



The Pinniped Press

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

We need help with our upcoming Music in the Redwoods concert on June 22nd. We need help now with publicity – posting flyers, getting our events in calendars, etc. At the event we will need people to help with ticket sales, parking, beer/wine table, set up and take down, and more.

We are currently in need of volunteers to work in all capacities at the Slack Tide Café: Barista, sandwich maker, dishwasher, prep work. All shifts. Be part of a great team of people and a beautiful location!

Volunteers are needed to help with the monthly mussel collection as part of the Red Tide Program. See the meeting time and location in the calendar below.

We are looking for volunteers to help table at events with Noyo Center information. We will pair you up with experienced volunteers. All volunteers are welcome.

If you are interested in volunteer opportunities contact Wendi Felson, Volunteer Coordinator at wendi@noyocenter.org.



Drink Your Drink and Swallow the Container: Bioplastics Made from Seaweed

By Dobie Dolphin

Every day, 8 million pieces of plastic pollution find their way into the ocean. Plastic even finds its way into our bodies in the form of microplastics. Only 9% of plastic waste is recycled.

Bioplastics are plastics derived from biological substances rather than from fossil fuels. Seaweed is a perfect ingredient for making bioplastics. It's a renewable resource that doesn't compete with food crops, requires no fertilizer, can be grown without land or freshwater, and it's 100% edible or compostable in-home compost piles. Seaweed captures carbon 20 times faster than trees do, so seaweed farming has a high potential for climate-change mitigation. In the last decade, global seaweed production has increased almost 75%.

Conventional methods to produce seaweed packaging include the usage of chemicals and heat treatment to extract polysaccharides. Now, the latest technologies use benign fermentation to promote the extraction of polysaccharides without the use of harsh chemicals.

London-based Notpla (Not plastic) designed an edible sachet of water made from seaweed and other plant extracts. To drink the water, you simply pop the sachet in your mouth. They also make takeout cardboard boxes with a seaweed-based inner coating that are biodegradable and compostable in-home compost piles. Just Eat, a food delivery app in Britain, began using the boxes to fulfill some of its orders, including at the European women's soccer finals in July. Notpla is the 2022 winner of the prestigious Earthshot Prize in the category of Build a Waste-Free World.

Sway, a startup company based in Oakland, California, winner of the Beyond the Bag Challenge and the Tom Ford Plastic Innovation Prize, makes seaweed-based home compostable plastic packaging including retail bags and wrappers. Sway seeks "to extend the inherent generosity of the ocean by pairing the benevolent qualities of seaweed with advanced materials science. Without compromising on performance, we design next-generation replacements for plastics that replenish life from sea to soil."

Evoaware, an Indonesian company, makes seaweed-based packaging as well as straws, sanitary napkins, soaps, and toothpicks.

While seaweed-based packaging is still more expensive than traditional plastic packaging, costs are expected to fall as the industry expands and new manufacturing methods are developed.

Pyrosoma

By Peggy Martin

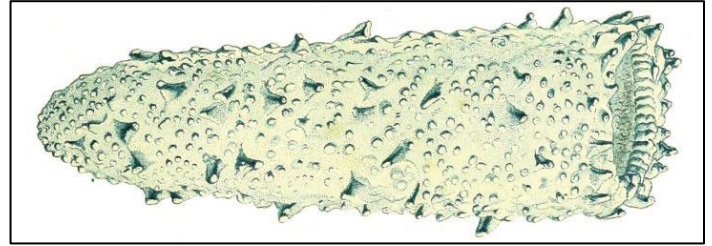
What I first thought to be a small piece torn from a jellyfish, was something quite interesting. Both simple and complicated. Scientists refer to them as the "unicorns of the sea" because they are so strange and seem to appear out of nowhere. As marine biologist, Rebecca Helm put it, they're "completely improbable, utterly mysterious." Each hollow, tubular, organism is composed of hundreds or even thousands of tiny outward-facing zooids. The filter-feeding zooids are fused together into a transparent tube by a gelatinous tunic - closed at one end, open at the other. According to scientist Jan Witting, each zooid has "a simple brain, stomach, liver, and a basket with cilia that acts as a filter." Each zooid is a clone of its neighbor, capable of copying itself and adding to the colony.



Pyrosome observed at Virgin Creek Beach Oct. 2022

Pyrosoma: continued

The National Museum of Natural History's Encyclopedia of Learning (EOL) web page says they are commonly called "sea pickles" and other nicknames include "sea worms," "sea squirts," "fire bodies," and "cockroaches of the sea." French naturalist François Peron, in the early 1800s, was the first to formally describe them and gave them the genus name *Pyrosoma*.



Pyrosoma atlanticum:
published in *Annales du Muséum d'histoire naturelle*, 1804.

The genus *Pyrosoma* is named for its bioluminescent ability; notable for the brilliant and sustained light they produce. The name *Pyrosoma atlanticum* comes from the Greek words *pyros* meaning 'fire' and *soma* meaning 'body'. Though they are native to the ocean off the coast of California and other temperate marine waters, *atlanticum* refers to the Atlantic Ocean where François Peron first collected specimens for scientific description.

Pyrosoma atlanticum, the most common pyrosome, has a tough bumpy texture, can get up to 60 cm long, and is colorless or tinged with a bit of blue, gray, yellow, or pink. Found in tropical and temperate waters, *Pyrosoma atlanticum* is a pelagic species and therefore not often found along shorelines. The colonies float free in the ocean, and undergo a large diurnal migration, rising toward the surface in the evening and descending around dawn. As they float, individual zooids take in water through an oral siphon from the exterior of the pyrosome, filtering out plankton and other nutrients then expelling the filtered water into the interior of the pyrosome funnel and out the posterior opening. This flow of water not only facilitates food acquisition and respiration, but also allows the colony to move slowly by propulsion.

According to National Oceanic and Atmospheric Administration (NOAA) Fisheries, "As with many gelatinous zooplankton, we lack crucial insights into their natural history, so it can be difficult to tease apart how they may be impacting marine ecosystems. For instance, pyrosomes can grow rapidly, and are efficient filterers with the potential to have a significant impact on phytoplankton blooms." While individually small, in 2017 hundreds of thousands appeared in masse along the West Coast. Their sheer numbers hurt the Oregon salmon industry because they clogged catching facility gear. In a Newsweek article it was stated, "Fishermen abandoned fishing in certain areas..." and "scientists worried they might all die at the same time, which could lead to a mass of decaying organic matter which would suck oxygen out of the water and perhaps create a dead zone." Another study off the coast of West Africa suggests *Pyrosoma* tunicates that die and sink to the bottom of the ocean may represent a major food source for both benthic microbes and larger benthic organisms in the deep sea and should be included in models of large-scale cycling of elements such as carbon (EOL).

- Pyrosomes can get up to 60 feet long and look something like a windsock!
- Most pyrosomes that wash up along the West Coast are around the size of a large pickle but can get 2.5 feet long.
- Pyrosomes are pelagic colonial tunicates, which are part of the phylum Chordata, which include us humans.
- Unlike most adult tunicates which are benthic (bottom-dwelling) and sessile (fixed in one place), *Pyrosoma* are pelagic at all life history stages.
- Pyrosomes themselves can't swim fully against the current and are therefore considered plankton.
- The life history of *Pyrosoma* includes both sexual and asexual phases.
- Videos: <https://www.youtube.com/watch?v=FNhsHYU91OA> https://www.youtube.com/watch?v=qis_rfb7fnU

Morro Bay National Estuary Program. *Wildlife Spotlight: Pyrosoma atlanticum*. 2021. <https://www.mbnep.org/2021/09/18/morro-bay-wildlife-spotlight-pyrosoma-atlanticum/>

NOAA Fisheries. *Pyrosomes*. 2017. <https://www.fisheries.noaa.gov/science-blog/pyrosomes>

Science and Memory. *The Pickles That Followed the BLOB*. 2017:

<https://scienceandmemory.uoregon.edu/pyrosomes.html#:~:text=Scientists%20also%20know%20that%20pyrosomes,and%20are%20therefore%20considered%20plankton.>

EOL (Encyclopedia of Learning -National Museum of Natural History). *Pyrosome*. <https://eol.org/pages/46585531/articles>

Newsweek Tech and Science. *Mysterious Sea Pickles Invading West Coast in Bizarre Bloom*. 2017 <https://www.newsweek.com/mysterious-sea-pickles-invading-west-coast-bizarre-bloom-628338>

The Atlantic. *12 Reasons Pyrosomes are My New Favorite Terrifying Sea Creature*. 2013 <https://www.theatlantic.com/technology/archive/2013/08/12-reasons-pyrosomes-are-my-new-favorite-terrifying-sea-creatures/278316/>

National Maritime Historical Society Sea History for Kids. *Animals in Sea History: Pyrosoma*. <https://seahistory.org/sea-history-for-kids/pyrosomes/>

Biodiversity of the Central Coast. *Pyrosome: Pyrosoma atlanticum*. 2017. www.centralcoastbiodiversity.org/pyrosome-bull-pyrosoma-atlanticum.html

Volunteer Highlight: Elizabeth Gomez

By Linda Francis

For our Volunteer Highlight this month we celebrate Elizabeth Gomez, our 100th active volunteer with the Noyo Center. We are excited that she has joined our volunteer team and will make a terrific addition.

Elizabeth was born and raised in Cleone where Mackerricher State Park was her backyard filled with tide pools. Her love of the ocean started here, not from book learning but from time spent in observation and appreciation. Fort Bragg is home to her large extended family of aunts, uncles, cousins, and grandmother. Family gatherings often bring more than thirty of them together, including cousins from 3 months to 30 years of age and other family members into their 80s. Her Mom is one of twelve children, ten of whom immigrated in the 1990s from the small farming village of Estancia de Amborin, near the town of Villa Purificacion where Elizabeth still has some family. Currently, nine of her aunts and uncles live in Fort Bragg.

When she graduated in 2015, Elizabeth was the second generation in her family to graduate from Fort Bragg High School. Wanting to experience somewhere else, she moved over the hill to Ukiah where she tried college and odd jobs and finally got a job at the Savings Bank of Mendocino County. She was later able to transfer to the Fort Bragg branch happily moving back to the coast, knowing it was home. She is now at the Mendocino branch as a teller and doing customer service, providing her with a stable job with benefits. She enjoys her customers and co-workers.



When growing up, Noyo Center was barely a concept and Elizabeth now sees Noyo Center's long-range plan creating opportunities for the community and for its youth. It can often be challenging for a young person to make a lifelong career in Fort Bragg, so Elizabeth sees the Noyo Center and ocean education as a way to inspire kids to stay in the area or come back, and plans on being part of the effort to make this happen. At 26, Elizabeth finds life really exciting and really scary, but sees the Noyo Center and the areas blue economy initiatives as a way to a successful future.

Now in docent training at the Crow's Nest, she has found it to be a place of caring and love, with lots of easily accessible information, "Even better than the internet! I just love it. I want to get more involved mostly because of the great people." And, she has other reasons for volunteering. Elizabeth is one of Noyo Center's first Spanish speaking docents. She shared the story of a 7 year-old Spanish speaking kid she spent time with at the Crow's Nest and how excited he got about all he learned from her. She would like to see the local Latin American community more involved with the Noyo Center, educating the children who will educate their parents. So many families are working so hard at labor-intensive jobs that there is little time for the ocean. Her hope is that by being involved with the Noyo Center she can help make education and marine science more accessible to this new and growing audience.

Elizabeth "loves this place! The ocean and the people. I want to make things better!" Given her sparkling personality, energy, and thoughtful understanding of how she can make a contribution to doing so, I'm sure she will do just that.

Poop Deck News from May 11, 2023

By Donna Worster

Yesterday morning I was at the Slack Tide kitchen helping with prep for the weekly menu. It's not too challenging to chop onions, bell peppers and celery, although you must take care not to let the knife ding your finger! If you want to help out at the café let us know. You will need a certificate as a food handler, which is fairly easy to get. Later, I was at the Crow's Nest for the monthly meeting of the volunteers. I enjoy the company of the dedicated docents that see this place as a way to support efforts to get a permanent home for Betty Blue Whale and share her history with the public. I also added a new word to my vocabulary—hyoid, which is a U-shaped bone that supports the tongue and is found in many mammals, including humans. Unlike other bones, it is not directly attached to any surrounding bones, only muscles.

Poop Deck News from May 11, 2023: continued

Noontime I was over to the Botanical gardens to do a nature talk for students up from the Napa Valley. They were late in getting there and wanted to see the ocean, so we made a mad dash to the house on the cliff. This is the best place to give a brief history of how we collected our 73 ft. blue whale in 2009 and tell them about the largest mammal on earth.

Early that evening, I accompanied our Executive Director, Sheila Semans, where she spoke to a group at a meeting of the Lion's Club. I sat quietly and listened while Sheila told how the Noyo Center for Marine Science began and about our current progress. I swelled with excitement when she asked the audience, "How many of you have been to the Crow's Nest?" I saw every arm raised. And then she asked the question, "How many of you have been downtown to the Discovery Center Museum or to the Slack Tide café?" The same sea of arms (not hands) responded.

At the conclusion of her talk, she asked if there were any questions, I almost fell off my chair when the question was asked, "NOW HOW CAN WE HELP YOU?" When the meeting closed, there was the opportunity for Sheila to answer that and other questions from an engaged group, including an engineer that had worked with the Noyo Center in the past and is hoping to get involved again, possibly with the design of the La-bone-atory?

The meeting host for the evening was our neighbor at the Slack Tide Cafe—Captain Tim Gillespie, who has those two beautiful yellow and white party boats that tie up near our dock in the Noyo Harbor.

Next month I'll have pictures and the story of the cannibal crab that had to be put back where he belonged.

Poop Deck is the Crow's nest weekly newsletter.

Red Tide Sampling

by Sarah Grimes, Stranding Coordinator

Each week Noyo Center for Marine Science volunteers and interns collect plankton samples from the dock at Slack Tide Cafe and the Point Arena Pier. The samples are sent to the Department of Public Health to be tested for the presence of harmful algal blooms. Volunteers and interns also collect mussels for sampling once a month.

We welcome mussel collection assistance. The times for collections are tide dependent and must be done early in the week and early in the day so we can be sure to ship to DPH on time. See the calendar in this issue for collection times and dates.

To learn more about the program visit this link: <https://bit.ly/3dx2Ney>. And check us out on the map and see that our samples have had fairly low presence of harmful algae.



Photo: Madeline Pond, Noyo Center youth volunteer collecting plankton



Intern Lizeth with mussel samples.

The Journal Club

By Mary Glanville

The Noyo Center Journal Club held its first meeting on May 15th and the following is how we will operate going forward. The Journal Club will meet at the Slack Tide Café on the 4th Monday of the month at 10 am. The club studies one topic related to marine science each month. The moderator for each session rotates each meeting. The moderator preselects the topic and provides journal or web site articles related to that topic to the group in advance of the next meeting. Each person is encouraged to read at least one article and give a brief synopsis to the group, although everyone is welcome.

This month, as the designated leader, I chose Marine Pharmacology as the topic. Here's a brief synopsis:

- The world's oceans have become a hotbed for pharmaceutical research and are vastly untapped. This is largely because the ocean is chock full of microbes, viruses, and unique molecules that marine organisms have evolved to protect against.
- Microbes (microscopic organisms) are at the forefront of pharmaceutical research, and seawater is a microbial soup, developed over 600 million years. One liter of seawater contains over a billion bacteria, and over 10 billion viruses. Consider that when a tunicate filter-feeds, it's also exposed to bacteria and viruses, and must protect itself.
- Many marine organisms owe their resistance to symbiotic relationships with specialized microbes that live within their tissues, producing compounds that protect the host.
- Of 23 new drugs currently in clinical trials (as of August 2022), 16 are produced by microbes, and 4 are from invertebrates.
- New pharmaceutically active compounds have been found in rather unlikely places: Hydrothermal deep-sea vents, core samples under Antarctica, 60,000-year-old submerged ancient cypress groves off the coast of Alabama, a sandy beach on a remote volcanic Japanese island, eel grass, and even mooring lines at a pier.
- Seaweed is another source of pharmaceutical research. Antioxidant, anticancer, anti-inflammatory, and anti-diabetic compounds have been discovered in a variety of seaweeds. In addition, many seaweeds are a potent source of nutrition.

The next gathering of the Journal Club will be June 26th at 10 am, with Wendi Felson as the moderator for that meeting. The topic for this meeting is Personhood in Cetaceans. Below are links to the articles to read for the meeting.

Are Animals People Too?

<https://www.pepperdine.edu/magazine/spring-2022/are-animals-people-too.htm>

Animal Personhood: Muddled Alternative to Real Protection

https://e360.yale.edu/features/animal_personhood_muddled_alternative_to_real_protection

Legal Personhood and the Nonhuman Rights Project by Steven Wise

https://www.animallaw.info/sites/default/files/lralvol17_1_1.pdf

Marine Mammals: The Evolving Human Factor by Guisepe Notarbartolo di Sciarra and Bernd Wursig Editors, Cetacean Personhood, Rights and Flourishing, Chapter 12. Whale and Dolphin Conservation

<https://us.whales.org/whale-culture/scientific-evidence-for-whale-and-dolphin-rights/>

World Ocean Day is June 8
 Visit our [WEBSITE](#) for information
 and join our [Zoom meeting](#) on June 6 and learn
 more about the history of WOD and for
 updates on Noyo Center activities!



What Washed In

By Nancy Lloyd

After speaking with Sarah Grimes this month, we can say with relief that we have had a lull in the ocean wash-ups of larger marine mammals the past few weeks. Let's celebrate having more time to enjoy the burst of spring life all around us on our beautiful Mendocino coast!

Speaking of new life – currently developing in my own yard full of California native plants – let me share a photo of a California Quail nest I discovered a week ago in my wine barrel planter...so far with 9 lovely eggs. The hen is expected to lay a few more eggs before she starts to incubate them until they hatch all in one day after 3 full weeks of nesting.



Calendar

Saturday June 3, 10 am: New Volunteer Orientation, Slack Tide Café

Monday, June 5, 6 pm: Pinniped Press meeting <https://us02web.zoom.us/j/85045100225>

Tuesday, June 6: World Ocean Day: History and Noyo Center activities update with Sue Coulter: <https://us02web.zoom.us/j/88336646255>

Thursday, June 8: World Ocean Day

Saturday, June 10: 10 am to noon, World Ocean Day beach cleanup at Noyo Harbor beach.

Saturday, June 10: 12 to 4 pm, Talking Trash at the Discovery Center.

Saturday, June 10: 3 am to 4 pm, Trivia games at the Slack Tide Café

Sunday, June 11: 2:30-5 pm, Latino Outdoors at the Crow's Nest.

Tuesday, June 13: 6 pm Science Talk; topic to be announced <https://www.noyocenter.org/science-talks>

Wednesday, June 14: 10 am Docent's meeting, Crow's Nest.

Wednesday, June 14: 6:30 pm, Beach Survey Program meeting <https://us02web.zoom.us/j/81628595428>

Tuesday, June 20: 9:30 am, Red Tide Program mussel collection. Meet at the Enchanted trailhead, just north of Montessori Del Mar school on HW1.

Thursday, June 22: 4 pm, Music in the Redwoods, a fundraising concert. Info and tickets: <https://www.noyocenter.org/music-in-the-redwoods>

Monday, June 26: 10 am Journal Club, Slack Tide Café.

The Pinniped Press team: Carin Berolzheimer, Sharon Bowers, Dobie Dolphin, Wendi Felson, Linda Francis, Jeff Jacobsen, Nancy Lloyd, Peggy Martin, Toni Rizzo, Jim Rolfe, Teresa Skarr, Donna Worster, 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