in Chico often. Royce has a son who also lives in Chico.

Mary and Royce moved to Fort Bragg in 2017 from Paradise, fortuitously one year before the horrific fire. Mary had retired from teaching and was tired of hot temperatures and began looking far and wide to where they might retire. The search included Belize, Costa Rica, Panama, Nevada City, and Tahoe when the realization hit: moving to where they loved to vacation was the place to be. They found fifteen lovely acres north of Cleone, and here they are.

Volunteer Highlight: Mary Meline and Royce Peterson - continued

Mary started volunteering with Noyo Center at the Crow's Nest and is there every Sunday from eleven to one. She loves watching the kids react to all they see there, and then asks them questions drawing them into all the wonders of the ocean and the Crow's Nest. She recently started volunteering at the Discovery Center as well, where once again her joy of teaching extends into the dome as she helps kids figure out what they want to see.

Many years ago, she and Royce thought it'd be fun to have a party at their property with a band, and food, dancing, and fun. They decided to make it a benefit for some organization and picked Noyo Center. After four years of planning the party began with some 100 people enjoying the day while raising money for Noyo Center. After the event, they declared, No-Way-Never-Again. Well, until one year later when Wendi approached them, and the second fundraising party occurred. A wonderful time was had by all, but No-Way-Never-Again. But turns out the date for party 2024 is already on the books. Lucky Noyo Center.

These events drew Royce into involvement with Noyo Center. Using his wood-working skills, he got involved with the transformation of the Slack Tide Café. Taking trees from their land, Royce milled the wood Richard transformed into a beautiful custom fitted wooden railing on the deck where we've enjoyed food and drink as we sit with our elbows on this beautiful wooden art transfixed as nature and boats go by.

Mary loves being involved with an organization that truly cares about the environment and the community and enjoys the many friends she has made along the way. And we are grateful for the contributions she and Royce make and certainly look forward to the third annual party at their home.



Mary and Royce

Limpets

From a recent Poop Deck News column by Donna Worster

It's pouring rain, half my house is not insulated so the noise is making me lazy for my part in this issue of the Pinniped Press and I have hit my deadline. Enjoy the brevity.

Some months ago, Sheila Semans sent me a report about limpets, a small species of sea snail, because I had shown her my pictures of the limpet storage hole in the floor of a Skara Brae house located in a Neolithic settlement of ten clustered houses on the Orkney Islands. When I asked about the container and was told they were limpets, my interest in these ocean occupants of 5,000 years ago was piqued. The guide said they were probably eaten as food and tasted like shoe leather.



Limpets - continued

The article that Sheila shared with me is by Jonathan Webb, Science reporter, BBC News. I have taken a few excerpts that I think will be of interest to my readers:

“Engineers in the UK have found that limpets’ teeth consist of the strongest biological material ever tested. Limpets use a tongue bristling with tiny teeth, less than a millimeter long, to scrape food off rocks and into their mouths, often swallowing particles of rock in the process. The teeth are made of a mineral-protein composite, which the researchers tested in tiny fragments in the laboratory. They found it was stronger than spider silk, as well as all but the very strongest of man-made materials. The findings, published in the Royal Society’s journal *Interface*, suggest that the secret to the material’s strength is the thinness of its tightly packed mineral fibers—a discovery that could help improve the human-made composites used to build aircraft, cars and boats, as well as dental fillings. And to continue, “Limpets are the bulldozers of the seashore,” said Prof Steven Hawkins, of the University of Southampton. “The reason limpet teeth are so hard is that when they’re feeding, they actually excavate rock. In fact, if you look at their fecal pellets they actually look like little concrete blocks - because by the time it’s gone through their gut it’s hardened.”



My pet limpet in the tidepool aquarium at the Crow’s Nest is growing each week. If you really look at him, you can see the teeth. On one occasion while I was doing my beach survey research, I picked up a rock, which appeared to have marks left by the teeth of feasting limpets, along with other barnacles.

News and Notes

Surprise Harbor Seal Predator: Noyo Center’s Sarah Grimes and PhD student Frankie Gerraty are featured in this article in the Times Standard. Nice work!!



[How a series of gruesome seal deaths on the California coast led researchers to a surprise predator](#)

The coyotes’ taste for marine mammals could be genuinely new, or it could be that researchers are just beginning to notice it.

www.times-standard.com

News and Notes – continued

Community Science Project: The California King Tides Project helps us visualize future sea level by observing the highest tides of today. You can help by [taking and sharing photos](#) of the shoreline during King Tides to create a record of changes to our coast and estuaries.

[Explore a map of photos from recent King Tides.](#)

Find out [what time and how high](#) the King Tides will be near you. Learn how to participate by [uploading your photos via a web browser or with a free app](#). Your photos will be added to a [map](#) of this season's King Tides photos. As always, please be cautious and respect the power of the ocean, and don't disturb shorebirds that may be much farther upland than usual. <https://www.coastal.ca.gov/kingtides/>

Calendar

- January 4, Thursday, 2 pm: Fundraising committee via zoom: <https://us02web.zoom.us/j/85779257969>
- January 6, Saturday, 10 am: New volunteer orientation, Field Station.
- January 8, Monday, 6 pm: Pinniped Press meeting via zoom: <https://us02web.zoom.us/j/85648325119>
- January 10, Wednesday, 10 am: Docent's monthly meeting, Field Station.
- January 11 and 12, Thurs. and Fri., high tide: King Tides Project.
- January 12, Friday, 9 am: Board of Director's meeting, Field Station.
- January 13, Saturday, 10 am: Events Committee meeting, Field Station.
- January 16, Tuesday, 6 pm: Science Talk with Scott and Tree Mercer, "The Value of Whales and Threats To their Survival."
- January 19, Friday, noon: mussel collection. Meet at Enchanted trailhead (north of Montessori school on HW1).

The Pinniped Press team: Jim Rolfe, Dobie Dolphin, Wendi Felson, Linda Francis, Peggy Martin, Donna Worster, and Toni Rizzo. Staff support: Sarah Grimes and Trey Petrey

If you have photo or writing skills or have a particular idea for an article, want to join a great group, or send a letter to the editor, write to Toni at: editor@noyocenter.org

Best Wishes to Everyone for a Peaceful and Happy New Year!



Photo: Linda Ruffing