

Cetaceans

whales, dolphins and porpoises



-Breathe air through a blowhole

-90 species of cetacean all are marine except 5 species of freshwater dolphin

-divided into two groups; Baleen whales and toothed whales

Baleen whales

- Filter feeder
 - modified plates made out of Keratin (like our hair)
 - each plate has hair like bristles that trap prey (krill)
- whales open mouth, suck in large amounts of water, push water out with their tongue trapping prey on bristles
- 13 species of baleen whales
- Blue whales are the largest



Toothed Whales

- 80 species of toothed whales
- largest is the Sperm Whale (highly endangered)
- eat fish and squid mainly, sometimes sharks and lobsters
- Orca whales and narwhals
- very social and intelligent
- live in pods (groups)
- porpoises and dolphins are really toothed whales
- Hunting whales has been banned since about 1946



Diving the Depths

Pearl Divers to Squid Eaters



Pearl Diver (Free Dive)
Pearl divers of the coastal town of Papeete in French Polynesia dive without external air supply. They can dive to depths of more than 30 meters when they collect oysters for up to two minutes.

39 meters



Emperor Penguin
Emperor penguins dive deeper than any other bird. They hold their breath when they dive and hold long. How long their breath depends on how deep they dive and how fast they move.

200 meters



SCUBA Diver (Aided Dive)
In June 2007, Sheck Exley set the World's Deepest Open Circuit SCUBA record. He descended to a depth of 318.25 meters. He took about 20 minutes to reach 318.25m, and 12 hours to surface.

318.25 meters

Bottlenose Dolphin

Bottlenose dolphins usually do not need to dive deep to catch their food, however they are capable of diving under experimental conditions to 500 meters.



535 meters



Beluga Whale

Beluga whales are able to swim both forward and backward (something few other animals can do). Under experimental conditions a beluga whale dove to a depth of 642 meters.

647 meters

Southern Elephant Seal

Southern elephant seals live in both Antarctic and Atlantic waters and are the largest of all seals. The deepest one recorded by an Elephant Seal is 2388 meters.



2388 meters

Sperm Whale

Sperm Whales are one of the deepest-diving mammals on the planet. They are in search of squid to eat and are believed to be able to dive up to 2000 meters in depth to the ocean floor.



3000 meters

What problems do we have diving?

What adaptations have marine mammals evolved to have?

Mammal Diving

Some mammals can hold their breath for up to 2 hours



How do they do that?

slow heart rate, myoglobin helps to store more oxygen, pool blood around major organs and away from extremities, more blood.

weddell seals hearts will only beat 4 times a minutes when deep diving



SPERM WHALES:

- ☒ Routine dives :
- ☒ 400m for 40min
- ☒ Maximum depths:
 - ☒ 2000m

BEAKED WHALES:

- ☒ Routine dives:
 - 800 m for 60 min
- ☒ Maximum durations:
 - 120 min

- ☒ Bottlenose dolphin
(*Tursiops truncatus*)
typically dive <5 min
& <20 m

Large baleen whales
typically dive <5 min;
can reach depths of
200 m

Pinnipeds: Maximum depths range: 600m to 1500 m

Echolocation:

Toothed whales have specialized organs to emit and receive sound waves
used for navigation and hunting
helps to judge surroundings in dark water or find food
precise enough to tell the difference of a B-B pellet and a kernel of Corn

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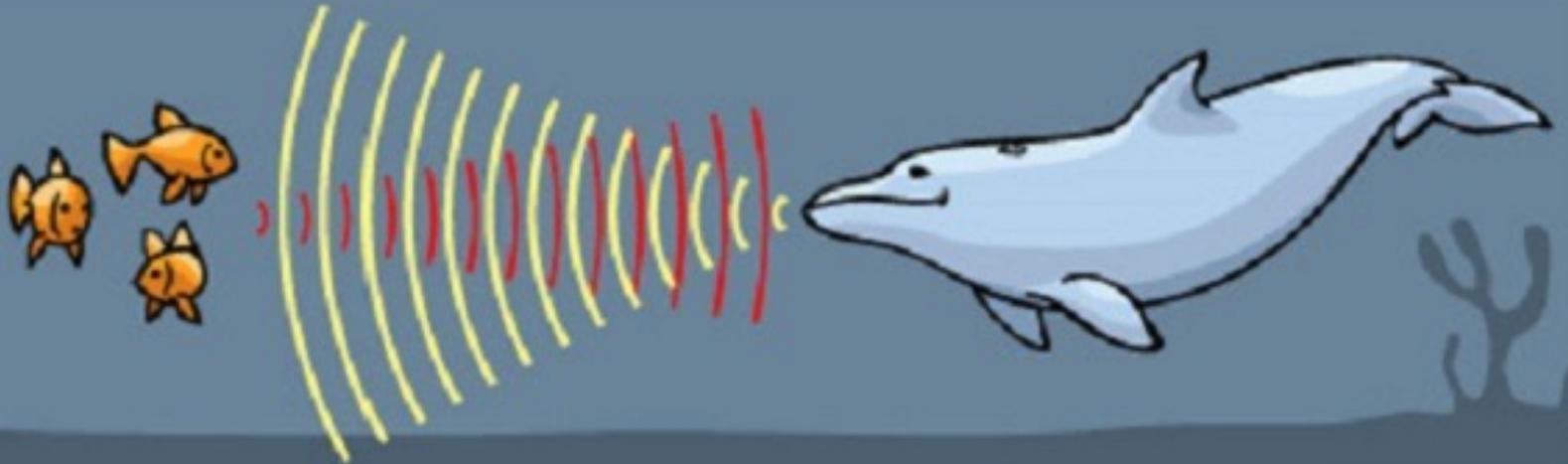
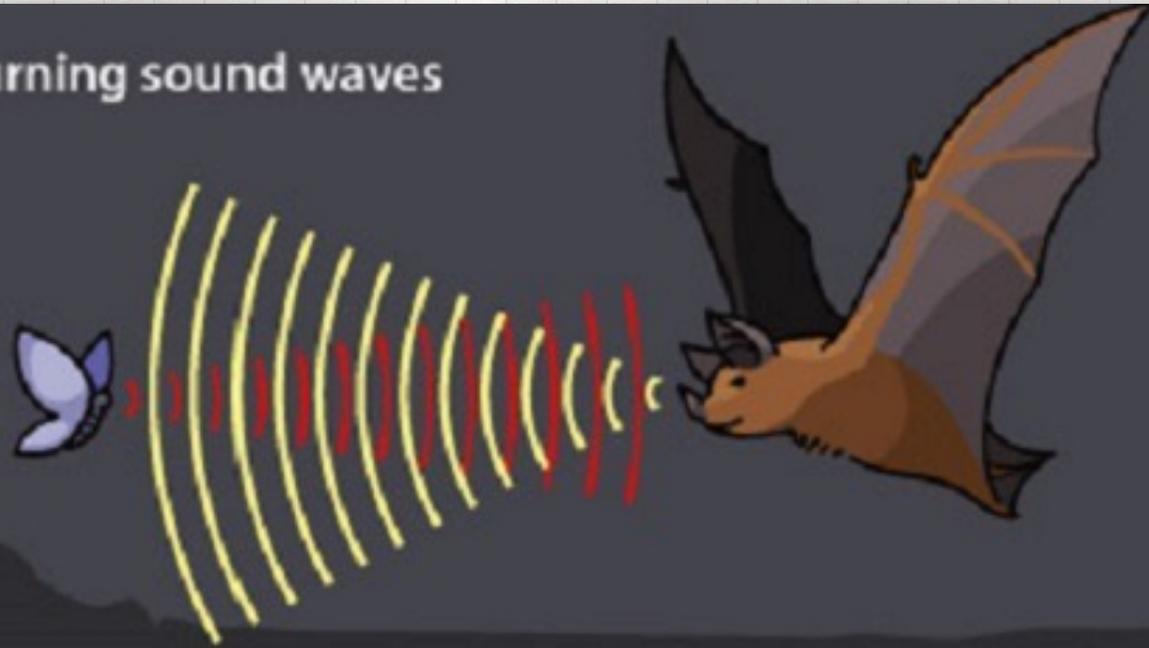
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Echolocation

■ Sonar ■ Returning sound waves



Callocities on Right Whales



Hardened skin upraised bumps callus

the callosity tissue is dark like the whale's skin, but it is infested with light-colored cyamids (Si-am'-ids), or "whale lice."

can be used to Identify whales

Position of Callosity are like skin color patterns

Can be used as genetic identification of whales that are related to each other.



Marine Mammal Protection Act 1972

The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S.

Some marine mammal species or stocks may be in danger of extinction or depletion as a result of human activities;

These species or stocks must not be permitted to fall below their optimum sustainable population level ("depleted");

Measures should be taken to replenish these species or stocks;

There is inadequate knowledge of the ecology and population dynamics; and

Marine mammals have proven to be resources of great international significance.

The MMPA was amended substantially in 1994 to provide:

Certain exceptions to the take prohibitions, including for small takes incidental to specified activities, when access by Alaska Natives to marine mammal subsistence resources can be preserved, and permits and authorizations for scientific research;

A program to authorize and control the taking of marine mammals incidental to commercial fishing operations;

Preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction; and

Studies of pinniped-fishery interactions.