



The Pinniped Press

A newsletter by and for Noyo Center for Marine Science volunteers

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Sperm Whales are Extraordinary Creatures

by Andrew Jordan

On July 29, 2022, a passer-by near Mendocino spotted a sperm whale carcass floating just offshore. Whales washing ashore in this area is unusual but especially a sperm whale (*Physeter catodon*). We wanted to learn more about these strange, amazing creatures. Once you get past the menacing leviathan of Moby Dick and all the badly misdescriptive anatomical names given (apparently) by whalers of the past, the biological sophistication of sperm whales is remarkable.

First, their echo location mechanism is based on reflection and not emission. With bats, there seems to be a direct transmission of sound/sonic signals out to the environment. When the bat receives the reflected signal, it knows what's going on and what's there around it. However, with sperm whales (and other whales), a signal/pulse/noise is generated in an area around the blowhole. For sperm whales, this area is known as the monkey lips (or phonic lips).

From <https://cosmosmagazine.com/science/biology/why-the-sperm-whale-has-a-huge-head/>:

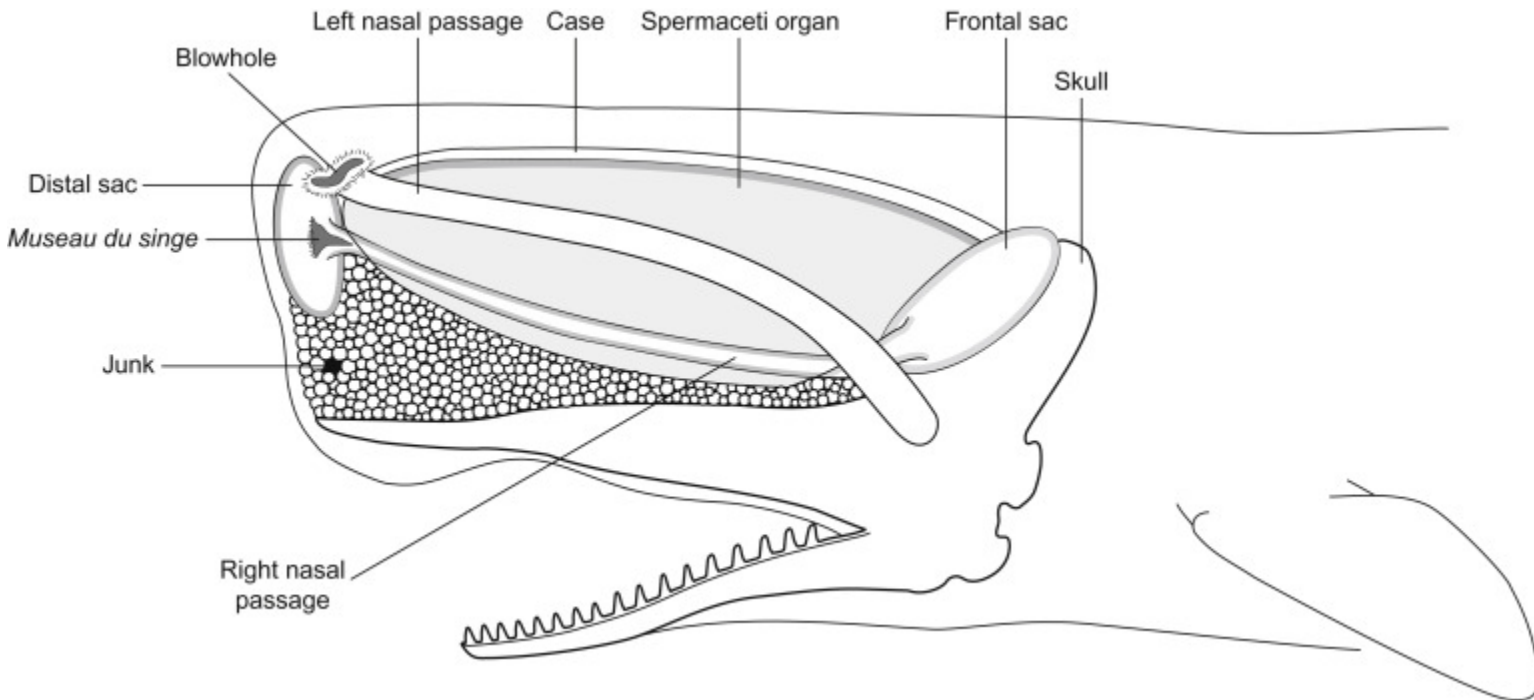
"Whales vocalize by blowing air across structures resembling vocal cords. These lie in the head and are called monkey lips. After the monkey lips generate sound waves, the oil-filled organ in the whale's head focuses them, researchers believe. Acting like a giant acoustic lens, muscles alter the organ's shape to focus the sound and perhaps scan the surrounding waters.

It's not only sperm whales that have this oil-filled organ. Think of the high-domed "forehead" of dolphins. Like all toothed whales, their domed forehead contains an oil-filled sac, which is used as part of their echolocation equipment."

Once the signal is generated by the monkey lips, only some of the sound gets transmitted to the ocean. The predominant portion gets sent backward to a vertical projection rising from the whale's skull through the spermaceti organ of the whale's head. The sound is then reflected at the skull's topmost vertical projection to the junk which has cartilage/collagen partitions and out into the surrounding environment/ocean. The junk of the sperm whale is the fatty structure found in the forehead known by whalers as the melon because of its pale-yellow color, and is traditionally called "the junk" because whalers dismissed it as a worthless source of sperm oil. It contains compartments of spermaceti separated by walls of cartilage.

Muscles and other tissues surround both the spermaceti organ and the junk. Frontal and distal sacs lie at opposite ends of the right nasal passage while the left nasal passage proceeds directly to the blowhole with subsequent coupling to the distal sac at the front of the whale's head.

All of this seems to show a developed system for generating and directing sound waves. These sound waves take different forms and can be as powerful as 230 decibels/db (underwater). In the air, such sound waves would be about 174 decibels. Some jet engines are about 140 db from 100 feet away.



From Ellis, R. (1980). *The book of whales*, Knopf, New York.

Other unique characteristics are present in sperm whales' anatomy and behavior. They have an edentulous (lacking teeth) upper jaw which instead has sockets into which the teeth of the lower, dentulous jaw fit. They can dive over two kilometers to look for food, making them one of the deepest diving mammals in the ocean. And they are the largest of the odontocetes (toothed whales) along with having one of the largest brains of any animal. They are also one of the most sexually dimorphic cetaceans in terms of body weight and length. For example, males can average 16 meters (53 ft) in length while females average 11 meters (36 ft).

As the Noyo Center for Marine Science learns more about Sperm whales and about whale-falls we hope to share much more information.

For more information:

https://en.wikipedia.org/wiki/Sperm_whale

<https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/physeter>

Volunteer Highlight: Mary Glanville

by Linda Francis

Mary is the third generation of family pharmacists. While being a pharmacist was always Mary's dream, she took a few side trips first. At UC Berkley, she changed her major five times and graduated with a degree In Marine Biology. She took up scuba even though she didn't swim and fell in love with mollusks. She then worked for 9 years at the Lawrence Hall of Science included supervising the animal lab, teaching school groups, and more.

She did not defer her pharmacist dream forever. After receiving her Doctor of Pharmacy degree at UCSF, she worked as a pharmacist for over 30 years. Mary has always had a special interest in the use of plants as medicine, which led to studies in faraway places, including the Amazon and Papua New Guinea.



In 2007, Mary and her fifteen-year old daughter, Kara, wandered up Highway 1 for a mother-daughter weekend. As they crossed the Big River Bridge, Kara declared they should be living here not Mountain View. The family was in flux at the time and Kara persisted. Soon she and Mary moved to the Village of Mendocino where Kara thrived at Mendocino Community High School. In 2009, they moved into the home Mary purchased in Cleone.

Mary was born and raised in Oakland, and from 2015-2021, she returned to Oakland to care for her dear uncle, and to settle his estate once he passed at age 93. In October 2021, she moved back permanently to Cleone. She currently supports pharmacies when they need additional help.

While exploring Fort Bragg, Mary stumbled upon the Noyo Center's Discovery Center, and having always had a love of marine science, was captivated by the exhibits, and inquired about volunteer opportunities. She began working as a volunteer during the March 2022 Whale festival. She is now a docent at the Crow's Nest twice a month, has volunteered in a variety of roles at the Slack Tide Cafe, and helps with training of newer volunteers.

She continues exploring ways to be involved with and supportive of her community. In addition to the Noyo Center she volunteers with State Parks to eradicate invasive plants, and has joined the Mendocino Audubon Society, the Native Plant Society, and the Grassroots Institute. Mary also rides with the SOBs - that's Seniors on Bikes!

Mary's pride and joy are her kids. Kara has a Master's Degree in Astrophysics from UC Berkeley, and currently works in the music industry in Nashville. Her son Kale is working on a post-doctorate in Genetics at Harvard.

What Washed In?

by Nancy Lloyd and Sarah Grimes

Stranding Coordinator Sarah Grimes says that increased shark sightings and interactions on the Mendocino coast are normal in the fall months, sometimes called *Sharktober*. According to the global non-profit organization Shark Stewards, *Sharktober* is the period when adult white sharks return to the west coast after a long migration from the central Pacific, and an area sometimes called the white shark cafe. Our nearby MacKerricher Beach State Park recently posted a warning sign about shark sightings.

Coincidentally, recent marine mammal strandings in October included 2-3 animals with injuries consistent with predation from shark bites or killer whales. These animals, which included sea lions and harbor seals, represented about 10% of the injured animals found over these weeks.

All marine mammal stranding activities are conducted under authorization of the National Marine Fisheries Service through a Stranding Agreement issued to the California Academy of Sciences/Noyo Center for Marine Sciences and MMPA/ESA Permit No.18786-06, and the Marine Mammal Health and Stranding Response Program.



Many of the specimens from Mendocino County are prepared for the California Academy of Sciences' (CAS) vast collection. The specimens are each given a unique ID #, such as CAS-SWG-200 (CAS-Sarah's initials-that animal's assigned number).

Sarah Grimes has been collecting specimens for the stranding network since 2015. The range of animals has included six species of pinnipeds, whales, dolphins, porpoises, coyotes, bobcats, river otters, birds, and a black bear. Her 207th animal, a California sea lion, registered as CAS-SW-207, was reported on October 14th, 2022, a real milestone!

Photo: Rear flippers of a Harbor Seal showing injury consistent with predation

Human Impact on Whales

by Peggy Martin and Sue Coulter

In September, a young humpback whale, *Megaptera novaeangliae*, washed ashore just south of Glass Beach. Noyo Center staff responded, assessing and collecting scientific information in coordination with the California Academy of Sciences, and were on hand to assist with the necropsy, conducted with the assistance of a representative from Cal Poly Humboldt. The summer had already brought a Hubb's beaked whale (*Mesoplodon carlhubbsi*) and a sperm whale (*Physeter macrocephalus*), to our shores. And since then, in October, another deceased humpback whale washed ashore near Glass Beach.



In the case of the September humpback response, we hope to learn much more from the data collected, including the age, general health, and a possible cause of death. Of all the animals that wash ashore, or are otherwise reported, just a small percentage are actual ship strike mortalities, or a collision between any type of boat and a marine animal in the ocean, but it is something Noyo staff always looks for. Whales struck by vessels often sink to the ocean floor or float offshore where they are consumed by scavengers, making it nearly impossible to determine actual numbers. According to 2019 National Marine Fisheries Service Stock Assessment Report, humpback whale strikes are estimated to be reporting only approximately 10% of the time, and just 2% for blue whales. A 2017 U.S. West Coast Exclusive Economic Zone study estimated vessel strikes caused 22 humpback whale deaths that were reported that year. We must stress that these are only estimates.

Whales coming to the surface to breathe, rest, or sleep just below the surface, often presents opportunities for vessel strikes. Larger boats, such as cargo vessels, tankers, or military vessels, present an even greater threat farther out in the ocean. The resulting injuries can include blunt trauma and/or propellor strikes which can cause bruising, deep cuts and gashes, broken bones, severed fins or spine, and internal damage. The injuries can lead to disfigurement, scarring, or death, immediate or delayed.

Humpbacks are among the world's most endangered whales and are also among the whales most frequently involved in ship-strike incidents, with gray whales (*Eschrichtius robustus*) being the most reported in California. Humpback, Gray, Blue (*Balaenoptera musculus*), and Fin (*Balaenoptera physalus*) whales are the most vulnerable to vessel strikes because they migrate and feed along the coast where they overlap with active shipping traffic.

This overlap has not gone unnoticed. In 2013, to keep ships away from vulnerable whale populations, NOAA narrowed the shipping lanes vessels use to travel in and out of San Francisco Bay. In 2015, NOAA implemented a voluntary 10 knots or less speed limit (May to November) for large shipping vessels traveling in and out of the Bay. Because of the



reduction in ship-strike incidents from this management change, the Center for Biological Diversity filed a legal petition with the Biden Administration in 2021 requesting that the 10-knot voluntary speed limits through whale habitat be made mandatory and year-round, for vessels 40 feet or longer. According to a Center for Biological Diversity 2021 press release, "an analysis of ship strikes involving large whales found none were seriously injured or killed by ships moving slower than 10 knots".

Because whales are often unseen or surface with little or no time for a vessel to avoid a collision, a technology-based mapping analysis tool Whale Safe (<https://whalesafe.com/>) has been developed that integrates acoustic and visual whale detections with model predictions to warn large ships when whales are nearby. The Whale Safe system has been deployed in the Santa Barbara Channel and off the San Francisco coastline. Community scientists and trained observers contribute by logging whale sighting reports on the Whale Alert app. (<https://www.whalealert.org/>).

How can we help?

- If you operate a vessel, follow all regulations, guidelines, and distances. SLOW DOWN anytime a marine mammal is present. <https://www.fisheries.noaa.gov/topic/marine-life-viewing-guidelines/guidelines-&-distances>
- Buying local can help reduce the need for shipping.
- By supporting the founding and enforcement of National Marine Sanctuaries <https://sanctuaries.noaa.gov/> and Marine Mammal Protected Areas <https://www.marinemammalhabitat.org/> we help provide whales a safe space.
- By donating to research, conservation, and education organizations and advocacy groups, we help advance the body of knowledge, develop resources, make policy changes, and influence the next generation of advocates.

Join us in January when our monthly Science Talk on Zoom will be a program on the Whale Safe system.

Did You Know?

by Donna Worster

Thanksgiving is just around the corner. Let's talk about the largest mouth in the world. I've heard our blue whale has a mouth that can hold 125,000 hamburgers. If 20 hamburgers equals 1 turkey (to get the season started) that amounts to 6,250 turkeys. Here's more from the BBC-Earth News: *"A blue whale's mouth cavity is so vast and stretchy that it can engulf a volume of water equivalent to its own body mass, say scientists. The whales - the largest animals on the planet - filter the krill they eat from these huge watery mouthfuls."*

Enjoy that Thanksgiving dinner and be grateful for having our own Blue Whale close and that we are working toward her new house.

Calendar:

- November 3, Thursday, 10 am on Zoom. New Volunteer Orientation. <https://us02web.zoom.us/meeting/register/tZMlfu2oqTooGdQYJRW-zB1QP6kBi6LJAz4h>
- November 5th, Saturday, 12 – 4 pm, Mural Unveiling Street Party by the Alleyway Art Project, Fort Bragg. There will be music, food and lots of activities for children. We'll need up to 4 volunteers.
- November 7, Monday, 9:30 am. Plankton collection at the Slack Tide café deck. Come to observe and learn more about our Red Tide program. All are invited.
- November 7, Monday, 6 pm on Zoom. Pinniped Press newsletter team meeting. All invited. <https://us02web.zoom.us/j/85081350173>
- November 9, Wednesday, 10 am. Docents meeting at the Crow's Nest. Interested in becoming a docent? We can use you on Tuesdays or Wednesdays.

- November 9, Wednesday, 6:30 p. Beach Survey Program meeting on zoom.
<https://us02web.zoom.us/j/81404627268>
- November 14, Monday, 2 pm. Volunteer meeting for all those interested in working on programs with children. It will be held at the Slack Tide Café.
- November 16, Wednesday, 6:30 pm on Zoom. Science Talk on Plastics in the Environment with Sue Coulter. Register on our website: noyocenter.org
- Save the date! Noyo Center Holiday Party. December 3, Saturday, 3:30 – 5 pm at Slack Tide Café. Holiday Party for staff, board, interns and volunteers.

We are currently looking for volunteers interested in working at the Slack Tide café either as bartenders, food handlers or general support as needed. To serve alcohol, you must have an ABC license and to prepare or serve food, a food handlers license. They are easy to obtain, and we will provide information on how to obtain them if you are interested. We are also currently looking for volunteers interested in becoming a docent at the Discovery Center. This will be a position to help fill in for staff in greeting visitors and talking with them about the Noyo Center and our exhibits. Please respond with any volunteer comments, questions, suggestions, etc. to: wendi@noyocenter.org

Pinniped Press team: Karen Dunbar, Wendi Felson, Linda Francis, Andrew Jordan, Nancy Lloyd, Peggy Martin, Denise Mattos, Mary Patyten, Jim Rolfe, Sara Rose, Teresa Skarr, Cynthia Travis, Donna Worster with Sue Coulter, Sarah Grimes and Trey Petrey. If you have photo or writing skills or have a particular idea for an article or just want to join in with a great group, let me know: wendi@noyocenter.org

