

Humpback whale
feeding, showing
baleen plates



David Fleetham/Alamy

Whaling

GCSE key words

Sustainability
Conservation

During the last century whales were hunted and killed by many nations for the valuable materials they provided. Whale populations collapsed as a result. Here we look in detail at this example of human impact on the environment.

Whales were killed for all sorts of products. For example, baleen whales were used to make whalebone corsets and the teeth of sperm whales were used to make ivory for piano keys and buttons.

Whales are mammals; they come in many different shapes and sizes. There are 15 species of so-called great whales, including the largest animal on Earth, the blue whale.

The 15 species of great whale fall into two groups according to how they feed: **baleen whales** and **toothed whales**. Fourteen, including the blue whale, are baleen whales, but the sperm whale is one of the toothed whales. There are 70 species of toothed whale; these are mostly much smaller than the baleen whales. Dolphins and porpoises are in the toothed whale group (see Table 1).

There is more detail about some of the great whales in Table 2.

Baleen whales

Baleen whales feed on small animals. Many species catch shrimp-like creatures called krill and some feed

on small fish as well. Baleen whales have a special feeding mechanism in their mouths that acts as a giant sieve or filter. Several hundred elongated triangular baleen plates, 1–2 m long, grow down on either side from the roofs of their mouths. These plates are made of a fibrous horny material. The baleen plates are 1–3 cm apart and fringed on the inward edge with fibres. The plates grow continuously so that, as the fibrous edges fray in use, they are replaced.

After gulping a large volume of water and krill (or small fish) into its mouth, a baleen whale raises its tongue, which increases the pressure. This forces the water out between the baleen plates at the sides of the animal's mouth, back into the sea. The krill are trapped inside the whale's mouth because the gaps are narrow; the fibres contribute to the overall filtering effect. The whale can then swallow its meal.

Table 1 Types of whale

Group	Number of species	Examples
Baleen whales (<i>Mysticeti</i>)	14	Blue, fin, sei, humpback
Toothed whales (<i>Odontoceti</i>)		
Beaked whales	21	Includes bottlenose whale
Other species of whale	9	Sperm whale, narwhal, white whale
Porpoises and close relatives	6	Harbour porpoise
Dolphins and close relatives	34	Common dolphin, pilot whales, killer whales

Table 2 *Whale statistics*

Species	Average length (m)	Average mass (tonnes)	Distribution	Main prey	Estimated population	Status
Blue	25–26.2	100–120	Worldwide	Krill	1700	Once hunted extensively. Numbers very low but may be increasing
Fin	19–22.3	45–75	Worldwide but less common in tropics	Krill and small fish	30 000	A target for modern whaling. Numbers reduced in some areas, recovering in others
Sei	13.6–16	20–25	Worldwide to subpolar regions	Krill, small fish, squid and copepods	54 000	A target for modern whaling but numbers not reduced as much as blue and fin whales
Common minke	8–10	9	North Atlantic and Pacific from tropics to pole	Small fish and krill	174 000	A target for modern whaling
Antarctic minke	10–11	9	Circumpolar seas in southern hemisphere	Krill and sometimes small fish	761 000	A target for modern whaling
Humpback	12–14	25–30	Widely distributed from Arctic to Antarctic	Krill and small fish	11 750	Increase of 3.1% 1979–93 in North Atlantic; increase of 10.9% 1977–91 in southern hemisphere
Sperm	11 (female) 15 (male)	20 (female) 45 (male)	Worldwide	Squid, fish in some places	No estimates	Once heavily exploited but now reasonably abundant

Population estimates were made between 1982 and 2001.

Sperm whales

The sperm whale is a different shape from the various species of baleen whales. Its mouth is smaller and it has teeth, rather than baleen plates. It catches much larger prey, such as sizeable squid.

Catching whales

Whales are caught using whale catchers – small vessels, with engines powerful enough to pursue a whale.

The harpoon fired from the bows of the catcher is a heavy structure, made from a number of steel components (Figure 1). At the front is the hollow head, packed with explosive. The next section has three or four hinged bars, or flukes, with teeth at their ends, tied down in the closed position. This is attached in turn to a metal shaft, which attaches to the line to the whale catcher.

When the harpoon is fired into a whale, the sudden decrease in velocity drives a firing pin in the second section into a detonator in the explosive charge – as a result the hollow head explodes inside the whale. At the same time the second section is pushed backwards. The ties on the flukes break and hinge open. The teeth provide a firm grip inside the whale. If this does not kill the whale the line is played out as the whale swims on.

The whale catcher then uses its mast and a series of pulleys and springs to act like a huge fishing rod (see Figure 2). Once the whale dies it is towed to a factory ship. This has a large ramp at the stern, leading to a wide flat deck, to which the whale is hauled with cables for butchering.

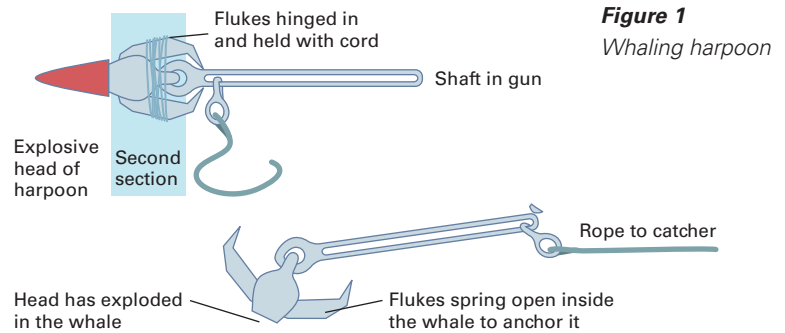


Figure 1
Whaling harpoon

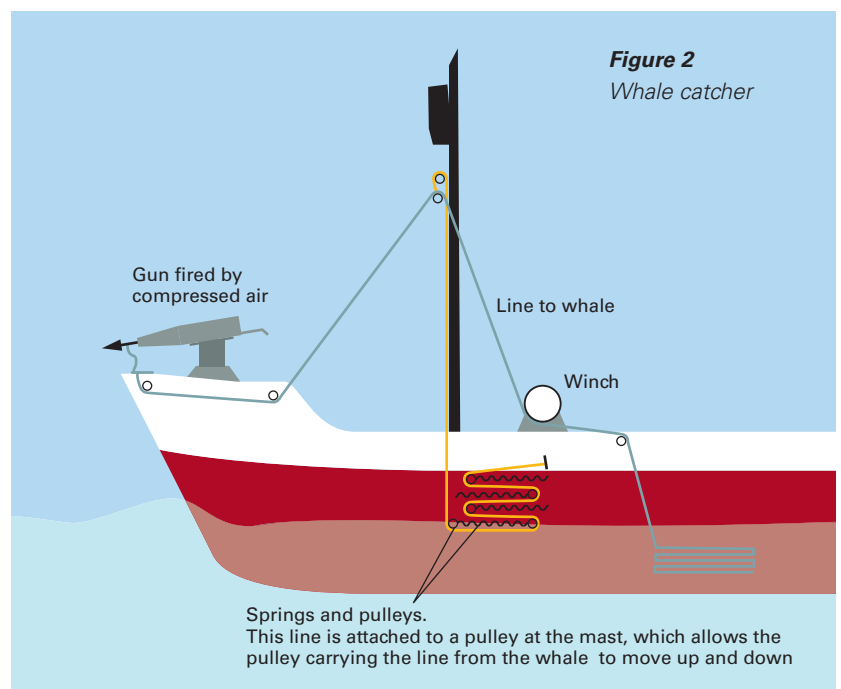


Figure 2
Whale catcher



Minke whale killed by a Japanese whaling fleet for 'scientific purposes'

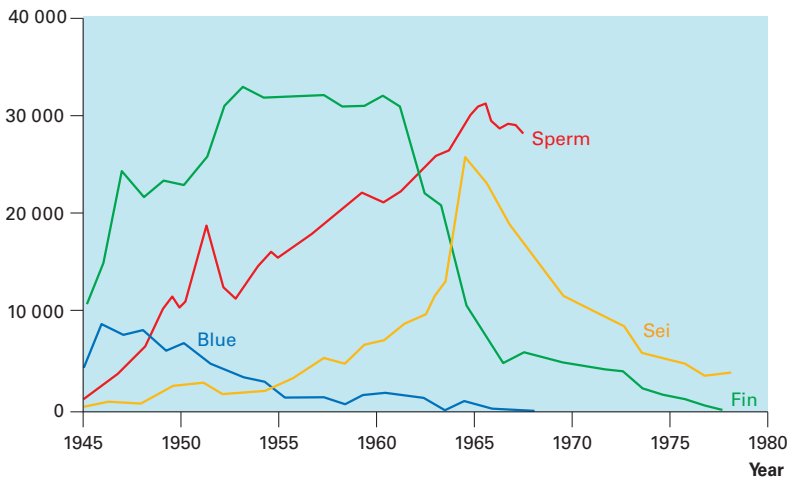


Figure 3 Whale catches since 1945

Inuit people used to use whale ribs and skulls to support the roof of pit houses dug into the ground and then covered with turf. There are no trees for house construction in the Arctic.

An end to the whale hunt?

Whale populations collapsed in the twentieth century (Figure 3). First the blue whale, then the fin whale, then the sei whale became more difficult to find and catch as numbers decreased. People became more concerned at the impact they were having on the planet and started to place a value on whales beyond the financial value of the materials their carcasses yielded.

Some people and governments started to become more active in defence of these creatures. The International Whaling Commission was formed in 1946 when commercial whaling was in full swing and it levied quotas as stock fell. In 1982, the International Whaling Commission decided by majority vote to implement a pause or 'moratorium' in commercial whaling, with effect from 1986. It was hoped that the moratorium would be in time to 'save the whales'.

Recent estimates of great whale populations for some parts of the world's oceans are given in Table 2.

Box 1 Useful websites

- If you want to research whales and whaling in more detail and find out more about the role of the International Whaling Commission visit: www.iwcoffice.org
- If you are interested in animal welfare issues raised by whale hunting, an IWC report on a workshop in 2003 is at: www.iwcoffice.org/conservation/welfare.htm#killing
- You can find out about British research on whales and seals, by the Sea Mammal Research Institute, at: www.smru.st-and.ac.uk/
- The Whale and Dolphin Conservation Society is a global charity. Go to www.wdcs.org to find out more.

At present there is ostensibly no commercial whaling. Since the moratorium, Japan, Norway and Iceland have issued scientific permits as part of their research programmes. All three countries caught whales in the past. The factory ships of Iceland and Japan, with attendant catchers, ranged all the way to the Antarctic.

In recent years, only Japan and Iceland have issued permits, maintaining that the catches are essential to obtain information necessary for rational management and other important research needs. Scientists advising governments of many countries take the view that there is little scientific merit in this renewed hunt and that it should not be extended further.

In fact, the meat from these whales is sold for human consumption, especially in Japan, so it could be argued that 'scientific purposes' are used as an excuse for what is in reality a small-scale commercial operation. At the most recent meetings of the IWC there has been renewed pressure to reopen commercial whaling.

Reasons for whaling

Economic arguments from Norway, Iceland or Japan for a lifting of the moratorium are relatively weak. Elsewhere such arguments are more convincing. Small communities of native people live scattered around the Arctic. Although they enjoy some of the benefits of modern living, until relatively recently they were entirely dependent on various species of smaller whales from the sea and reindeer or caribou on land for meat. These people are still allowed to hunt in the traditional way that has existed for centuries. The whales are chased in open boats and killed with hand-thrown harpoons.

Nigel Collins teaches biology and is an editor of CATALYST. Before teaching biology he visited old whaling stations when working in the Antarctic. He also lived in an Inuit village in Alaska, where whales were still being caught with hand-thrown harpoons.