

Audio Gallery

Explore an extensive gallery of underwater sounds made by animals, people, and natural phenomena.



Courtesy of Protected Resources Division, Southwest Fisheries Science Center

Scientist Gallery

Watch video interviews with prominent marine scientists.



Tom Kleindienst, Woods Hole Oceanographic Institution



Jill Schoenherr

Technology Gallery

Discover the tools used to measure the temperature of the ocean, track marine mammals, measure ocean currents, and much more.

Resources

Media Resources

Material designed for the media on the basics of sound in the ocean.



Teacher Resources

Activities, powerpoints, tutorials, and links designed for educators.



Student Resources

Tutorials and features designed for students.



Education resources include classroom activities, step-by-step instructions for building a hydrophone, and comprehensive lists of printed and Internet resources related to sound in the sea. Further additions to the website are on-going; scientists with recordings of sounds appropriate for the Audio Gallery are encouraged to contact:

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Discovery of
Sound in the Sea

Project partners

University of Rhode Island Office of Marine Programs
 Marine Acoustics, Inc.



Scientific review panel

All DOSITS content has been reviewed by a panel of over 60 ocean scientists led by
 Dr. Darlene Ketten, Woods Hole Oceanographic Institution
 Dr. James Miller, University of Rhode Island
 Dr. Peter Worcester, Scripps Institution of Oceanography

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Discovery of Sound in the Sea

Sound provides a three-dimensional view of the underwater environment that is not limited by light levels. The *Discovery of Sound in the Sea* website (www.dosits.org) describes how marine animals and people use sound to sense their surroundings, to communicate, and to navigate.

This Internet resource provides scientific information for the general public and K–16 educators and students. It also includes advanced level content appropriate for high school physics or undergraduate classes. The website provides an introduction to underwater acoustics and explains how people and animals use sound to accomplish everyday tasks. There is also an in-depth discussion on the effects of underwater sound on marine mammals and fishes. This interactive website has three galleries highlighting sounds in the sea (Audio Gallery), current scientific investigations (Scientist Gallery), and scientific equipment (Technology Gallery).

Animals and Sound in the Sea

How are animals affected by underwater sound?

Specific sounds and increased background noise can impact marine animals. The effects vary depending upon the sounds an animal can hear, the intensity and frequency of the sound, and other variables.



Paul E. Nachtigall, Hawaii Institute of Marine Biology

How do animals communicate under water?

Marine animals produce a variety of underwater vocalizations that can be used to communicate over short or long distances. For example, humpback whales produce a series of vocalizations that collectively form a song that can be heard miles away.



Tom Macchierri

Science of Sound in the Sea

How fast does sound travel under water?

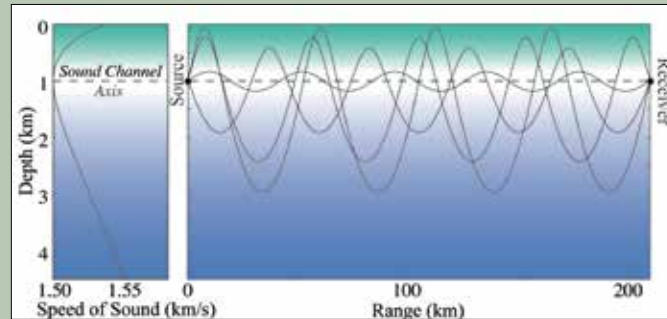
J.-D. Colladon, *Souvenirs et Mémoires*, Albert-Schweizer, Geneva, 1893.



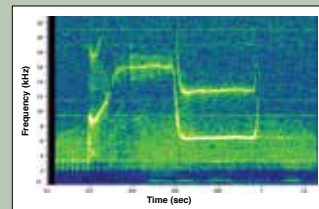
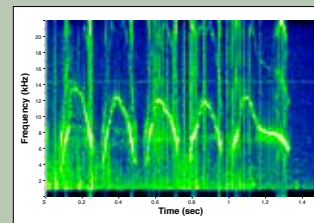
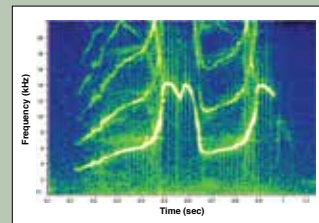
In 1826, Daniel Colladon and Charles Sturm measured the speed of sound in water to be five times faster than the speed of sound in air.

How does sound travel through the ocean?

A sound channel in the ocean allows low-frequency sound to travel great distances. This channel is called the SOund Fixing And Ranging, or SOFAR, channel.



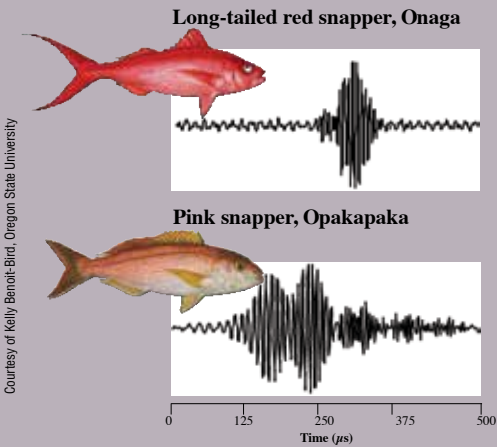
What are common underwater sounds?



The ocean is filled with a variety of sounds. Spectrograms are used to display common underwater sounds, such as these dolphin signature whistles.

People and Sound in the Sea

How is sound used to identify fish?



Courtesy of Kelly Benoit-Bird, Oregon State University

Fish finders use reflected sound to locate fish. Scientists hope to use the unique sonar echoes from different species of fishes in Hawaiian waters to determine population size.

How do explorers find sunken ships?

Side scan sonar is often used to find objects, like shipwrecks, on the seafloor. This sonar image is of the British freighter *Empire Knight* that sank in 1944 off the Maine coast.



Courtesy of Klein Associates, Inc.

How is sound used to measure ocean temperature?

Ocean temperatures can be calculated by measuring the amount of time it takes for sound to travel a known distance under water. Hydrophone arrays (white dots) have been used to measure the temperature in the North Pacific.

Courtesy of Peter Worcester, Scripps Institution of Oceanography

