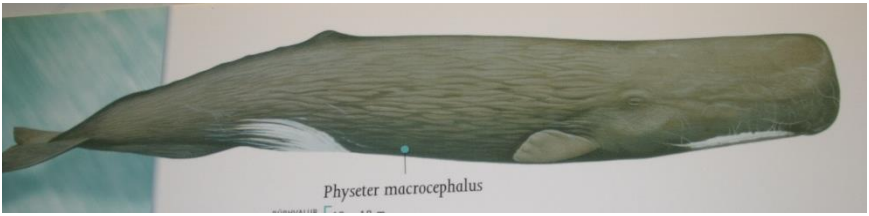
# The Húsavík Whale Museum


THE HÚSAVÍK WHALE Museum

# What is a whale?




Whales, dolphins, and porpoises form the largest order of marine mammals, the **cetaceans**. They breathe air with lungs, nurse their young with milk, and swim by moving their tail horizontally. Their skin is smooth without any scales.

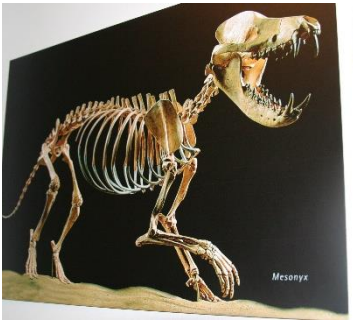
Currently, about **88 different cetacean species** of various sizes and ocean habitats are known. There are two suborders of cetaceans: the baleen whales, or Mysticeti, consisting of 15 species and the toothed whales, or Odontoceti, consisting of roughly 73 species.

**Distribution**

For many cetaceans the year is divided into feeding and breeding seasons. For most baleen whales migrations of 3.000 - 5.000 km are common. The inability of the newborn calves to survive in cold waters forces the females to migrate to warmer waters where breeding and mating occur.

- ✓ Migration routes of Humpback and Grey whale populations are well known. Humpback whales cover 8.000 km each way. The Grey whales travel 10.000 km a way, undertaking the longest migration of all mammals known to date.

# Evolution

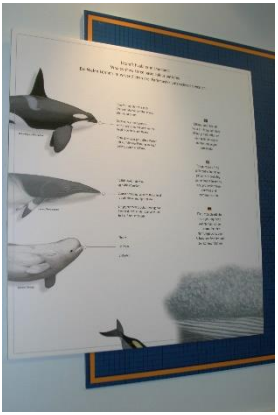



Cetaceans are believed to have evolved from an extinct group of mammals called the Mesonychids. These wolf-like animals had long limbs and lived on land. According to their DNA, whales are closely related to cows, pigs and other land animals.

During evolution the whales developed a streamlined body shape and a pronounced skull, their nostrils migrated to the top of their head and the genitals became enclosed in slits. The forelimbs became flippers and the hind legs disappeared, leaving only small bony remnants.

- ✓ DNA tests revealed that the hippotamus is the whale's closest relative.

# Morphology and anatomy of whales



Whales show three basic colour patterns: uniform, spotted or striped. They have three basic body shapes, which are dolphin-like, with throat grooves, and without throat grooves. The shape of the dorsal fins and flukes also vary in size and shape.

Whales are **warm blooded**, just like other mammals. The body temperature is kept between 36-38°C. Their body is covered with a 5-50cm thick layer of fat called blubber. Their sophisticated heat exchange system (the arteries are placed close to the veins) minimize heat loss through their extremities.

# Diving and respiration

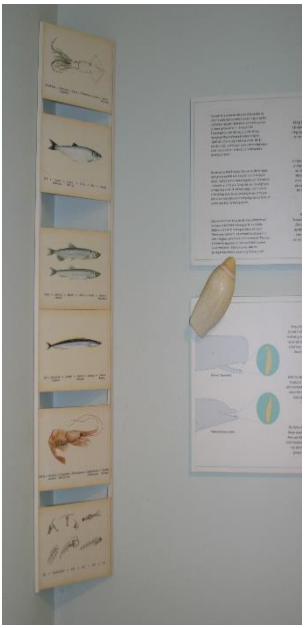
Dive depths and dive times of various species can be seen in the table. Toothed whales are especially excellent divers.

- ✓ The sperm whale can dive up to 3.000 m deep and stay more than 2 hours under water.

After a deep dive, whales surface to take 3 - 5 consecutive breaths. Their warm and moist breath condenses when it hits the air, creating a visible fountain, **the blow**. Shape and height of the blow is characteristic for many species. During a dive, the oxygen is stored by the protein **myoglobin** in the muscle tissue.

- ✓ Whales normally exchange 90% of the air in their lungs with one breath, human lungs normally exchange only 15%.

# Feeding



Toothed whales **catch single prey**, like fish, squid, or other sea mammals such as seals or whale calves. Most teeth are conically shaped (except for porpoises, which have spade-like teeth) and are used to tear but not to chew. Some toothed whale species have no functional teeth. The prey is swallowed whole, using a technique called suction feeding.

✓ The tooth has growth rings and can be used to determine the whale´s age.

Baleen whales feed by **filtering plankton**, krill, copepods, herring, sand eel, capelin and crabs. They generally feed at high latitudes during the summer months, where the productivity is high. In the winter and while migrating, they have little or no food intake. Having expandable throat grooves, baleen whales gulp large amounts of water, which they push through the baleens, catching the food in the baleens.

- ✓ Humpback whales have a unique feeding technique called bubble-net feeding. Several individuals circle around a school of fish and create a net of bubbles, causing the fish to concentrate in a dense flock. Then they swim up to the surface, while gulping all the fish at once.

Whales have a four-chambered stomach. The first chamber, called forestomach, contains sand and shell pieces and is kept in motion to mechanically crush down the food.
Whales satisfy their thirst mostly with food. The salt from the water inhaled with prey is extracted and the water is efficiently conserved in their kidneys.

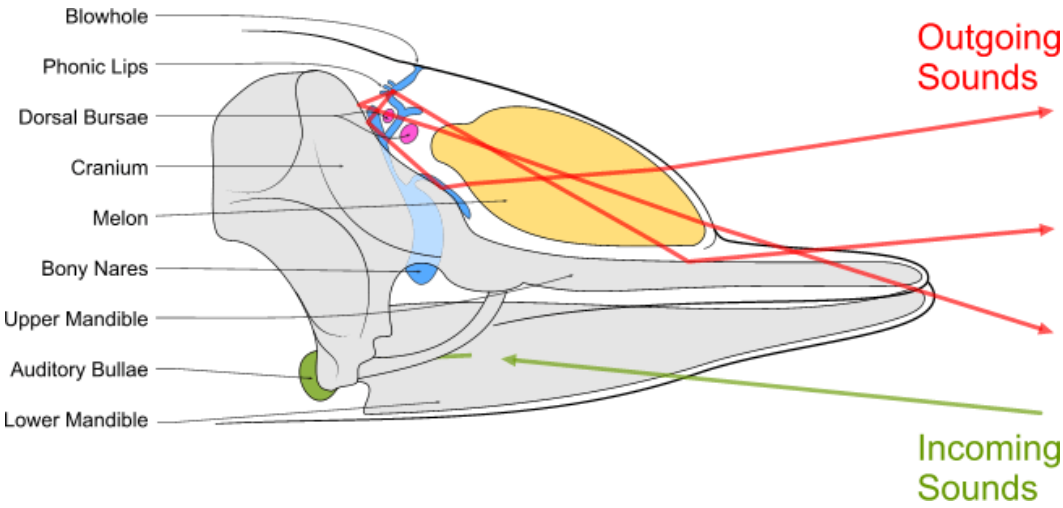
# Senses

Though the **vision** of Cetaceans is limited by the watery environment, they see quite well in water and in air. Some whales have a good binocular vision. On the tongue there are **taste buds**, providing information about the surrounding water chemistry. The skin of cetaceans is very sensitive to **touch**, and stroking and touching are part of courtship rituals in most species. Mothers and calves frequently reaffirm their bonds by touching each other. But a whale's strongest sense is **hearing**.

# Sounds and echolocation

Whales release sound waves and clicks that return as an echo after having reached an object. By observing the time it takes the echo to return, the distance from the object can be determined. The jawbones function as sound transmitters to the inner ears; and each ear receives sound independently. This technique is called echolocation and allows whales to navigate, hunt, communicate and find each other in the vastness of the ocean..

- ✓ A dolphin can hear sounds of 75 Hz – 150 000 Hz frequency, whereas a human only 20 – 20 000 Hz.

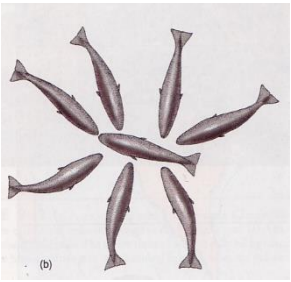



Low frequency sounds travel especially long distances in marine environments. They are therefore used for communication.

# Social organisation and behavior

The social organization of cetaceans ranges widely, from the **highly complex** societies found in many of the toothed whales to the unstructured **solitary** ways of baleen whales, of which the basic social unit is formed by mother and calf.

- ✓ Killer and long-finned pilot whales spend their entire lives in highly organized pods where all individuals are closely related. They develop hunting strategies that depend upon these long-term bonds. During mating season the males leave their pods temporarily to mate with females of other pods, preventing genetic isolation.




Cetaceans can communicate with a variety of postures and surface behavior. **Breaching** (jumping out of the water), **lobtailing** and **flipper slapping** (repeated slapping of tails or flippers on the water surface) can be interpreted variously as a warning signal or a way to get rid of parasites but sometimes the reason is unknown. **Spyhopping** (raising the head above water) is used to look around and scan the surface.

- ✓ Mutual assistance is additional evidence of their complex behaviour. It has been observed that group members will protect injured or dying individuals, sometimes even carrying them to the surface to breathe.

**Reproduction**

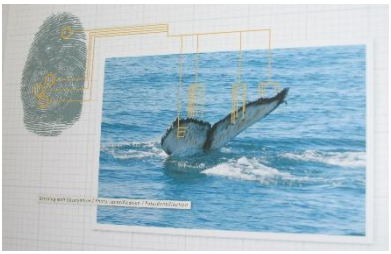
Most cetaceans engage in polygamy and relationships are only maintained during one breeding cycle. Male mating strategies include competitive and courtship behaviour, acoustic displays such as singing, and sperm competition.

The gestation period is 11-18 month depending on species. Calves are born tail first so they are attached to the oxygen-rich placenta for longer and are less likely to drown. The calf swims to the surface to take the first breath, often with the help of its mother. Parental care rests with the females. The milk is squirted into the calf's mouth which allows drinking underwater.

- ✓ A blue whale calf gains 90kg with a milk consumption of 240 l per day.

Depending on the species a female gives birth every 2-5 years. This low birth rate coupled with high mortality of the newborns, extensive hunting and environmental threats, explain the drastic depletion of many populations.

## Research



Generally little is known about cetaceans and research was rather difficult in the past. Nowadays scientists obtain information about migrations and behavior using satellite tagging or acoustic methods, e.g. hydrophones. Analyses of DNA samples obtained from the skin reveals much about the whale origin and genetic structure of populations.

Another research method is photo identification. Pictures of features that distinguish species and individuals are taken and then used to identify individuals just like fingerprints are used in humans. Mostly the shape or the color of the fluke, dorsal fin or body is used.

- ✓ The University of Iceland‘s Research Center in Húsavík performs photo ID research of the whales and dolphins in Skjálfandi Bay.

# Environmental threats

The impact of humans on marine ecosystems is indisputable. One of the biggest threats is the water pollution. Rubbish such as plastic bottles or nets float in water, causing the death of animals when swallowed or if they cause entanglement. Pollutants accumulate in organisms towards the top of the food chain and can increase disease or lower reproductive success.

- ✓ The contamination of marine mammals raises big concern regarding the consumption of whale meat.

Extensive input of organic matter (eutrophication) caused by untreated sewage and agricultural activities may accelerate unwanted algae growth.

Overfishing and habitat alteration are another threat: species like cod or halibut are seriously depleted and the Atlantic cod is now listed on the IUCN Red list of threatened species as vulnerable. Fishing gear can destroy habitats and biogenic structures like coral reefs.

- ✓ Researchers estimate that around 308.000 cetaceans die in fishing nets every year as so called “by catch”.

# The yellow submarine


**The Yellow Submarine** is the museum‘s playspace devoted to children.
It was designed by an art student from Finland. In here the children can draw pictures, play with some toys, or sit down and read books with their parents.

## Whale species panels

**Narwhal (*Monodon monocerus*, Odontoceti)**

The Narwhal lives in Arctic waters and its main characteristics is the tusk. In most 2-3 years old males the left front tooth erupts through the upper lip and grows up to 2,7 m in length.

**World population: 50.000 Status: unknown**

**Humpback Whale (*Megaptera novaeangliae*, Mysticeti)**

Males are best known for their songs, which are considered to be the most complicated in the animal kingdom and are thought to be courtship displays. During the 20th century, populations were reduced to 10% of their original numbers due to extensive whaling.

**World population: 22.000 Status: vulnerable**

**Sperm Whale (*Physeter macrocephalus*, Odontoceti)**

The largest of all toothed whales feeds mainly on deep-water squid including the giant squid. The enormous diving capacity (3000m) was first recognized when Sperm Whales got entangled in submarine telephone cables over 1 km below the sea's surface.

**World population: 200.000 Status: vulnerable**

**Long Finned Pilot Whale (*Globicephalus melas*, Odontoceti)**

The Long-Finned Pilot Whales belong to the family of ocean dolphins. They are a very social animal that travel in groups of 10-100 individuals. These whales are only hunted regularly on the Faroe Islands.

**World population: 250.000 Status: not endangered**

**Cuvier´s Beaked Whale (*Ziphius cavirostris*, Odontoceti)**

They feed on squid and fish, which they capture mostly by suction since all beaked whales lack functional teeth. Only two non-functional teeth erupt in the lower jaw.

**World population: unknown Status: unknown**

**Northern Bottlenose Whale (*Hyperoodon ampullatus*, Odontoceti)**

The Northern Bottlenose Whales are extraordinarily social animals that usually live in groups of four individuals. They dive up to 1.500 m deep and feed mainly on squid but also on herring, deep-sea fish, shrimp, and even sea-cucumbers and starfish.

**World population: unknown Status: vulnerable**

**Harbour Porpoise (*Phocoena phocoena*, Odontoceti)**

With its total length of 1,4-1,9 m and no more than 80 kg weight, the Harbour Porpoise belongs to the smallest of the Cetaceans. In the past it has been hunted because of its coastal habitat. Today, they are mostly threatened by fishing nets.

**World population: 1.000.000 Status: not endangered**

**Beluga Whale (*Delphinapterus leucas*, Odontoceti)**

Belugas are some of the most vocal Cetaceans. Their high-frequency sounds can be heard clearly above the water. They live in small pods but can congregate to more than 1.000 individuals. They follow fish, especially salmon, upstream for hundreds of miles.

**World population: around 100.000 Status: vulnerable**

**Northern Right Whale (*Eubaleana glacialis*, Mysticeti)**

The Northern Right Whale is among the most endangered mammals in the world. It was excessively hunted because the thick layer of blubber provided lots of valuable oil.
Their life expectancy exceeds 70 years.

**World population: 500 - 1.000 Status: endangered**

**Minke Whale (*Baleanoptera acutorostrata*, Mysticeti)**

The Minke Whale is the smallest and most abundant rorqual and seems to be less sensitive to disturbances. Compared to other species, it seems to have responded better to the massive population depletions experienced during the whaling era of previous centuries. They can reach 50 years of age.

**World population: 500.000 - 900.000 Status: recovering**

**Bowhead whale (*Balaena mysticus*, Mysticeti)**

The only non-migrating baleen whale species is spending its life following the advance and retreat of the Arctic ice. Bowhead whales use echolocation to avoid colliding with icebergs. They can travel long distances under ice and are capable of breaking through ice layers up to 6 m thick to breathe.

**World population: 8.000 Status: endangered**

**Sei Whale (*Balaenoptera borealis*, Mysticeti)**

They usually travel alone or in small groups but larger aggregations have been recorded in good feeding grounds. Calves separate from their mother at 6-8 months of age. Sei whales can reach almost 70 years of age.

**World population: 50.000 Status: endangered**

**Fin Whale (*Balaenoptera physalus*, Mysticeti)**

Their asymmetrical pigmentation is unique among whales. The lower jaw and the first part of the baleens on the right side are white and the rest is black. They can live for more than 80 years.
**World population: 120.000-150.000 Status: endangered**

**Blue whale (*Balaenoptera musculus*, Mysticeti)**

The Blue whale is considered the largest animal to have ever lived on earth. The longest specimen measured just over 33 m. Like other baleen whales, it feeds on the smallest animals of the ocean, zooplankton and small schooling fish, consuming up to 5.500 kg per day. Blue Whales are believed to have a life span of up to 100 years.
**World population: 10.000 – 14.000 Status: endangered**

# The bird cliff

On the panels you can find information on the length, weight and the wing span of each species. Furthermore there is the size of the population in Iceland and Europe (in pairs), the duration of stay in Iceland, the duration of the nesting season and the number of eggs. The nesting areas in Iceland and distribution are marked in the maps.

# Whaling history

The first organized whalers that hunted cetaceans in North Atlantic were probably the **Basques** in the 12th century. In the 16th century they also arrived in Iceland. In the past whaling was a dangerous business due to the primitive equipment and small boats. Some species were easier to hunt than others.

- ✓ The Southern and Northern Right whales got their English names because they swim slowly and have a thick layer of blubber, that causes their carcass to float. Therefore they were the “right whales” to hunt, because killing them was easy.

It is likely that Icelanders traded with Basques but didn't engage in the hunting itself. The milestones in history of whaling are the establishment of steamships in 19th century, the invention of **harpoons with explosive tips**

(displayed on the floor in the center of the room) and the practice of pumping air into those species of whale that tend to sink after harpooning. This enabled hunters to take a wide range of species in great numbers.

- ✓ Various products originating from whales were used in the past: the oil for heating or cosmetics, the meat as food for humans and animals, the balleens for the corsetes of women. The teeth and bones were cut to serve as decorative objects or tools of daily use.

Until 1913 it was mainly the Norwegians who hunted whales around Iceland. They moved their activities to Antarctica when there were fewer whales to hunt around Iceland. The first whaling ban by national law was then announced in Iceland in 1915, but in 1928 it was repealed. Iceland itself started commercial whaling in **1935**. In the next forty years 300-400 whales a year were slauthered, in total about 20.000 whales. Finaly in 1983 the International Whaling Commission (IWC) passed a ban on commercial whaling effective in 1986.

- ✓ The photos in the left part of the room are from the times of commercial whaling.

Iceland has twice run **scientific whaling** programs under special permit of the IWC, in 1986-89 and 2003-2007. Mostly Minke, Fin and Sei whales were hunted by the hundreds. They were criticized by the environmental organizations as the samples were often not represantative enough to give objective results and the meat was sold to restaurants.

- ✓ As marked with red spots on the small map, 36 minke whales were killed in 2003, some of them within whale watching areas (blue patches). This leads to conflicts with whale watching companies.

In 1991 Iceland resigned from IWC, when the plea of the Scientific Committee to resume commercial whaling was rejected, but joined again in 2002. As a new member, it promised not to resume commercial whaling until 2006. In 2006, commercial whaling was resumed and the whale meat was planned to be sold to Japan. But this did not occur and commercial whaling nearly ceased again in 2007. However the pro-whaling community in Iceland insisted on continuing commercial whaling for the domestic market.

# The Blue Whale

Whale strandings are a worldwide phenomenon and have occurred throughout history. Finding a stranded whale has always been an important event, as it provided much oil and meat and could save people from starvation. The Icelandic word "Hvalreki" ("whale stranding") means unexpected luck and is still used when someone wins the lottery. In chapter 25 the Grettir's Saga describes a quarrel of two men over a stranded whale that resulted in a fight. To prevent such conflicts there existed certain rules in Iceland in the past that directed the treatment of a stranded whale body. They were a part of "Jón's Book", which dates back to 1281. Because every stranded whale had to be announced, Iceland owns at present a unique register of whales that stranded in the last 1000 years.

The species that commonly strand belong to the deep sea toothed whales that strongly depend on their echolocation: the pilot whales, the sperm whales, the false killer whales and locally the Northern bottlenose whales or white beaked dolphins. The toothed whales are also mostly involved in mass strandings because of their strong social cohesion. Usually baleen whales are found stranded as single individuals.

The reasons for whale strandings remain unclear. Apart from disease, the anthropogenic influence is nowadays also often suggested. The artificial sounds produced by ship traffic, navy or seismic experiments may cause failure of the navigation system of a whale and its disorientation.

# Natural history

On the map from 1585 various monster-like drawings of whale species can be seen, however only a few can be recognized (e.g. the narwhal). Whales around Iceland are further mentioned in the Norwegian treatise Speculum regale, The King's mirror, written in the 13th century. Then, in 1640, Jón Guðmundsson the Learned wrote On Iceland's diverse nature. It consisted of several illustrations of whales (displayed behind the glass). Some whale species names used by Jón such as the Redcombe or Cirriped are unfamiliar to a contemporary reader and the described whale species cannot be identified.

The displayed 10.200 years old whale bones were discovered in Aðaldalur near Húsavík Airport. Other whale bones together with an ancient building and many

artifacts were found in Keflavík valley. The bones were used as construction material for the house. The fossil displayed in the centre of the room is 12.800 years old. The poster on the right with detailed drawings of whales was made by a biologist Bjarni Sæmundsson around 1930.

# Orca and White-beaked dolphin room


This room focuses on the different topics that focus on White-beaked dolphins and Orcas. For example, how these animals have been kept in captivity, trained for the amusement of humans and even hunted for food in the wild. You can also read about how these whales can have different dialects in different groups.

In here you can also read about the different types of Orcas that exist today, about their family life and how these cetaceans are the biggest members of the Dolphin family.

Two skulls hang suspended from the ceiling on the far end of the room. One of a White-beaked dolphin, and another one of what appears to be an Orca. But it is in fact of a different species.
If you look closely you can tell that the teeth are replicas, made to look bigger than in reality.

Can you tell which whale this skull is from?
Hint: Look closely at the shape of the skull, and go upstairs on the Whale Walk. There you can find the same kind of whale this skull belongs to.

# The Whale Walk

In the whale walk you can see a collection of whale skeletons. All of the animals except of the narwhal stranded. The painting in the background is from a local artist Sigurður Hallmarsson and shows the mountains of Kinn and Skjálfandi Bay.

- ✓ After finding a corpse, the skeleton has to be cleaned of the tissues. The corpse is allowed to decay in fresh air for 2 years, then the bones are positioned into a tank with hot water and soap for another 2 years in order to drain the fat. Afterwards the bone puzzle must be completed and a beautiful skeleton can be displayed

**Sperm whale (*Physeter macrocephalus*)**

This 14 m long sperm whale stranded in 1997. It was shot after it became evident that it would not survive. It's jaw was broken but this was not the reason for its death. The missing part was replaced with the jaw of another individual. The head can form up to 1/3 of the total body length.

- ✓ The huge upper part of the skull is all filled with "spermaceti", an oily substance of unknown function. It could help regulate the buoyancy and therefore make diving easier for the whale. It may also serve as a huge acoustic lens or it could be a male sexual trait announcing the owners fitness.

**Narwhal (*Monodon monocerus*)**

The narwhal skeleton was donated by Húsavík's twin town known as Qeqertarsuaq, Greenland. This narwhal was hunted by the indigenous people in Greenland, who are legally allowed to hunt the species for subsistence. Its tusk is about 2,18 m long.

- ✓ Some individuals may have two tusks but it is a rare exception.

**Minke whale (*Balaenoptera acutoroatrata*)**

This skeleton is from a Minke that drowned in a fishing net in 1997. The forelimb still shows similarities to other mammals in the structure and number of bones. The baleen whales have four fingers whereas the toothed whales have five.

**Humpback whale (*Megaptera novaeangliae*)**

This humpback calf was only 6-8 months old when it stranded only 34 km outside of Husavik, on Grimsey. The cause of death is not known.

✓ The long flippers of Humpback whale adults are the longest appendage of any animal: they can become almost 6m long.

**Killer whale (*Orcinus orca*)**

This Orca was found in 2001 at Stokksnes in south east Iceland. An Orca individual has 10-13 pairs of admirable teeth on each of the jaws. The tooth is curved inwards and backwards to help grip the prey.

**Cuvier's beaked whale (*Ziphius cavirostris*)**

This 6 m long whale was found on the South coast of Iceland in 2002. The long beak-like snout is typical for all beaked whales. Usually in male individuals two teeth erupt in the front of the lower jaw.

**Long-finned pilot whale (*Globicephalus melas*)**

This pilot whale stranded on the North-east coast of Iceland in October 2002. They have up to 1m long flippers with five fingers.

**Northern bottlenose whale (*Hyperoodon ampullatus*)**

The short flippers are common for beaked whales. This 8 m long whale was found stranded at the South coast in September 2002. The duck-like skull may be important for echolocation.

- ✓ In winter 2005/2006 there was a whale of this species spotted swimming against the current of the river Thames in London. Unfortunatelly the huge rescue operation was not successful.

**Sowerby's beaked whale (*Mesoplodon bidens*)**

This individual stranded in 1999, being only the second of its species ever to be found in Iceland.

- ✓ The beaked whales are mysterious creatures as they are deep-sea species and tend to avoid boats. Therefore they are hard to study and scientists don't have much information about them yet.