The nature of blue whales

Blue whales are baleen whales: instead of teeth, their mouths contain plates of baleen, made from a substance similar to that in our fingernails, which hang from their upper jaws. Remarkable as it may seem, these largest of all creatures subsist largely on some of the very smallest – tiny, often microscopic – animals called zooplankton, and particularly small shrimp-like crustaceans called krill; the baleen plates act as sieves, allowing the whales to filter these marine micro-organisms from the sea as they swim.

The average length of a blue whale today is reckoned to be between 24 and 28m, with females slightly larger than males, and those in the southern hemisphere larger than those north of the equator. The record confirmed length is 31m, and whalers have reported maximum lengths of up to 33.5m. Some scientists have postulated that the average and maximum lengths of blue whales are less now than they were before commercial whaling, because whaling has removed the very largest whales from the gene pool.

What WWF is doing

WWF experts consult with scientists and lobby governments at the annual meetings of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).

This organisation sets catch limits for Southern Ocean fish and krill, and takes into account the impact of these catches on krill-eating predators – not least the blue whale.

WWF works in the International Whaling Commission (IWC) to ensure that endangered species of whales, including the blue whale, are never again threatened by whaling. WWF is also lobbying the IWC and its scientific committee to address the new threats to blue and other endangered whales, including the threat from climate change and the pressures on krill.

What needs to be done

To help the recovery of blue whales in the Antarctic, WWF is recommending that:

- the IWC gives high priority to funding long-term, dedicated population surveys and undertakes research on the relationship between blue whales, krill abundance and the potential threats to their recovery, including climate change.

- the IWC and CCAMLR should continue collaborating closely in researching the interaction between krill and all cetaceans.

- CCAMLR needs to maintain and enforce highly precautionary catch limits for krill

- WWF is calling for a reduction of 10% in industrialised countries' CO_2 emissions on 1990 levels by 2010 to help reduce the serious impacts of climate change.

For further information on WWF and its work, visit www.panda.org or www.wwf-uk.org

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WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:
- conserving the world's biological diversity
- ensuring that the use of renewable resources is sustainable
- promoting the reduction of pollution and wasteful consumption.

Blue Whales

The largest animal ever to live on Earth

The blue whale is the largest animal ever to live on Earth – larger even than any dinosaur. It is almost as long as a Boeing 737 and at 160 tonnes weighs four times as much. Its heart alone weighs around 2,000 kilograms and each beat pumps roughly 300 litres of blood round its body. The blue whale is so large that an African elephant could fit on its tongue; in fact, the largest adult land mammal is smaller than a blue whale is at birth.

Distribution

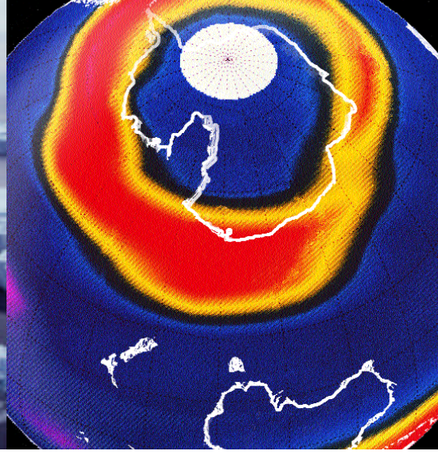
Blue whales are found across the world's oceans. They have been seen north of Svalbard, 1,500 km from the North Pole, and along the edge of the Ross Ice Shelf, the planet's most southerly marine waters. But they are not evenly distributed: there appear to be several distinct populations, possibly comprising up to four separate sub-species in the north Atlantic and north Pacific, the northern Indian Ocean, the Antarctic, and the sub-Antarctic regions of the Indian Ocean.

Blue whales and commercial whaling

Commercial whaling by the British, Dutch and others was in full swing by the mid-17th century; but it would be almost 300 years before it extended its reach to blue whales. These and other rorquals (baleen whales) were too fast and strong for whaling vessels, and most of them lived far out to sea,beyond the whalers'reach. But in the early 20th century, steam-powered ships with deck-mounted grenade harpoon cannons were developed to chase and secure blue whales; then, with the arrival of giant factory ships – huge, floating processing plants where whale carcasses could be cut up at sea without the need to return constantly to port – the blue whale's fate was seale

From 1910 to 1925, a recorded 47,200 blue whales were caught in the Antarctic. That 15-year total was exceeded over the next four: from 1926 to 1930,the total catch was 49,800. It soared yet further: 29,400 in 1931 alone. That was to prove the highest single-season haul of blue whales ever. A further 118,300 were reported as being caught in the eight years before World War II; when the war ended, the International Whaling Commission (IWC) was developed in an attempt to regulate the slaughter.

But whalers continued to target the species, and as blue whale numbers crashed,so did the catches: by the 1955-56 season, the catch had dropped to 1,614,and by 1962-63 it had fallen to 947. Finally, in the 1964-65 season, all the whalers in the Southern Ocean were able to find just 20 blue whales; they killed them all. At its next meeting, the IWC granted the blue whale complete protection from hunting. But by then it was too late. In the Antarctic at least, the species was almost extinct. Despite this legal protection, the killing continued. In 1993. the world learned that Soviet fleets had falsified whaling records and continued to hunt blue whales up to 1980. Official whaling records reported only 156 blue whales had been killed,when in fact, 1433 whales had been taken.



How many blue whales exist today?

Although we cannot be certain, it is estimated that at the beginning of the 20th century, there were between 275,000 and 300,000 blue whales in the world, of which the vast majority, around 250,000, were in the Antarctic. Today the number is probably under 5,000. In the north Atlantic, there are perhaps 1,000 or 2,000; in the north Pacific, somewhere in the range of 1,400 to 4,000. In the Antarctic, there are probably fewer than 1,000 – possibly just 400.

Particularly in the Antarctic, blue whale numbers are so low that its long-term survival is by no means assured, even though the population is no longer haunted by the spectre of commercial whaling. When populations reach such low levels, scientists warn that it can sometimes take only a relatively small environmental stress to push them even closer to the precipice of extinction.

With the exception of whaling and sealing, and the exploitation of some fish populations such as the Antarctic cod and the Patagonian toothfish, the marine ecosystem of the Southern Ocean has been relatively free of such environmental pressures. However, researchers have recently begun to look with some concern at possible changes in the Southern Ocean ecosystem as a result of human activities, some of which could seriously affect the remaining blue whales, particularly as a result of pressures on their krill prey.

The trouble with krill

There is little agreement on the amount of krill in the world. For many years, the global biomass (the combined weight of all the krill in the world) was believed to be in the region of 500 million tonnes; in 2000,however, the Commission for the Conservation of Antarctic Marine Living Resources advised that that estimate was now considerably lower – somewhere between 62 and 137 million tonnes. Still more recent estimates have suggested the total could actually be higher than previously reported: 1.3 billion tonnes in the Southern Ocean alone. Yet, as British science writer Fred Pearce recently noted, there are "growing fears that the krill... may be at risk of dying out as global warming gathers pace".

Disappearing sea ice

The reason for such concern is sea ice: the permanent ring of frozen ocean which surrounds Antarctica. In summer, this sea ice covers an area of around 3.8 million sq km, but expands in winter to around 19.4 million sq km. It is a boon for Antarctic marine life. During the winter it provides a platform for microscopic plants called marine algae (phytoplancton); in the summer, as the ice melts it releases the algae into the water, where they are fed upon by krill, which in turn fall prey to larger organisms. For this reason, the edge of the sea ice is the area of highest productivity in the Southern Ocean ecosystem and the place where it is easiest to find whales.

But a series of studies has shown that, as temperatures have increased in recent decades (apparently in tandem with growing atmospheric concentrations of greenhouse gases such as carbon dioxide),the sea ice has been diminishing rapidly. According to Australian researcher Bill de la Mare, in the Antarctic it shrunk by about 25 per cent between the mid-1950s and mid-1970s. Other studies have noted declines in populations of some Antarctic wildlife, apparently as a result of such sea ice decrease. Bill Fraser of Montana State University, for example, has recorded a 50 per cent drop in the Ad lie penguin population around Palmer station in the Antarctica Peninsula – from 15,000 pairs to 7,500 – in 25 years, and a 10 per cent drop in just two years. He believes this is because retreating sea ice releases fewer algae into the ocean, providing fewer feeding opportunities for young krill. This causes them to die out, which in turn prompts a decline in the krill's other predators, including seals and penguins.

A 2001 study published in the journal of the Royal Society came to a similar conclusion. Its authors analysed data on krill-eating predators at South Georgia from 1980 to 2000, and found that population size and reproductive performance were declining in all species. They concluded that "the biomass of krill... was sufficient to support predator demand in the 1980s, but not in the 1990s" and that "demand for krill exceeds supply."

Ozone depletion and fishing

Nor is that the end of the pressures facing krill – and, therefore, the blue whale. Since the mid-1980s, scientists have recorded substantially depleted levels of stratospheric ozone above the Antarctic. This "hole" in the ozone layer emerges every austral spring, steadily repairing itself over the course of the summer, before erupting again the following spring. The hole is caused by chemical pollutants, primarily chlorofluorocarbons or CFCs. Although the use of many of these chemicals has been banned, their persistence in the atmosphere is such that the hole continues to expand: in the spring of 2000, it covered 28.4 million sq km – three times the size of the entire United States and the largest yet recorded.

The disappearance of this protective shield allows greater amounts of the sun's dangerous ultraviolet-B (UV-B) rays – the same ones which cause sunburn and, in extreme cases, melanoma – to reach Earth's surface. A 1999 study found that even relatively small amounts of UV radiation can cause DNA damage and mortality in krill, especially among juveniles. UV-B radiation may also impact the algae on which krill feed – a problem likely to be exacerbated by declines in sea ice, as sea ice is generally believed to absorb some of the worst UV radiation.

And yet,even as krill reel from such pressures, they may have to face even more. Several countries are once again showing an interest in establishing a commercial fishery for krill in the Antarctic, not least because of the growing demand for them in the fish-farming and recreational bait industries. At a time when such an important part of the Southern Ocean ecosystem may be at risk because of environmental changes, it is folly to introduce additional stresses on this ecosystem. It would be a catastrophe for the natural world if the decline in whale numbers, brought about by commercial whaling, were now accelerated by new commercial pressures.