



# Marine Mammals and Noise

## Fact Sheet

### AMBIENT NOISE IN THE OCEANS

Ambient noise is the background noise in marine environments comprised of a variety of both natural and man-made sounds.

*Natural sources* of sound include: earthquakes, wave action, wind, and rain, as well as sounds produced by marine animals.

#### FAST FACT:

Ambient noise levels are predicted to continue increasing in both coastal and deep ocean areas.

Major contributors of *man-made sources* of sound include: commercial ships and recreational watercraft, oil and gas exploration, sonar, marine pile driving, and underwater explosions.

### THE BIOLOGICAL IMPORTANCE OF SOUND

Marine mammals have evolved an extremely sharp sense of hearing in marine environments where sound is very reliable, especially over long distances. Marine mammals can distinguish biologically important signals among many different underwater sounds; however, some types of sound may disrupt or injure marine mammals.

- Marine mammals use sound to communicate, navigate, and detect predators and prey.
- Communication is vital for both solitary animals and groups when trying to attract mates, maintain group cohesion, or announce position or location.
- Toothed whales use echolocation to obtain environmental information, such as water depth, distance of objects, and location of food.

#### FAST FACT:

Underwater sounds travel five times faster and 60 times further than sound travels through air.

### MAN-MADE NOISE AND MARINE MAMMALS

The extent that man-made noise is a significant threat to marine mammals is variable and depends on a variety of environmental and biological factors. Research indicates that the effects of noise may range from minor disturbances to injury, and in some cases, death. Effects of noise depend on a variety of factors including the species and behavior of the animals, as well as the frequency, intensity, and duration of the noise. There is also concern that the effects of noise may act jointly or cumulatively with other threats in the ocean (e.g., pollution, prey availability, entanglement in nets, and climate change).



# Marine Mammals and Noise

## Fact Sheet

### POTENTIAL EFFECTS OF NOISE ON MARINE MAMMALS

**Behavioral Effects:** Behavioral responses to noise can range from minor to severe, depending on location, season, species, life-history stage, and type of noise. Some behavioral effects may include:

- Changes in biologically important behaviors, such as breeding, calving, feeding, or resting.
- Changes in diving behavior, such as reduced or prolonged dive times, increased time at the surface, or changes in swimming speed.
- Changes in historical migration routes.

**Physiological Effects:** The physiological effects of noise on marine mammals are not well understood. However, some studies on the effects of noise on animals suggest the following may occur:

- Temporary or permanent hearing loss.
- Stress (may affect the animal's immune system, reproductive health, or behavior).
- Physiological responses associated with changes in normal diving behaviors.

**Masking:** Masking occurs when certain types of noise in the ocean interfere with a marine animal's ability to hear other important sounds.

- Masking is most pronounced when a noise is at the same frequency and loudness as biologically important sounds, such as mating calls.
- Some cetaceans may respond to masking noise by changing their calls (e.g., call rate, frequency, loudness, or duration), or by changing their behavior.

#### FAST FACT:

Scientists believe female blue whales can hear the low frequency mating songs of males from a distance of several thousand miles.

**Population Level Effects:** Population level effects could occur if noise impacts resulted in a decrease in the number of animals in a population. Currently, there is not enough data on most marine mammal populations and the effects of noise to determine population level effects over time.

### DID YOU KNOW...

NOAA Fisheries Service works cooperatively with other Federal agencies, non-governmental organizations, and the scientific community to better understand marine mammal communication, hearing, behavior, and the potential effects of sound on marine mammal populations. NOAA Fisheries Service continues to build partnerships to develop innovative solutions to minimize the impact of noise-producing activities on living marine resources.

For more information, visit: <http://cetsound.noaa.gov/>