PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

A. PROPOSAL: inclusion of *Physeter catodon* on Appendix I and II.

B. PROPONENT: Government of Australia

C. SUPPORTING STATEMENT

1	**Taxon**	
1.1	**Class**	Mammalia
1.2	**Order**	Cetacea
1.3	**Family**	Physeteridae
1.4	**Genus and species**	*Physeter catodon / Physeter macrocephalus* (Linnaeus 1758)[1]
1.5	**Common names**	English: Sperm whale Spanish: Ballena Esperma French: Cachalot

2 Biological data

P. catodon is the largest of the toothed whales, and the only great whale in the suborder Odontoceti. It is a dark, wrinkled marine mammal featuring a massive blunt head, a round or triangular hump, a blowhole on the front left side, a keel-like white belly and large triangular flukes, with a straight trailing edge and a deep central notch.

P. catodon lives to 60 or 70 years. It exhibits the highest degree of sexual dimorphism of any cetacean: males, noticeably larger in the head, attain physical maturity at 35-60 years and average 15.2-16.1m in length, while females attain sexual maturity at 25-45 years and average 10.4-11.0m in lenth. The maximum recorded weight is 57.1 tonnes (male) and 24.0 tonnes (female); the maximum recorded length is 18.3m (male) and 12.5m (female) (Bannister 1968, 1969; Rice 1989).

Females are believed to remain in the same nursery groups for life – comprising 10 to 25 females, juveniles and small males. Aggregations of such groups have been reported, sometimes into the thousands (eg. in the Tasman Sea, February 1978: Paterson 1986). Medium-sized males form smaller bachelor schools of 15-21 year-olds, and remain in temperate waters. Large males, on the other hand, are solitary, and can penetrate polar seas.

P. catodon are seasonal breeders, mating from late winter through early summer. The normal breeding cycle is 3-6 years, in which the mother gestates a single young for 14-15 months, suckles the calf for about two years, and then enters a resting period.

P. catodon produces clicks, which travel up to 10km underwater as a series of multiple pulses. This is probably both for echolocation and contact calls, usually during deep diving. At the surface, they emit social sounds – every individual has a unique call. *P. catodon* swims at less than 7 km/hr at the surface, often almost motionless, but can attain 30 km/hr when disturbed.

The diet of *P. catodon* consists mainly of oceanic cephalopods – medium-sized deep water squids – swallowed whole. It is virtually the only predator of this species.

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[1] Linnaeus mistakenly described two different *Physeter* species, *macrocephalus* and *catodon*. Both names have since been found to refer to the same species. *P. macrocephalus* was originally preferred, whereas in recent years, *P. catodon* has prevailed as the scientific name. However, the International Whaling Commission still calls the sperm whale *P. macrocephalus*.

Like other cetaceans, *P. catodon* are "K strategists," in that they are large, long-lived and slow to mature, they have fewer, larger offspring and a high parental investment in young, and have evolved in an environment with little (temporal and stochastic) variation. As an Order, cetacean populations are thus not equipped to cope with and rebound from:

- sudden declines in population numbers, as has happened over the past two centuries because of unsustainable hunting; or
- detrimental environmental impacts on habitat due to anthropogenic factors from pollution, climate change, increased fishing effort, shipping traffic etc. as is currently the case.

2.1 Distribution

P. catodon occurs in all deep oceans of the world, from the equator to the edges of the polar pack ice. The species has been found in the Atlantic, Indian and Pacific Oceans, and, in semi-landlocked regions such as the Mediterranean.

Only mature males range into the higher latitudes, during summer. In the Southern Hemisphere, females and younger males range as far south as the Subtropical convergence (about 40°S), whereas in summer adult males migrate further to Antarctica (to 65° or even 70°S). In the North Pacific, females and younger males range north as far as the Subarctic boundary (about 42°N); adult males further to 60°N in the Gulf of Alaska. In the North Atlantic, females and younger males range to the Subpolar Convergence (about 45° to 50°N); adult males to 69°N, entering the Barents Sea (IUCN, 1991).

P. catodon populations in the Atlantic, Indian and Pacific Oceans are partially isolated from each other by the major continental land masses. The amount of contact between the populations is largely unknown (IUCN, 1991). Both sexes may move between the Atlantic and Indian Oceans, around the southern tip of Africa (35°S). Indian and Pacific Ocean populations may move through the passages between the Lesser Sunda Islands, and possibly around the south of Tasmania, Australia (43°S). Between the Pacific and Atlantic Ocean populations, however, there is only a remote possibility of contact, through large males travelling around Cape Horn (57°S).

The Northern and Southern Hemisphere populations may also be isolated from each other. Their reproductive cycles are 6 months apart, which suggests that the apparent year-round concentration of *P. catodon* on the equator is in fact two separate concentrations – of the northern populations wintering there in October to March, and the southern populations from April to September (IUCN, 1991). There is as yet very limited data on the differing morphological, immunogenic and enzyme characteristics between populations.

North Atlantic

The range of *P. catodon* includes the deeper basins of the Caribbean Sea and the Gulf of Mexico in the west, and the Mediterranean Sea in the east. Adult males range north during summer into the Davis Straits, the waters west of lan Mayen, and Nordkapp, Norway. Occasionally they are found east of Svalbard, and in the Barents Sea as far east as the Kanin peninsula (69°N). The limits of females in the North Atlantic are poorly documented, but they probably range north to the Subpolar Convergence between the Gulf Stream and the Labrador Current at 45° to 50°N (IUCN, 1991).

North Pacific

P. catodon range north into the deeper waters of the South China Sea, the East China Sea, the Sea of Japan, the Sea of Okhotsk, the Bering Sea, the Gulf of Alaska, and the Gulf of California. The shallow continental shelf apparently bars their movement further northward into the northeastern Bering Sea and Arctic Ocean. Females regularly range only about as far as the Transitional Domain – north of the Subarctic Boundary, where the Kuroshio and the Oyashio Currents converge. Occasionally they have been found as far north as Kamchatka (53°N), the Commander Islands (55°N), the Aleutian Islands, and to 60° in the Gulf of Alaska (IUCN, 1991).

Southern Hemisphere

The range limit of adult males that enter the Antarctic waters of the Southern Ocean during summer is 65° or perhaps 70°S. Information from pelagic whaling expeditions suggests that very few females range south of 40°S, but many were caught north of that latitude in the southern Atlantic, Indian and Pacific Oceans (IUCN, 1991).

Indian Ocean

Both sexes range north into the Gulf of Aden, the Arabian Sea, the Bay of Bengal, and the Andamah Sea. The Red Sea and Persian Gulf do not appear to provide suitable habitat, and there are no documented reports from these areas (IUCN, 1991; Rice, 1989).

2.2 Population

The original global population of *P. catodon* has been estimated at 2 million. Commercial whaling from the early 18th to the late 20th century reduced *P. catodon* stocks. Present population estimates are the subject of ongoing controversy. The IUCN concluded that, although estimates abound, the actual worldwide abundance of the species is not known with any precision – "hence the extent to which populations have been reduced by commercial catches is also very uncertain" (IUCN, 1991: 329).

Various attempts by the Scientific Committee of the International Whaling Commission (IWC) to estimate *P. catodon* populations were subject to debates over the reliability of their modelling and assumptions. Estimates based on Catch Per Unit Effort (CPUE) data from whaling fleets as an index of abundance failed to take into account the geographical pattern of whaling operations (Cooke and de la Mare, 1983). Inferences of population sizes from the changing distributions of sizes of animals in the catches have also been shown to be unreliable (de la Mare and Cooke, 1985). The Scientific Committee notes that the remarkable global genetic and morphological uniformity of the species, and the different social and movement patterns of males and females, create "large difficulties in determining stock structure and abundance" (IWC, 1998a: 81).

The IWC is not currently prepared to give an abundance estimate, citing a lack of detailed assessment and statistical certainty.

North Pacific

The North Pacific was the focus of modern *P. catodon* pelagic whaling operations. About 290,000 of this species were killed there in the 20th century, more than in any other ocean. Catch numbers peaked in the 1960s and 1970s: whalers killed over 16,000 in 1968. From the 1950s, pelagic catches initially targeted large males in the far north (beyond 50°N). The fleets moved gradually south and east, until by the end of pelagic whaling in 1979, the catches were mainly south of 30°N, taking medium-sized males and females. Scouting boat observations suggested a decline in abundance of about fourfold in the area north of 40°N between the periods 1965-70 and 1975-80 (Cooke, 1985), when pelagic catches totalled about 100,000. Since this area's population consists mainly of males, it is not clear what effect the depletion had on the total population.

Kasamatsu and Ohsumi (1985) estimated an abundance of 40,000 to over 80,000 *P. catodon* from a partial survey of the western North Pacific south of 40°N. However, this population is a good example of the uncertainty of the estimates. Based on an analysis of whaling ships' log books, Tillman and Breiwick (1983) estimate that *P. catodon* abundance declined by about fivefold in the western North Pacific south of 40°N in the first half of the 19th century – as a result of catches totalling fewer than 40,000 animals between 1825 and 1858. There is no conclusive explanation of the apparent discrepancy between this finding and the 20th century catch data. Thus, there is no agreed estimate of abundance (IUCN, 1991).

Southern Hemisphere

The absolute abundance of *P. catodon* in the Southern Hemisphere remains highly uncertain. Using a combination of data from the 1978/79 to 1985/86 IWC/IDCR Surveys and Japanese scouting vessel data from 1965/66 to 1987/88, Borchers, Butterworth and Kasamatsu (1990) estimated the abundance of *P. catodons* in January and February south of 30°S at 32,000 (c.v. 0.70).

Analyses of the size-distribution of males in the commercial catch suggest that whaling halved the populations of “exploitable” animals (30ft or longer) in IWC Sperm Whale Divisions 2 and 3 – the Southern Hemisphere from 60°E to 30°W – from 1912 to 1979 (Cooke, de la Mare and Beddington, 1983). However, subsequent analyses consider these figures only very rough indications of the populations (de la Mare and Cooke, 1985).

Off the coast of Western Australia, the Southern hemisphere Division 5 population (90°-130°E) was estimated to have declined between 1947 and 1979 by 91% (males >20 years) and 26% (females >13 years) (Kirkwood, Allen and Bannister, 1980). A size-distribution method of analysis also indicated a decline in the southeast Pacific (Division 9: 60°W to 100°W). The long history of whaling off the coasts of Chile and Peru reduced exploitable numbers from about 130,000 in 1912 to 45,000 in 1981 (IWC, 1981). Elsewhere in the Southern Hemisphere, there is insufficient data to infer population sizes (Cooke et al*.*, 1983).

2.3 Habitat

P. catodon are pelagic, offshore, deep water inhabitants. Populations concentrate where the seabed rises steeply from a great depth, which may draw them near coasts and oceanic islands, in search of their major food, deep-sea cephalopods. (Bannister, Kemper and Warneke, 1996).

The trophic habitat of this species is vast. Diving is long and deep, especially by large males, which have been recorded diving up to 138 mins, although typically less than 45 mins. Different measuring techniques give different maximum diving depths: found at 1,135m (entangled in a cable); tracked to 1,827m (by active sonar) and 2,250m (by passive acoustics); and inferred to have dived to 3,195m (from field observations and stomach contents). However, it appears that the vast majority of dives are to less than 1,000m (Rice, 1989).

The critical *P. catodon* breeding and calving habitat is in temperate and tropical oceanic waters. No specific localities have been recognised (Best, Canham and MacLeod., 1984; Bannister et al., 1996). However, it is known that the critical breeding period for Northern Hemisphere populations is from January to August, peaking between March and June. Calving females are also in these waters from May to September. Southern Hemisphere populations breed in similar temperate and tropical regions from July through March, with a peak between September and December. Their calving season falls in November to March (Rice, 1989).

2.4 Migrations

P. catodon migrate seasonally between warmer and colder seas. In each Hemisphere, the species makes a generalised movement towards the poles to feed in their respective summers, and a corresponding movement towards the equator to breed in winter. During winter, the large males – that may have penetrated the polar seas – migrate vast distances to join the nursery groups.

While the exact patterns of migration are not yet mapped precisely, it seems likely that some members of *P. catodon* populations also move laterally between the major oceans during the Southern Hemisphere summer. These paths include around the Southern tip of Africa (35°S), between the Lesser Sunda Islands, and around the south of Tasmania, Australia (43°S). Large males may migrate between the Indian and Pacific Oceans on a path around Cape Horn (57°S).

3 Threat data

3.1 Direct threats to the populations

In 1991, the IUCN considered existing conservation measures controlling the direct threat of whaling for *P. catodon* to be adequate. However, it based this conclusion on the condition “that they are maintained and enforced” (IUCN, 1991: 329). The International Convention for the Regulation of

Whaling allows Parties to issue permits unilaterally, to kill whales for scientific research. Since 2000, the JARPNII program has authorised Japanese whalers to take 10 *P. catodon* from the western north Pacific per year for scientific purposes.

The first commercial sperm whale fishery began from the American eastern seaboard in 1721. From the Atlantic Ocean, this industry expanded to make voyages to the Pacific Ocean in 1791 and to the Indian Ocean in 1830 (Mawer, 1999). Between 1804 and 1876, USA whalers alone killed an estimated 225,521 *P. catodon*. One traditional fishery survives from these times, taking several animals for local use each year with hand harpoons from the villages of Lamalera and Lamakera in Indonesia.

The modern whaling industry did not primarily target *P. catodon* until the 1950s, when shortages restored the value of sperm oil to a level at which pelagic whaling was once more profitable. The demand – for lubricants, leather tanning and the chemical industry – raised the annual world catch from a pre-war average of 2-3,000 animals to a world peak of 29,255 in 1964 (IUCN, 1991). Whereas *P. catodon* were only 10% of the world whale catch in 1949/50, they accounted for 56% of all reported kills in 1969/70 (FAO, 1978-82: 82). Over 20,000 were caught in the North Atlantic after 1950, mainly off Iceland, the Azores, Madeira, and Spain (IUCN, 1991).

Commercial hunters threatened the balance of *P. catodon* populations, by targeting the larger breeding-age males, and upsetting the male-to-female ratio. As a consequence, the birth rate seriously declined in some populations (IUCN, 1991).

P. catodon may drown through entanglement in discarded fishing gear. Some evidence of this has been reported. An Italian drift gillnet fishery for swordfish in the Mediterranean killed a number of animals, threatening the survival of what is believed to be a small local population. In response, Italy closed this fishery. Some takes in other fisheries worldwide are also reported (IWC, 1990).

Unregulated whale watching also places stress on *P. catodon* individuals and groups. This is a rapidly growing industry that range states need to regulate, because at certain proximities and intensities, operators and tourists will interfere with critical breeding and socialising behaviour (Gordon, Moscrop, Carlson, Ingram, Leaper, Matthews and Young, 1998).

P. catodon is also susceptible to pollution. The increasing volume of marine debris, particularly buoyant and synthetic items such as plastic, may threaten this species through the possibility of entanglement and ingestion. Substantial volumes of rubbish discarded by humans have been found in the stomachs of stranded whales (Laist, Coe and O'Hara, 1999). Further, oil spills and the dumping of industrial wastes into waterways and the sea lead to bio-accumulation of toxic substances in the body tissues of the top predators, making such events dangerous to great whales (Cannella & Kitchener 1992; IWC, 2000). High concentrations of cadmium, mercury and polychlorobenzine were detected in seven male *P. catodon* stranded on the southern North Sea coast (Holsbeek, Joiris, Debacker, Ali, Roose, Nellissen, Gobert, Bouquegneau, and Bossicart, 1999). While the high pollutant levels were not considered the direct cause of mortality, they illustrate the vulnerability, at least of this population, to heavy metal and organochlorine pollution.

Chemical pollution, in particular the persistent organic pollutants including PCBs, DDTs, PCDDs, HCB dieldrin, endrin, mirex, PCDs, PBs, PEDEs, polcyclic aromatic hydrocarbons and phenalos as well as metals and their organic forms methyl-mercury and organotins are of concern for marine mammals in the marine environment. Many of these pollutants can cause immune suppression, making them more susceptible to prey depletion, habitat modification, environmental changes (including global warming or ozone depletion) or disease. Synergistic and cumulative effects must be considered in the assessment of any risk to individual species or populations. (Reijnders & Aguilar, 2002), Currently marine mammals in mid-latitudes (industrialised and intense agriculture use) of Europe, North America and Japan have the highest loads. However levels of organochlorines are declining in the mid latitudes and are predicted that in the near to midterm future the polar regions will become the major sinks for these contaminants. (Reijnders & Aguilar, 2002). Of the 2 million tonnes of PCBs that have been produced world wide, only 1% has reached the oceans at this stage. Around 30% has been accumulated in dump sites and the sediments of lakes, estuaries and coastal zones and future dispersal into the marine environment cannot be controlled (35% are still in use) The open ocean water serves as the final reservoir and sink for the worlds PCB production. (Reijnders 1996).

Levels of PCB and DDT have been detected in *B. bonaerensis* and appear to vary depending on geography and diet, with adult migrating to less polluted areas. (Reijnders & Aguilar, 2002)

3.2 Habitat destruction

At the 50th meeting of the IWC, the Scientific Committee identified "environmental change" as the looming threat to whale populations and their critical habitats. This meeting discussed the impact of climate change, chemical pollution, physical and biological habitat degradation, effects of fisheries, ozone depletion and UV-B radiation, Arctic issues, disease and mortality events and the impact of noise and resolved an ongoing work program for continued investigation (IWC, 1998b).

3.3 Indirect threats

Global environmental change is an indirect threat to *P. catodon*. Springer (1998) concluded that fluctuations in marine mammal populations in the North Pacific are entirely related to climate variations and change. One of the more important impacts of a changing climate on marine mammals is changes to the abundance of and access to prey. This has a particularly detrimental impact on marine mammals that feed from the top of the food chain, such as whales (IPCC, 2001).

Further, global warming appears to be related to reductions in sea ice: one study concludes that the Antarctic sea-ice receded by 2.8 degrees latitude (168 nautical miles) between 1958 and 1972 (de la Mare, 1997). This would have interfered with the feeding patterns of adult males, as well as altering the seasonal distributions, geographic ranges, migration patterns, nutritional status, reproduction success, and ultimately the abundance of marine mammals (Tynan and DeMaster, 1997).

3.4 Threats connected especially with migrations

While migrating between feeding and breeding grounds, *P. catodon* are susceptible to shipping strikes. The increase in oceanic traffic increases the likelihood of collision with large vessels on shipping lanes in critical P. catodon habitat beyond the edge of continental shelves. *P.catodon* has a habit of staying motionless at the surface for considerable periods, and is thus potentially more susceptible to ship strikes (Whitehead, 2002).

Underwater noise pollution is often a direct threat to migrating cetaceans, given their reliance on sound for navigation through their highly developed echolocation systems. *P.catodon* are particularly sensitive to moderate and high frequency sounds, from approximately 1 - 20 kHz (Richardson, Greene, Malme and Thomson, 1995). It is difficult to identify conditions under which *P. catodon* is particularly sensitive, given the varying acoustic transmission conditions from shallow water to deep, and relative to the animal's position within a water column. However, a number of anthropogenic sound sources are known to produce underwater acoustics within the frequency range of *P. catodon*, and potentially within migratory routes.

Most seismic exploration occurs at frequencies below the frequencies of the calls and optimum hearing of odontocetes, hence *P. catodon* may be rather insensitive to these sound pulses (Richardson, et al, 1995). However, overall received levels of airgun pulses often exceed 130 dB re 1 ?Pa, and may be potentially audible to odontocetes (Richardson, et al, 1995). For example, *P. catodon* were observed moving away from an area where seismic surveys had commenced in Mexico (Mate, Stafford and Ljungblad,1994), and ceased calling during some instances when seismic pulses were received from an airgun array over 300 km away (Bowles, Smultea, Würsig, DeMaster and Palka, 1994). In contrast, observers on a seismic vessel near the United Kingdom did not note strong avoidance behaviour when air guns were operating (Würsig and Richardson, 2002). These cases illustrate the variable responses of *P. catodon* to noise, and the difficulty of determining those circumstances of exposure that may impact on the activities of the animal at the time.

Military activities that produce significant underwater sound pressure may also potentially interrupt whales' movements and natural activities, including critical migratory, feeding and breeding patterns. These sounds include those associated with underwater detonations of explosives, and the penetration of active sonar (Richardson, et al, 1995). The higher the frequency of the sonar, the more likely the noise would interact with *P. catodon*. However, as with seismic exploration activities, *P. catodon* responses to active sonar have been observed to vary from matching its clicks to the timing of an echosounder pulse, to falling silent and moving from the area (Watkins, Moore and Tyack, 1985; Watkins, Daher, Fristrup, Howald and Notarbartolo di Sciara, 1993; Papastavrou, Smith and Whitehead, 1989). However, this variation could simply reflect the great variation in sonar frequencies and intensities.

P. catodon are susceptible to stranding. In 160 years of strandings records from Tasmania (Australia), past which the species regularly migrates, these whales were the second-most frequently stranded species (31 events and 10 herd strandings; Nicol & Croome 1988). Further, stranded *P. catodons* are difficult to rescue, as their weight crushes their organs once on land, and their assymetrical blowhole readily clogs with sand (Mawer, 1999: xi). In February 1998, a nursery group of 66 individuals stranded while migrating past the Tasmanian west coast. In January 2002, 14 whales believed to be *P. catodon* beached near Oura, in southwestern Japan.

3.5 National and international utilisation

There is currently no demand for *P. catodon* products that cannot be met by alternatives. No large-scale industry ever caught the animals for human consumption – the meat was generally considered unpalatable, and is now known to concentrate water-borne pollutants such as mercury, at unacceptable levels (Plummet and Bartlett, 1975).

Ambergris, the fatty substance which forms as ulcers around squid beaks in the digestive system of *P. catodon*, was once highly prized as a fixative to enhance perfumes. It is no longer used for this purpose because cheaper substitutes are available. The remaining commercial demand for medicinal ambergris in the Middle East appears to be satisfied through material found washed ashore on beaches (Anderson, 1990). Whalers also used *P. catodon* teeth to produce scrimshaw – distinctive forms of carving, ornaments and jewellery. While plastic substitutes are widely available, good examples of scrimshaw from the 19th century are still highly prized.

The major product of whaling for this species, however, was sperm oil, for several centuries the finest quality source of lighting and industrial lubricant. Now, users choose petroleum or jojoba bases for the same purposes. However, this collapse in demand was partly forced by the decision of the IWC to limit supply. The IWC's decision is subject to regular review, and the long history of trade in sperm oil demonstrates the capacity of the market to revive unpredictably.

4 Protection status and needs

In 1996, the IUCN listed the status of *P. catodon* as Vulnerable – VUA1bd:
Facing a high risk of extinction in the wild in the medium-term future, due to a population reduction of at least 20% over the last 10 years or three generations. The Cetacean Specialist Group made this judgement on the basis of b) an index of abundance appropriate for the taxon, and d) actual or potential levels of exploitation (IUCN, 2000).

4.1 National protection status

National legislation protecting the *P. catodon* is mainly derived from international agreements.

4.2 International protection status

Articles 65 and 120 of the United Nations Convention on the Law of the Sea (UNCLOS) accord a special status to marine mammals, and specifically allow for more strict protection of marine mammals by coastal Parties or international organisations. Also in relation to cetaceans, Articles 65 and 120 oblige coastal Parties to work through appropriate international organisations for their conservation, management and study.

P. catodon is protected from whaling by the IWC, through its general moratorium on commercial whaling. Given uncertain stock analyses, the moratorium imposed a zero catch limit on every whale stock, effective from 1985/86. This limit is subject to annual review by the IWC. The IWC also protects whales, including *B. borealis*, through the declaration of sanctuaries, to provide freedom from disturbance for migrating and breeding great whales that were once hunted to the brink of extinction. The IWC established the Indian Ocean Sanctuary in 1979, and the Southern Ocean Sanctuary in 1994. These sanctuaries are important zones of protection for whales.

International trade in *P. catodon* products has been controlled since 1985 by the listing of the species in CITES Appendix I. However, the two major whaling nations – Japan and Norway – entered reservations against this listing, and are thus not bound.

In general terms, the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) relates to whale protection. CCAMLR applies to the Antarctic Convergence, a natural oceanographic boundary formed where the circulation of cold waters of the Antarctic ocean meets the warmer waters to the north. Although whales are not specifically referred to in the CCAMLR, its objective is the conservation of Antarctic marine living resources.

The Jakarta Mandate is an agreement implementing the Convention on Biological Diversity, 1992, in the marine environment. The Jakarta Mandate encourages a precautionary approach to resource management and promotes the adoption of ecosystem management principles. It also recognises that wide adoption and implementation of integrated marine and coastal area management are necessary for effective conservation and sustainable use of marine and coastal biological diversity.

4.3 Additional protection needs

As noted above, the IUCN lists *P. catodon* as vulnerable. The global population of the species was greatly reduced by past whaling, and there is no evidence to suggest that population numbers have recovered to pre-whaling levels (IUCN, 1991). Additionally, the species is subject to a number of ongoing threats. Because the species is a “K strategist,” it will take even longer periods of time to recover from any further impacts.

The main vehicle for the protection and conservation of *P. catodon* is the International Convention for the Regulation of Whaling (ICRW) which establishes the moratorium on commercial whaling, and two regional whale sanctuaries (the Indian Ocean Sanctuary and the Southern Ocean Sanctuary).

In the event of a resumption of commercial whaling, the efficacy of the Convention on International Trade in Endangered Species of Wild Fauna (CITES) as a protection measure for whales would also be compromised. This is because a number of Parties with interests in commercial whaling have entered reservations against the listing of certain whale species, and are thus not bound by the Convention. Further, some of these Parties have regularly proposed the downlisting of great whales from Appendix I to Appendix II.

Under UNCLOS, Parties have an obligation to protect the marine environment within their exclusive economic zones and on the high seas in cases where they have jurisdiction. However, effective conservation for migratory species of cetaceans requires a consistent and coordinated approach to the development and application of conservation measures throughout the full range of a species’ habitats, regardless of which jurisdictions they fall within. This includes important feeding, mating and calving sites and the migration routes between them.

Inclusion of *P. catodon* on Appendix I and II of the Convention on the Conservation of Migratory Species of Wild Animals allows non-parties to the Convention to provide protection for the species, and participate in regional agreements ratified under the auspices of the Convention. This makes the protection measures more accessible than under other international agreements. *P. catodon* would also benefit from such cooperative research and conservation actions. A listing under the CMS would also complement the current protection provided by the ICRW and CITES.

5 Range states

Because it is a cosmopolitan oceanic species, *P. catodon* is of conservation concern to almost every country with a sea coast, and every country registering shipping.

The IUCN (2000) lists the following countries as range states:
Argentina, Australia, Belgium, Brazil, Canada, Chile, China, Colombia, Costa Rica, Eritrea, Falkland Islands/ Malvinas, French Polynesia, Greenland, India, Indonesia, Ireland, Japan, Kenya, Democratic People's Republic of Korea, Republic of Korea, Liberia, Mexico, Mozambique, Myanmar, Netherlands, New Zealand, Norway, Panama, Portugal, Saint Helena, South Africa, Spain, Sri Lanka, Suriname, United Republic of Tanzania, Thailand, United Kingdom, United States, Uruguay, Venezuela.

Of these, the following are Parties to the CMS:
Argentina, Australia, Belgium, Chile, India, Ireland, Kenya, Netherlands, New Zealand, Norway, Panama, Saint Helena (British Overseas Territory), South Africa, Spain, Sri Lanka, United Republic of Tanzania, United Kingdom, Uruguay.

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