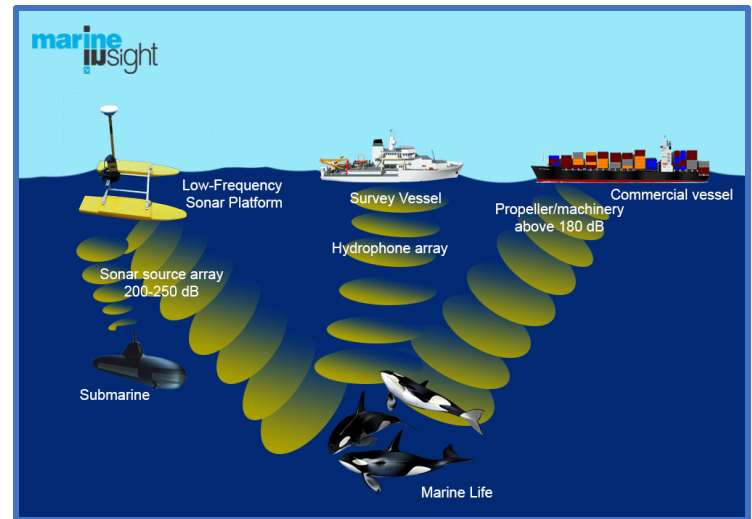




Understanding Ocean Noise

What is Ocean Noise?

Ocean noise can be many things. It can be the songs of humpback whales communicating, or the echolocating clicks of dolphins trying to locate prey. But sadly, ocean noise does not always refer to the natural sounds of the sea. Ocean noise pollution describes human-caused sounds that are the loudest and most disruptive in ocean waters. This noise pollution often comes from the propellers of large shipping vessels, sonar, and deep-sea drilling for oil.*



Threats of Ocean Noise on Marine Life

Although sounds from vessels, like large ships, are not always heard above the surface of the water, the sounds they produce beneath the surface have serious impacts on various marine animals. This loud and disruptive underwater noise is constant, and these sound waves can travel several miles from the source.* This constant ocean noise can be incredibly harmful for many marine species and contributes to strandings, injured hearing, abnormal behaviors or even altered feeding habits. Dolphins, porpoises, and whales are especially vulnerable to ocean noise pollution as they rely on sounds to communicate, feed, migrate, and reproduce.

Reducing Ocean Noise

One of the main areas where there are positive changes in reducing ocean noise pollution is within industrial shipping companies. Many scientists and organizations have encouraged shipping freighters to slow their speeds in areas where there is high animal activity. Slower speeds help the ships avoid hitting marine mammals, reduces the ship's noise pollution, and helps the company save on fuel! In many areas, shipping companies are not required to slow down, but many do so voluntarily to help these animals and protect the ocean.



The Marine Mammal Center.

The Marine Mammal Center advances global ocean conservation through marine mammal rescue and rehabilitation, scientific research, and education.

The Marine Mammal Center & Our Involvement

How the Marine Mammal Center Helps!

The Marine Mammal Center (TMMC) does a lot of work with disentangling large marine mammals and performing necropsies* on whales, dolphins and porpoises. This work helps us understand some of the main threats these animals face in the oceans. TMMC shares this research to policy makers, governments, and organizations to create positive changes on large scale issues such as sustainable fishing, overlapping whale & boat traffic in specific areas, ocean pollution, and more!



Patient Highlight: Humpback Whale Entanglement

In 2018, The Marine Mammal Center was notified of an entangled juvenile humpback whale outside of Eureka, CA. The whale had several buoys and hundreds of feet of fishing line wrapped around its tail. Over 20 people from various organizations set out to rescue this whale from the trash and debris that encompassed it. After determining the best method of disentangling the whale, they got to work!

After a few hours, the whale rescue teams made their final cuts on the gear, and the whale was free. The entangling line and fishing equipment was taken from the whale to be analyzed and see if it could be connected to a specific fishery. This information from the fishing gear allows The Marine Mammal Center, and other research scientists, to help encourage positive changes for more sustainable fishing practices that reduce the possibility of marine mammal entanglement.

By performing disentanglements of whales, and doing ongoing research, TMMC has discovered more areas where fishing, larger shipping vessels, and whales overlap. This information can help create policy that aims to preserve these species.



NOAA FISHERIES MMHRP PERMIT #18786-03
Photo Credit: Tackaberry/Flynn



The Marine Mammal Center.

* Look at our resource guide on the last slide to learn more about these concepts

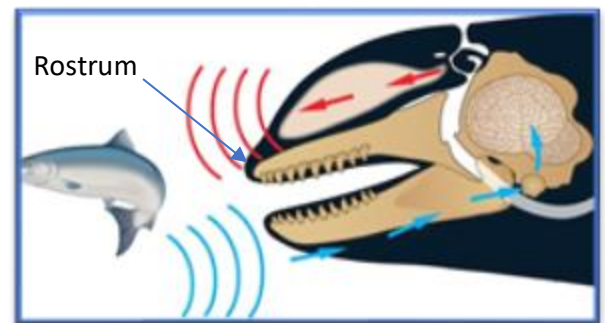


Orcas & Ocean Noise

Echolocating Orcas

Orcas are the ocean's apex predator, or the predator at the top of a food web. They are highly intelligent animals that live in pods with their families, hunt and feed cooperatively, and can live to be over 100 years old! Orcas feed using a process called echolocation, an adaptation commonly used by dolphins and porpoises.

Echolocation is the ability to "see" your prey by using sound waves. This process starts by the orca sending out high-frequency clicks (sound-waves) that travel quickly through the water around them. Once a sound wave hits an object, such as prey, it will bounce back to them as an echo. These echoes are received by the lower jaw and rostrum (forehead) of the orca, and are then interpreted by the brain to know what the object is or where to hunt.



Orcas & Ocean Noise Pollution

Ocean noise pollution has been known to negatively affect echolocating animals such as orcas, dolphins and porpoises. It is important to eliminate ocean noise pollution that will drown out the echolocating clicks that these marine mammals use to feed. As ocean noise pollution becomes more common, these added sounds can mask the echolocation clicks of orcas and other animals, making it difficult for them to find prey and stay healthy.

Listen to the sound of echolocating orcas and how it is disrupted as a large shipping vessel passes these animals.

[Sound Link](#)

Getting Involved

- ❖ Buy & support local products and businesses
- ❖ If you like to be on the water, choose non-noisy options! Instead of motorboats or jet skis that contribute to underwater noise pollution, use kayaks or paddle boards instead.
- ❖ Be an ocean advocate & spread awareness on ocean conservation



Echolocating in a Modern Ocean

Activity:

Being an echolocating marine mammal in the ocean today is quite difficult. In addition to the abundance of ocean noise pollution that makes it more difficult for marine mammals to find their prey, prey is also limited due to overfishing.

In order to gain a better understanding of the struggle these animals face, you are going to do an experiment where you become the echolocating orca in a healthy ocean vs. an ocean polluted with sound.

Materials:

- ❖ 2 people (player 1 & player 2)
- ❖ Speakers or radio to play music
- ❖ Stopwatch
- ❖ Blindfold (optional)



Instructions

1. You will begin the game with player 1 as the orca, and player 2 will be the prey! The prey choices you can choose from include salmon, sea lions, sharks, and more! Player 1 will give player 2 (prey) 30 seconds to hide before looking for them.
2. When you begin to search for your prey, you will do it using a call and response to mimic echolocating. You will call out "ocean", and when your prey hears you say that, they will respond "noise". You and your partner must maintain the same volume of calling out the entire game. Time yourself to see how long it takes to find your prey in round one. Once you found your prey, record your time on a sheet of paper.
3. You will do the same activity for round two, but this time, you will add some noise pollution to simulate ocean noise. Turn on some music at a very high volume and leave it on until you find your prey. Repeat steps 1 & 2, keeping your call and response at the same volume as it was in round one. Once you found your prey, stop your stopwatch and record your time.

*Optional: For an additional challenge, player 1 wears a blindfold and relies only on "echolocation" to find their prey (player 2). Do this safely! Proceed with caution and make sure to be safe if you decide to try this extra challenge.



Echolocating in a Modern Ocean

Activity Questions

1. Did you find your prey more easily in round one or round two?

2. How did "echolocating" in the first round compare to the second round? Was one easier/harder?

3. What would be some challenges of living in an environment with constant noise?

4. Can noise pollution impact other marine mammals that do not echolocate?* How?

5. What are some ways that you can help with ocean conservation? (Can include ways to help with ocean noise pollution, overfishing, etc.)





Additional Resources

If you're interested in...

- How sound travels in water:
 - Watch this video on [ocean acoustics](#) to learn more about how sound travels in the water vs. in the air, more on ocean noise, and ways to help reduce sound pollution
- Industrial shipping companies reducing their noise pollution:
 - Read this [article](#) by NOAA to learn more about ocean noise in California, how these lower frequency sounds target species that do not echolocate, and the various ways they are attempting to reduce noise in these highly trafficked areas
- Ocean pollution sounds:
 - This short video gives you an understanding of what some of this [noise pollution](#) sounds like
- Necropsies:
 - Exams performed on animals by scientists to determine why and how an animal passed away
 - This helps give researchers lots of valuable information about the health of our oceans and the animals that live in those waters
- Overfishing & sustainable seafood:
 - Explore the [Seafood Watch website](#) to learn more about sustainable seafood
 - Use the [Seafood Watch guide](#) to help you choose the most sustainable seafood in your state
 - Explore some of The Marine Mammal Center's other activities highlighting overfishing & sustainable seafood
 - [Whale-y Big Ideas](#)
 - [Marine Cuisine](#)
 - [Take a Sea-T at the Table](#)
 - [All Caught Up](#)
 - Or try making any of these "Top Chef" worthy [sustainable seafood dishes](#) with your family or friends

