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Why preventing whaling in the Southern Ocean is crucial for the world's whales

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Page 10 & 11; Southern right whale (*Eubalaena australis*) off the Auckland Islands, New Zealand © Brian J. Skerry / National Geographic Stock / WWF

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Why preventing whaling in the Southern Ocean is crucial for the world's whales

The Southern Ocean is critical to ensuring the recovery and viability of the great whale populations in the southern hemisphere. It provides the feeding grounds needed to sustain most southern hemisphere great whales – which coastal communities from Australia to Latin America to Africa are reliant upon for livelihoods and income derived from whale watching tourism. After rampant commercial whaling in the twentieth century brought most great whale species in the Southern Ocean close to extinction, the International Whaling Commission (IWC) established the Southern Ocean Whale Sanctuary in 1994, recognising the critical importance of protecting whales in this special place. Since the inception of the sanctuary, threats to whales in the Southern Ocean have broadened to include climate change, ship strikes, the potential of over-fishing and acoustic and chemical pollution. If whales in the southern hemisphere are to fully recover, the Southern Ocean Whale Sanctuary must be fully respected by all contracting governments to the IWC. WWF therefore urges all contracting governments to the IWC to reject any proposal that would set catch limits for whaling in the Southern Ocean.

The importance of the Southern Ocean for whales

The Southern Ocean – the sea surrounding the continent of Antarctica – is one of the world's most spectacular and ecologically important environments, and is home to thousands of species that live nowhere else. The continent of Antarctica is the coldest, windiest and driest place on the planet, yet the oceans surrounding it are some of the most productive on Earth, containing abundant marine life ranging from tiny photosynthetic organisms to the largest known animal ever to live on this planet – the 30 meter long blue whale. There are two main reasons why the Southern Ocean is so full of life. The first is the existence of a large amount of nutrients in the water, which act as a fertiliser, allowing for vigorous growth of tiny photosynthetic organisms (organisms which harness the energy of the sun to grow), or algae, which form the basis of the food chain. These nutrients are brought to the Southern Ocean by the southerly flow of deep, nutrient-rich water known as 'Circumpolar Deep Water' which rises to the surface (upwells) near the continent of Antarctica and makes nutrients available to photosynthetic organisms in the sunlit waters near the surface, which then grow into large 'phytoplankton blooms'. The second reason the Southern Ocean is so productive is that over the six summer months the sun never sets, meaning that photosynthesis, and growth of the phytoplankton blooms, can occur 24 hours a day.

Taking advantage of this abundant production are the Southern Ocean's most plentiful residents - the small shrimp-like Antarctic krill, *Euphausia superba*, which feed on the tiny photosynthetic diatoms which make up the phytoplankton blooms. It is quite possible that krill are the most abundant animal species in the world. As krill mature, they aggregate into huge schools or swarms so dense that they turn the water red or orange[1]. Within a school of krill, 30,000 individual animals can be found within one cubic meter of seawater[2]. The total surface of the distribution of Antarctic krill is approximately 36 million km^2 (equivalent to an area four and a half times the size of Australia[3]) and the total biomass of krill in the Southern Ocean is estimated to be around 350 million tonnes. Compare this with the current total world fish catch of less than 100 million tonnes[4], and it is easy to see the enormous source of protein this represents.

Sea ice Rothera Station, Antarctic Peninsula, Antarctica

1. Gascon, V., and Werner, R. 2005. An article prepared for the lighthouse foundation. Antarctic and Southern Ocean Coalition.
2. FARO. Biology and Fisheries History of the Commercially Harvested Species. Downloaded 21.4.2010 http://www.fao.org/DOCREP/003/W5911E/w5911e07.htm#b1-4.1%20Antarctic%20krill%20%28Euphausia%20superba%29
3. Gascon, V., and Werner, R. 2005. An article prepared for the lighthouse foundation. Antarctic and Southern Ocean Coalition.
4. FARO. 2009. World Fisheries production, by capture and aquaculture, by country (2007). Food and Agriculture Organisation. Downloaded 21.04.2010 ftp://ftp.fao.org/fi/stat/summary/default.htm

Krill are considered to be one of, if not the, most important link in most Southern Ocean food chains and are a key prey species for whales, seals, fish, squid, penguins and other seabirds. Many Southern Ocean baleen whales consume krill almost exclusively, although copepods and small schooling fish are also eaten, especially by Southern right whales and sei whales. Baleen whales feed on krill by filtering them out of the water using their baleen, which are huge plates of bone in their mouths in place of teeth. Baleen whales eat 30-50 million tonnes of krill in the Antarctic each year. Toothed whales (whales which have 'teeth' rather than baleen plates) take advantage of high densities of other animals which feed on krill – such as squid, fish and in the case of killer whales, seals and penguins. Beaked whales and sperm whales are estimated to consume 14 million tonnes of squid each year.

The abundance of krill in the Southern Ocean means that whilst the area accounts for about only 10% of the world's oceans, it probably supports more than 50% of the world's marine mammal biomass, including six species of pinnipeds (seals), eight species of baleen whales, and at least seven species of toothed whales[5] (see box 1). The particular biology and foraging habitats of many baleen whale species mean that they rely on large, concentrated, high density food reserves – attempts to feed on more dispersed food sources are not energy efficient. The Southern Ocean provides these high density food reserves in abundance, and therefore the importance of the Southern Ocean for whale conservation can not be overstated.

Whilst the Southern Ocean is important for whales, whales are also important for the Southern Ocean. Iron is a critical element in the region as it enables the growth of the algae which form the basis of the food chain. When the algae die, they sink and strip iron from the ocean's surface. However when the algae is eaten by krill, which is then eaten by whales, the iron is excreted back into the water in whale faeces. The iron concentration of baleen whale faeces has been found to be about 10 million times that of Antarctic seawater, so the faeces acts as a fertiliser for algal growth[6]. Increasing populations of baleen whales and krill would therefore have a positive feedback effect on the productivity of the entire Southern Ocean ecosystem, and would also play a role in global climate regulation as algae absorb CO_2 from the atmosphere, acting as a carbon sink and helping reduce climate change.

BOX 1

Whales of the Southern Ocean

Baleen whales include blue (*Balaenoptera musculus intermedia*), pygmy blue (*Balaenoptera musculus brevicauda*), fin (*Balaenoptera physalus*), sei (*Balaenoptera borealis*), Antarctic minke (*Balaenoptera bonaerensis*), dwarf minke (*Balaenoptera acutorostrata subsp.*) humpback (*Megatera novaeangeliae*) and Southern right (*Eubalaean australis*).

Toothed cetaceans include the hourglass dolphin (*Lagenorhynchus cruciger*), long-finned pilot whale (*Globicephala melas*), the killer whale (*Orcinus orca*), Southern bottlenose whale (*Hyperoodon panifrons*), sperm whale (*Physeter macrocephalus*) and Southern fourtooth whale (*Berardius arnuxii*).

5. Perrin, W.F., Wursig, B., Thewissen, J.G.M. 2009. Encyclopedia of Marine Mammals. Academic Press, Elsevier Inc.
6. Nicol, S., Bowie, A., Jarman, S., Lannuzel, D., Meiners, K.M., van der Merwe, P. 2010. Southern Ocean iron fertilization by baleen whales and Antarctic krill. Fish and Fisheries. Published online: 30 Mar 2010.

2 Impacts in the Southern Ocean affect whale populations in the rest of the southern hemisphere

Most of the great whales spend summers on productive feeding grounds and then migrate to their winter breeding/calving grounds in warmer waters, and are believed to feed little, if at all, while away from their feeding grounds[7]. In the southern hemisphere, the Southern Ocean constitutes the feeding ground for the majority of the great whales, with some whales travelling thousands of miles to the area in the summer months to feed on its abundant food resources.

The humpback whale, for example, spends the summer feeding on krill in the Southern Ocean, then travels to warmer waters in winter months to calve.

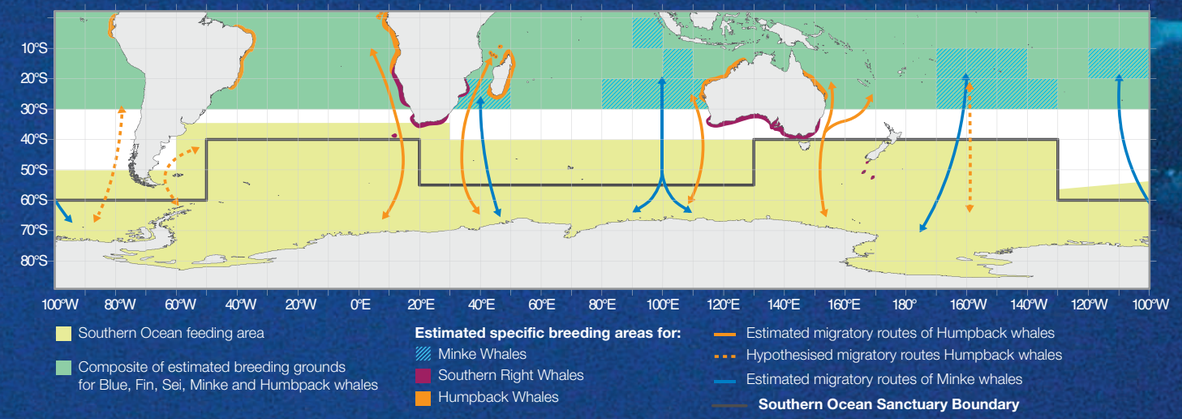
These winter habitats include:

- The coast of Brazil
- The coast of West Africa from the Gulf of Guinea down to South Africa
- The coasts of eastern South Africa, Mozambique, Madagascar (southern, western and eastern coasts), Mayotte, the Comoros and other western Indian Ocean island groups
- The coast of Northwestern Australia
- The coast of northeastern Australia, New Caledonia, Tonga and Fiji
- The Cook Islands and French Polynesia
- Ecuador, Galapagos, Colombia, Panama and Costa Rica.

Although some humpback whale feeding has been observed in the Benguela Current ecosystem on the migration route west of South Africa, the Southern Ocean is the main feeding ground of humpback whales, and it is believed that they do not feed to a significant extent elsewhere.

7. Perrin, W.F., Wursig, B., Thewissen, J.G.M. 2009. Encyclopedia of Marine Mammals. Academic Press, Elsevier Inc.

Figure 1: Some of the areas where Southern Ocean whales spend the winter months



Adapted from Davies, C.R., and Gales, N. 2004. A brief review of sanctuary theory as it applies to the review of the Southern Ocean Sanctuary and observed patterns in great whale populations in the Southern Ocean. IWC Scientific committee document SC/56/SOS2

The situation is similar for other baleen whales species, such as the Southern right whale which spends the summer in the Southern Ocean, and then winters at Peninsula Valdes, Argentina, the coast of Australia and along the coast of South Africa[8]. The winter habitats of blue whales which spend the summer in the Southern Ocean are not well known, but these animals potentially migrate to the waters off Namibia, South Africa, Angola, Australia, Western South America and Congo, although it is possible that a proportion of the population remains in the Southern Ocean year round.

If whale populations in the Southern Ocean are disturbed and not able to feed sufficiently in the Southern Ocean, it is possible they would not have the energy to make their long migrations to their tropical wintering regions. This means that if whale populations were again decimated in the Southern Ocean, these whales may also disappear from the seas around many other countries in Africa, Oceania and Latin America. This is not only important from a conservation perspective, but has socioeconomic implications as well, with coastal communities in many southern hemisphere countries generating significant income from whale watching tourism which has grown exponentially in recent decades. By 2008, 13 million tourists participated in whale watching each year in 119 different countries and territories worldwide, generating a total expenditure of US$2.1 billion[9].

In Latin America alone, 885,679 people per year are going whale watching, spending USD $79.4 million in direct expenditure (ticket sales) and USD $278.1 million in total expenditure. Whale watching is thus making a vital socioeconomic contribution to the development of local communities throughout Latin America[10], often in remote coastal communities which have few alternative livelihood opportunities. However, a thriving whale watching industry is dependent on healthy whale populations, and in order to strengthen this growing industry, it is critical that whales are protected not only in the areas where the tourism occurs, but also in their Southern Ocean feeding grounds.

8. Perrin, W.F., Wursig, B., Thewissen, J.G.M. 2009. Encyclopedia of Marine Mammals. Academic Press, Elsevier Inc.
9. O'Connor, S., Campbell, R., Cortez, H. and Knowles, T. 2009. Whale watching worldwide: tourism numbers, expenditures and expanding economic benefits, a special report from the International Fund for Animal Welfare. Yarmouth MA, USA. Prepared by Economists at Large.
10. Hoyt, E. And Iniguez, M. 2008. The State of Whale Watching in Latin America. WDCS, Chippenham, UK; IFAW, Yarmouth Port, USA; Global Ocean, London. 60pp.

Whales in the Southern Ocean are still severely depleted from previous whaling

The Southern Ocean was the scene of one of the most destructive periods in the history of human overexploitation. Industrial whaling began in the early years of the twentieth century, and continued for more than 60 years, during which time it removed about 71 million tonnes of whale biomass, or around 1.4 million individual whales, from the Southern Ocean[11]. When the industry began whales were so abundant that the first whale was shot directly in front of the whaling station. The industry targeted the largest and most profitable whales first, and when these whales were harder to find, targeted progressively smaller species, with whaling records indicating a serial depletion of blue, fin, sei, and humpback whales, with hunting efforts finally focusing on minke whales[12].

> *"By the summer of 1965-66, the combined efforts of all Antarctic whaling fleets could find only one solitary blue whale to kill."*

Records of whales killed were falsified; for example, Soviet whalers took 23,000 more sei whales and 43,000 more humpbacks than reported in official whaling records[13]. There were no regulations regarding species, age or sex of whales taken, which exacerbated the impact of the whaling activities as even calving mothers and juveniles were harvested. In the summer of 1930-1931, 29,410 blue whales were taken[14]. By the summer of 1965-66, the combined efforts of all Antarctic whaling fleets could find only one solitary blue whale to kill[15]. In just 60 years, this reckless behaviour had turned the Southern Ocean from an area with some of the highest densities of whales in the world, into a place where most whale species were on the brink of extinction.

11. Perrin, W.F., Wursig, B., Thewissen, J.G.M. 2009. Encyclopedia of Marine Mammals. Academic Press, Elsevier Inc.
12. Nicol, S., Worby, A., Leaper, R. 2008. Changes in the Antarctic sea ice ecosystem: potential effects on krill and baleen whales. Marine and Freshwater Research. 59, 361-382
13. Clapham, P. J., and Baker, C. S. (2002). Whaling, modern. In 'Encyclopedia of Marine Mammals'. (Eds W. F. Perrin, B. Wursig and J. G. M. Thewissen.) pp. 1328–1332. (Academic Press: San Diego, CA.)
14. Mizroch, S. A., Rice, D.W., Breiwick, J. M. NOAA blue whale fact sheet.
15. Shaw, I. M.. 2005. Antarctica and the Great Southern Ocean. The Great Adventure People.

Eventually, the International Whaling Commission took action to regulate the hunts – for example, banning hunting of Southern Ocean humpback whales in 1963 (although illegal hunting by the Soviet Union continued until 1972, leading to a population crash), followed by blue whales in 1964, fin whales in 1976 and sei whales in 1978. In 1982, the IWC decided to implement a pause or 'moratorium' in commercial whaling for all species which took effect from the 1986 coastal and 1985/86 pelagic whaling seasons. However the moratorium came too late for whales in the Southern Ocean. Whales are an extremely long lived, slow reproducing group of species (*see BOX 2*). It therefore takes whales an extremely long time to recover from overexploitation. Although several species have increased in number since commercial whaling ceased (blue whales for example are estimated to have had a rate of increase of 8.2% per year between 1978/79 and 2003/4, and humpback whales had an estimated increase rate of 12.4% for East Australia over 1981-1996 and 10.9% for West Australia over 1977-1991[16]) most whales in the Southern Ocean remain severely depleted when compared with their pre-whaling population levels. Table 1 provides some estimates of how the current populations of whales in the Southern Ocean compare to the populations that may have existed prior to the commercial whaling activities of the 20th century. It is important to note that most of these figures are rough estimates at best. The immense area of the Southern Ocean, and the severely depleted status of many populations, mean that is extremely difficult to establish precise population estimates for whale stocks in the Southern Ocean, and population estimates, particularly pre-whaling population estimates, are often extrapolations with a high degree of uncertainty.

> *"Most whales in the Southern Ocean remain severely depleted when compared with their pre-whaling population levels."*

Furthermore the current population estimates that are available are mostly not recent, and some whale populations will likely have recovered somewhat since the estimates provided in Table 1 were calculated. It is clear that many more decades of regular monitoring will be required to provide robust estimates of absolute abundance and recovery relative to pre-whaling population size[17], and the figures in Table 1 should be taken as an indicative guideline only. The uncertainty around pre-whaling and current population sizes of Southern Ocean whales increases the importance of a precautionary approach to their management – including the prevention of lethal activities such as whaling.

It is important to note however that the use of genetic techniques to model whale populations is indicating that pre-whaling populations may have been much higher than previously envisaged. In the North Atlantic for example, pre-whaling population sizes estimated using genetic techniques were up to 10 times higher than estimates made from historical documents and current abundance estimates[18].

BOX 2

Life cycle of Southern Ocean whales

Blue whales: reach sexual maturity at 5-15 years, females give birth every 2-3 years after a 10-12 month gestation period.

Humpback whales: reach sexual maturity anywhere from 5 – 10 years, and inter birth intervals in females are most commonly 2 years.

Antarctic minke whales: reach sexual maturity at 7-8 years, and generation time is estimated at 23 years.

16. IWC. Whale Population Estimates. The International Whaling Commission's most recent information on estimated abundance. www.iwcoffice.org/conservation/estimate.htm Downloaded 12th May 2010
17. The Palubmi Lab. Marine Population Biologicy, Marine Ecology and Evolution. Projects: Whales & History. Downloaded 6th May 2010. http://palumbi.stanford.edu/whales.html
18. The Palubmi Lab. Marine Population Biologicy, Marine Ecology and Evolution. Projects: Whales & History. Downloaded 6th May 2010. http://palumbi.stanford.edu/whales.html
20. Perrin, W.F., Wursig, B., Thewissen, J.G.M. 2009. Encyclopedia of Marine Mammals. Academic Press, Elsevier Inc.

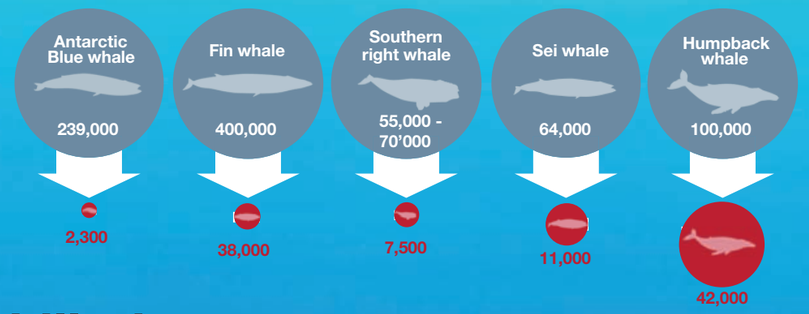
Table 1: Population estimates for Southern Ocean whales and whales killed in 20th century whaling

Species	IUCN listing	Pre-whaling population estimate	Most recent available population estimate	Whales killed in 20th century whaling
Antarctic Blue whale	Critically endangered	239,000 (IUCN)	1,150 – 4,500[21] (excluding pygmy blue) in 1997/98 Approximate point estimate: 2,300 (IWC)	329,212[22] in 20th century in Southern Ocean, +17,000 off southern Africa (IUCN)
Fin whale	Endangered	Nearly 400,000[23]	15,178 in 1983 or 38,185 in 1997[24] (IUCN)	725,000 between 1905-76 in the southern hemisphere (IUCN)
Humpback whale	Least concern. Oceania subpopulation - Endangered	100,000[25]	34,000 – 52,000 in 1997/98[26]. Approximate point estimate: 42,000 (IWC)	Over 200,000 killed in southern hemisphere between 1904 and 1973[26]
Southern right whale	Least concern	55,000-70,000 in 1770 for whole southern hemisphere (IUCN)	About 7,500[28] in 1997 (IWC) Population went as low as 300 in the 1920s	150,000 between 1770 and 1900 (conservative estimate) (IUCN)
Sei whale	Endangered	64,000 in 1960 (IUCN) excluding Area II (South Atlantic sector)	11,000 (1979) (IUCN) excluding Area II (South Atlantic sector)	Over 200,000 in southern hemisphere between 1905-1979 (IUCN)
Antarctic minke whale	Data Deficient	~670,000[29]	No population estimate currently available (IWC) but a reduction of approx 60% was indicated between 1978-91 and 1991-2004 (IUCN)	Nearly 100,000 in Antarctic, plus over 14,000 taken from Brazilian land station during 1964-85 (IUCN)

Note: The figures in the above table come from the IWC where available, and where not available, come from the IUCN Red List. The respective source is indicated against each figure.

Whale Populations

Status of Southern Ocean Whales Pre and Post 20th Century Whaling



Whales killed

Whales killed in 20th Century Whaling

21. Estimated rate of increase is 8.5% per year between 1978/79 and 2003/4
22. This figure excludes 12,618 pygmy blue whale catches
23. Perry, S.L., DeMaster, D.P. and Silber, G.K. 1999. Special Issue: The Great Whales: History and Status of Six Species Listed as Endangered Under the U.S. Endangered Species Act of 1973. Marine Fisheries Review. 61(1).
24. Mori, M. and Butterworth, D.S. 2006. A first step towards modeling the krill-predator dynamics of the Antarctic ecosystem. CCAMLR Science, Vol. 13, 217-277
25. Perry, S.L., DeMaster, D.P. and Silber, G.K. 1999. Special Issue: The Great Whales: History and Status of Six Species Listed as Endangered Under the U.S. Endangered Species Act of 1973. Marine Fisheries Review. 61(1).
26. Rates of increase estimated at 12.4% for East Australia over 1981-1996, 10.9% for West Australia over 1977-1991
27. Mori, M. and Butterworth, D.S. 2006. A first step towards modeling the krill-predator dynamics of the Antarctic ecosystem. CCAMLR Science, Vol. 13, 217-277
28. There is evidence of increase rates of 7-8% for populations of Argentina, Australia and South Africa.
29. Ruegg, K. C., Anderson, E. C., Scott Baker, C., Vant, M., Jackson, J.A., Palumbi, S.R. 2010. Are Antarctic minke whales unusually abundant because of 20th century whaling? Molecular Ecology 19, 281-291.

4 Whales in the Southern Ocean facing a new raft of threats

In the 21st Century, the Southern Ocean and its whales are facing a set of ever more serious threats. There is the potential for commercial fishing to put undue pressure on valuable prey species of whales such as Antarctic krill. The expansion of tourism in the Southern Ocean has lead to increased acoustic and chemical pollution, and the potential for ship strikes with whales.

However, the greatest long-term threat to the region is climate change. The impacts of global warming appear to be most dramatic in polar regions – the Arctic and the Antarctic. Over the past 50 years, the Western Antarctic Peninsula has warmed more than four times faster than the average rate of Earth's overall warming[30]. The Southern Ocean has warmed all the way down to a depth of 3,000m[31]. Not all of the Antarctic is warming nor has the warming been uniform. However in areas where significant warming has been experienced, terrestrial and marine ecosystems have undergone dramatic change[32]. Perhaps of greatest concern to Southern Ocean whales is the impact of global warming on krill. Studies have indicated that krill populations have declined by as much as 80% in the Scotia Sea and northern Antarctic Peninsula since the 1970s, with the declines linked to the loss of winter sea ice[33]. The specific impacts of krill declines for whales was not immediately clear, but in 2006 additional analyses revealed that the breeding success of the southern right whale was highly correlated with global climate signals and the impacts of those signals on krill. The researchers concluded that "even quite small changes in oceanographic conditions in the Southern Ocean could affect southern right whale population dynamics"[34]. Given current and expected future commercial fishing pressure on Antarctic krill stocks, the potential joint impact of climate change and fishing for krill could have a significant impact on the recovery of decimated great whale populations in the Southern Ocean.

Predicting the precise future impacts of climate change on the whales of the Southern Ocean is a difficult task. One study has attempted to model these future impacts, using state of the art climate models to predict how a 2ºC global temperature increase will affect Southern Ocean whales[35]. Under a 2ºC warming scenario, sea ice is projected to shrink by an average of 10-15%. This reduction could be up to 30% in some regions, meaning that species that are heavily dependent on sea ice, such as the Antarctic minke whale, are projected to lose between 5-30% of ice-associated habitat within 40 years – little more than the life time of an individual whale. Under 2ºC global warming, frontal zones – critical whale feeding habitats – are also projected to move southwards. Migratory whales such as the humpback and blue whales would have to travel even farther south (an extra 200-500km) to reach and feed at these food-rich areas. These longer migration paths could increase the energy costs of migration and reduce the duration of the main feeding season. As frontal zones move southward, they also move closer together, reducing the overall area of foraging habitat available.

In order to strengthen the resilience of Southern Ocean whale populations as they face this new raft of threats, it is of paramount importance to avoid any losses of whales due to whaling.

The maintenance of the Southern Ocean Whale Sanctuary is also of crucial importance in a broader sense, to allow for a key assessment of the impact of climate change to the overall health of the Southern Ocean. Only when Southern Ocean whale populations have stabilized from their current recovery phase will we have the opportunity to obtain a valuable assessment of the impact climate change has had on the whole ecosystem. Therefore it is crucial that the Southern Ocean Whale Sanctuary remain in place and that the recovery of the Southern Ocean great whale species remains undisturbed.

5 The Southern Ocean is already a legally established whale sanctuary

The need for whales in the Southern Ocean to be protected from commercial whaling activities has long been recognised. The first sanctuary to be established by the IWC was in the Antarctic, when in 1938, the area south of 40°S between longitudes 70°W and 160°W was declared as a commercial whaling free zone. This was primarily due to the fact that this sector had not yet been subject to commercial whaling activities, and it was considered highly desirable that the immunity which whales in this area had enjoyed should be maintained. However the area was opened up to commercial whaling in 1955 initially for three years as a means of reducing the pressure of catches on the rest of the Antarctic whaling grounds.

In 1994 the IWC adopted the Southern Ocean Sanctuary as an area in which commercial whaling was fully prohibited. The northern boundary of this Sanctuary follows the 40°S parallel of latitude except in the Indian Ocean sector where it joins the southern boundary of that sanctuary at 55°S, and around South America and into the South Pacific where the boundary is at 60°S (see figure 2). The sanctuary was written into the Schedule of the IWC with the following text '*commercial whaling, whether by pelagic operations or from land stations, is prohibited in … the Southern Ocean Sanctuary*'[36]. The text further clarified that '*This prohibition applies irrespective of the conservation status of baleen and toothed whale stocks in this Sanctuary*'. Japan was the only country to vote against the Sanctuary and lodged a formal objection to the extent that Sanctuary applies to Antarctic minke whales. Russia lodged an objection to the Sanctuary but withdrew this objection in the same year.

This Sanctuary was intended to be reviewed in 2004, ten years after its initial adoption. Pre-empting this, Japan proposed a resolution in 2002 aimed at undermining the Sanctuary, but the resolution did not receive sufficient support and was not adopted. In 2004, the Scientific Committee conducted its review of the Sanctuary, and concluded that a clarification of the objectives of the Sanctuary would be useful. Japan then proposed to abolish the Sanctuary, but did not receive enough support for this measure.

Today the IWC maintains the Southern Ocean Whale Sanctuary as an area where all commercial whaling is prohibited. Japan currently uses a loophole in the International Convention for the Regulation of Whaling (ICRW) which allows the lethal take of whales for scientific purposes, and has operated a 'scientific whaling' programme in the Southern Ocean since 1987. Japan has steadily increased the numbers of whales it kills in the Southern Ocean (see fig 3), and in 2005 started taking endangered fin whales in addition to Antarctic minke whales. In total, Japan has taken 9,409 whales in the Southern Ocean in the name of "science" – 9,395 minke whales and 14 fin whales.

Although the ICRW does contain a provision that allows governments to kill whales for scientific purposes, it was written more than 60 years ago, at a time when no practicable alternatives for lethal research existed. At that time, killing whales was unfortunately the only way to learn some of the most basic biological information, which was then used in setting catch quotas. In the last 60 years, non-lethal techniques have been developed that can provide the data required for management more efficiently and accurately than can lethal sampling. Given the availability of modern non-lethal techniques in common use by whale scientists elsewhere in the world, and the fact that the meat from whales killed in Japan's scientific research programme is directed straight into the commercial meat market, it is clear that Japan's scientific research is little more than a thinly veiled commercial whaling operation.

30. IPCC. 2007. United Nations Intergovernmental Panel on Climate Change. Climate Change 2007 – The physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.
31. Jacobs, S. 2006. Observations of change in the Southern Ocean. Philosophical Transactions of the Royal Society A, 364, 1657-81.
32. IPCC. 2007. United Nations Intergovernmental Panel on Climate Change. Climate Change 2007 – Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the IPCC.
33. Atkinson, A., Siegel, V., Pakhomov, E. and Rothery, P. 2004. Long-term decline in krill stock and increase in salps within the Southern Ocean. Nature. 432, 100-103.
34. Leaper, R. Cooke, J., Trathan, P., Reid, K., Rowntree, V. and Payne, R. 2006. Global climate drives southern right whale (Eubalaena australis) population dynamics. Biol. Lett. Doi:10.1098/rsbl.2005.0431
35. Tynan, C. T. and Russell, J.L. 2008. Assessing the impacts of future 2°C global warming on Southern Ocean cetaceans. International Whaling Commission, Scientific Committee document SC/60/E3
36. International Convention for the Regulation of Whaling, 1946 Schedule. Revised 2009. Available at: www.iwcoffice.org/_documents/commission/schedule.pdf

Figure 2: Map of established IWC sanctuaries – the Southern Ocean Sanctuary, and the Indian Ocean Sanctuary

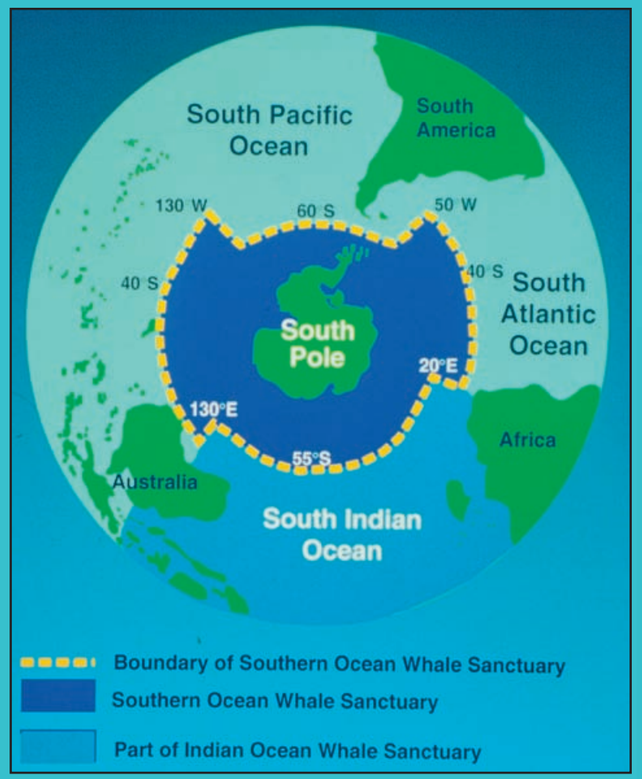
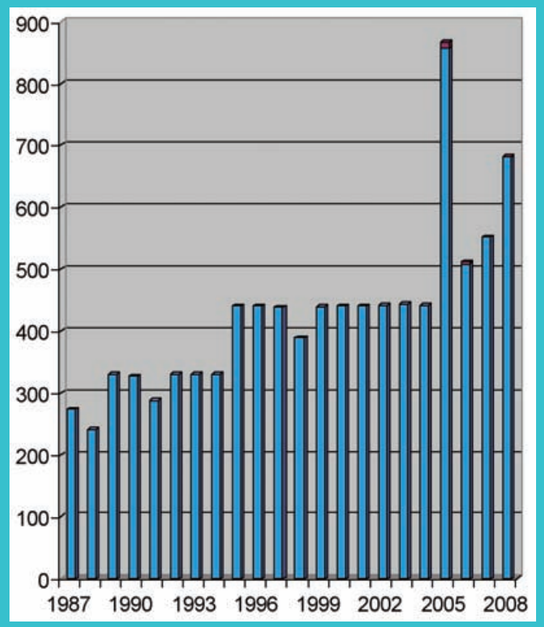


Figure 3: Numbers of whales taken by Japan in the Southern Ocean under scientific permit



"It is an unquestionable responsibility of the contracting governments of the IWC to eliminate all whaling in the Southern Ocean Whale Sanctuary"

6 Conclusion and recommendation

It is clear that the Southern Ocean is a critically important feeding habitat for most of the southern hemisphere's great whale populations, and protecting whales in the Southern Ocean is essential to secure healthy great whale populations in parts of the world as far away as Africa, the Pacific Islands, Oceania and South and Central America, where coastal communities have a growing dependence on whale populations for a burgeoning whale watching industry.

Whales in the Southern Ocean were subjected to severe overharvesting in the twentieth century, with unchecked commercial whaling driving many species to the brink of extinction. Whilst whaling in the Southern Ocean has been halted by all but one government for more than two decades, whale populations have failed to recover as rapidly as hoped, and exist today at extremely depleted levels.

In addition, Southern Ocean whales are now subject to a new and varied range of threats, most notably the predicted profound impacts of climate change on this fragile region.

The international community has long since recognised the importance of protecting whales in the Southern Ocean, and whaling in the Southern Ocean has been specifically prohibited by the IWC through the establishment of the Southern Ocean Whale Sanctuary.

WWF thus believes that it should be a fundamental and unquestionable responsibility of the contracting governments of the IWC to eliminate immediately, or with a short phase out period, all whaling in the Southern Ocean Whale Sanctuary, including the lethal take of whales for 'scientific research', and reject any proposal in the IWC that would set whaling quotas in this area.

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