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

A. PROPOSAL: inclusion of *Balaenoptera edeni* 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**	Balaenopteridae
1.4	**Genus and species**	*Balaenoptera edeni* (Anderson 1878)
1.5	**Common names**	English: Bryde's whale; Tropical whale Spanish: Ballena de Bryde French: Baleinoptere de Bryde; Rorqual d'Eden; Rorqual de Bryde; Rorqual Tropical

2 Biological data

In the one species of *Balaenoptera edeni*, a medium-sized baleen great whale, there appear to be two forms. Both of these have slender bodies and broad heads, dark on top and lighter beneath, with lateral ridges on the rostrum, two blowholes and three parallel ridges running from the blowholes to the snout. However, they fall into two size-groups. The larger offshore form moves seasonally, whereas a smaller inshore form appears to be sedentary (Cummings, 1985; Leatherwood and Reeves, 1983; Best, 1977).

B. edeni live for approximately 50 years. Inshore forms of the species reach physical maturity at 9-11.5m, whereas the offshore variety have attained the maximum recorded lengths of 14.6m (males) and 15.6 m (females) (Rice, 1998). Offshore females, slightly larger than males, reach sexual maturity at about 12.5m and 10 years of age, whereas males are sexually mature at about 12.2m, between the ages of 9 and 13. Maximum weight is about 20 to 25 t (Jefferson, Leatherwood and Webber, 1993).

B. edeni is a lunge feeder, filtering water and prey through baleen plates, especially *euphausiids*, or krill. The precise abundance of *B. edeni* has never been well known, partly because it is easily confused with the Sei whale (*B. borealis*).

B. edeni emit powerful low frequency moans, pulses, clicks, and grunts. They also communicate by breaching. This is an agile species, which has been reported to swim at more than 10 knots while feeding, to accelerate and change direction frequently, and often rise steeply to surface, where they often roll on to their sides and churn water. (Bannister, Kemper and Warneke, 1996; Cummings 1985).

Like other cetaceans, *B. edeni* 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

B. edeni is found in the Indian, Pacific and Atlantic Oceans. Its habitat includes tropical and warm temperate low latitude waters around the world, bounded approximately by latitudes 40°N and S (or the 20°C marine isotherm).

Pacific Ocean

In the western Pacific, *B. edeni* occur from Japan to New Zealand and Australia. In the eastern Pacific, they are found from Baja California to northern Chile. They are also present in the equatorial Pacific. The possibility of distinct offshore and inshore forms of Bryde's whales in the North Pacific is still uncertain, as there may be links between the offshore form from the Bonin Islands and inshore populations of Sanriku and Oshima, Japan (IWC, 1977; Cummings, 1985; Leatherwood and Reeves, 1983; IUCN, 1991).

Atlantic Ocean

Little is known of the distribution of *B. edeni* in the northern part of this region. From evidence of strandings, there appears to be a resident population in the Caribbean and Gulf of Mexico, which may extend to the Atlantic coast of the USA as far as north Chesapeake Bay. Sightings have been recorded off northern Venezuela (Notarbartolo di Sciara, 1983), and the species was once hunted off Brazil. In the eastern Atlantic, they have been reported from Morocco southward to the Cape of Good Hope. They have also been reported from the central equatorial Atlantic (IWC, 1977; Cummings, 1985; Leatherwood and Reeves, 1983; IUCN, 1991).

Southern Hemisphere

Both forms of *B. edeni* appear off the west coast of South Africa, and off the Brazilian coast. The offshore form have been recorded from Chile, the Natal coast of South Africa and Western Australia. The year-round tropical and temperate distribution of the offshore form suggests that the South Atlantic, South Pacific and Indian Oceans contain separate stocks (Best, 1977; IWC, 1977; Cummings, 1985; Leatherwood and Reeves, 1983; IUCN, 1991).

Indian Ocean

The range is from the Cape of Good Hope north to the Persian Gulf, east to Burma and south to Shark Bay, Western Australia. There are also animals in the central Indian Ocean (Best, 1977; IWC, 1977; Cummings, 1985; Leatherwood and Reeves, 1983).

2.2 Population

Various attempts by the Scientific Committee of the International Whaling Commission (IWC) to estimate *B. edeni* populations were subject to debates over the reliability of their modelling and assumptions. Until the 1970s, catches of *B. edeni* were recorded with those for *B. borealis.* Hence, it was very difficult to separate the statistics of past operations, in order to derive population estimates and/or catch quotas. Further, the Scientific Committee has agreed that this species' taxon "is highly complex and more work is needed (IWC, 1998a).

The IWC is not currently prepared to give an abundance estimate, citing a lack of detailed assessment and statistical certainty. However, a rough population estimate puts the number of *B. edeni* at 40-80,000, but the United Nations Environment Program (UNEP) notes the threat of illegal hunting and depletion of food supplies in many areas may make this figure too high.

The offshore stocks in each Hemisphere breed in their respective autumns, making the breeding seasons of the different Hemisphere stocks six months apart. Thus, it seemed reasonable at first to consider the populations as separate (IWC, 1977). This idea has since been questioned several times, but the problem has not been resolved, because of a lack of information (IUCN, 1991).

Northern Hemisphere
No information is available on the status, distribution, number of stocks or abundance of *B. edeni* in the Indian Ocean north of the equator, although in 1982 some sightings off Sri Lanka were reported (IWC, 1983a). In the absence of significant commercial catch records or data from sightings, the abundance of North Atlantic *B. edeni* is similarly unknown (IWC, 1979). The only information on *B. edeni* in the North Pacific is that, for management purposes, the idea of treating them as three separate stocks was first put forward in 1979 (IWC, 1980). The status or abundance of the eastern North Pacific population is similarly unknown, and in 1985, the IWC classified the East China Sea population as a Protected Stock: a small population from which any catch poses a serious threat (IWC, 1986).

Western North Pacific
Given the long history of catching *B. edeni* in the western North Pacific, various population estimates have been possible over the years. The disparity between these demonstrates the general uncertainty about the status of this species. Mark-recapture data gave an adult population of just over 32,000 in 1946, which had depleted to 23,500 in 1987. Calculations based on sightings data confirmed this depletion, but arrived at different estimates – of 26,000 in 1946 and just over 17,000 in 1987 (IWC, 1986). Then in 1988, another analysis of sightings data gave a total population estimate for both mature and juvenile animals of 18,000 (IWC, 1989). The IWC continues to debate the possibility of further sub-stocks in the region. Some of which may be more depleted, and thus more vulnerable, than others (IWC, 1999).

Southern Hemisphere
Population estimates for the Southern Hemisphere are unreliable, for they were derived mainly from sightings data from whaling fleet scouting vessels. Since the raw data have not been published, it has not been possible to reanalyse them using modern techniques (IUCN, 1991).

A cruise in 1983 provided data for a provisional population estimate for the South African inshore stock of 519 (s.e. 84). The eastern North Pacific population (the Peruvian stock) was seriously depleted, to as few as 1,400-2,400 adults in 1983 (IUCN, 1991). Estimates for the Southern Indian Ocean, an inshore population in the Solomon Islands, and the Western South Pacific stock, are all considered unreliable (IUCN, 1991). The IWC imposed zero catch limits on these populations in the 1980s, in the light of the inadequate estimates.

2.3 Habitat
B. edeni may be found in temperate to tropical waters, both oceanic and inshore, bounded by latitudes 40°N and 40°S, or the 20° isotherm. This species is usually seen singly or in small groups of up to seven animals (Rice, 1979; Kuzmin, Ivashin and Vladimirov, 1979; Cummings, 1985).

The trophic habitat of *B. edeni* is indicated by dives of up to 300m, and up to 20 min in duration.

It appears that inshore populations may breed throughout the year, and thus their critical breeding habitat includes their whole range. Pelagic stocks mate and calve in autumn and winter, and thus their critical habitats are towards the equator. Gestation lasts about a year, lactation probably less than a year, and the typical calving interval is two years. While newborn calves are born in temperate and tropical waters, the exact locations have not yet been identified.

2.4 Migrations
The larger pelagic forms of *B. edeni*, like other baleen whales, move annually between warmer and colder seas. In each Hemisphere, the species makes a generalised movement towards higher latitudes to feed in their respective summers, and a corresponding movement towards the equator to breed in winter. These migratory routes are somewhat shorter than other *balaenopterids*, remaining within the 20° isotherm.

3 Threat data

3.1 Direct threats to the populations

The International Convention for the Regulation of Whaling allows Parties to issue permits to kill whales for scientific research. Since 2000, the JARPNII program has authorised Japanese whalers to take 50 *B. edeni* from the western north Pacific per year for scientific purposes. This program killed 43 whales in 2000 and 50 in 2001.

The species was a focus of neither the early nor the modern whaling industry. However, the Sei whale was, and it is likely that reported catches of Sei whales included *B. edeni*. In the eastern South Pacific, as many as 90% of the "Sei" whales in Chilean catch reports may have been *B. edeni* (Gallardo, Arcos, Salamanca and Pastene, 1983). An estimated 10% of those taken by the Brazilian land station from 1947 were *B. edeni* (IWC, 1980a). Japanese coastal operations record catches from the East China Sea from 1955, and the South African stock was exploited from 1950 to 1967. Early land and pelagic whaling operations by various countries hunting larger species in tropical and warm temperate waters also caught this species incidentally (Tonnessen and Johnsen, 1982; Bannister et al., 1996).

Interest in direct exploitation of *B. edeni* revived in the face of diminishing quotas for the more favoured baleen species during the 1970s. The IWC fully classified Southern Hemisphere *B. edeni* stocks and set catch limits in 1979 (IWC, 1980). In 1980, the IWC allowed a catch of up to 197 per year in the Indian Ocean (IWC, 1981). The IWC gradually reduced the catch limit for the East China Sea stock from 19 in 1979 to zero in 1983 (IWC, 1984).

However, this species demonstrates the difficulty of imposing catch limits. Operations from the Philippines and probably Taiwan took this species from the western South Pacific stock without reporting their activity (IUCN, 1991).

The Action Plan for Australian Cetaceans (Bannister, Kemper and Warneke, 1996) identifies entanglement in fishing nets as posing a threat to *B. edeni*.

Unregulated whale watching also places stress on *B. edeni* 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).

B. edeni 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, Knowlton, Mead, Collet and Podesta., 2001). 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, 2000a).

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 *B. edeni*. 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, 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, *B. edeni* are susceptible to shipping strikes. The increase in oceanic traffic increases the likelihood of collision with large vessels on shipping lanes in critical *Species* habitat beyond the edge of continental shelves.

Underwater noise pollution is often a direct threat to migrating cetaceans, given their reliance on sound for navigation through their highly developed echolocation systems. *B. edeni* are particularly sensitive to low and moderate frequency sounds, from approximately 12Hz to 8kHz (Richardson, Greene, Malme and Thomson, 1995). It is difficult to identify conditions under which *B. edeni* 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 *B. edeni*, and potentially within migratory routes.

For example, seismic operations may disturb the movements and natural activities of the species through the production of continuous, high-level, low-frequency (below 1kHz) sound (Würsig and Richardson, 2002). Most Baleen whales continue normal activity up to 150db re 1 ?Pa, but, as these levels are some 50+ dB above typical ambient noise levels, lower received levels may have subtle effects on surfacing and respiration (Richardson, et al, 1995).

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).

Any of these types of anthropogenic interference can exhaust the animals, leaving them more vulnerable to attack by killer whales and sharks.

3.5 National and international utilisation

There is currently no demand for *B. edeni* products that cannot be met by alternatives. While the species was not one of the original targets of the whaling industry, the experimental Special Permit catch of the late 1970s indicated that the species could yield oil (at a rate of about 9% of that of a blue whale, or 1.66 tons per animal) and collagen peptide. When added to meat and blubber, this could yield an average total of 9.346 tons of products suitable for human consumption per whale (Ohsumi, 1980).

4 Protection status and needs

In 1996, the IUCN listed the status of *B. edeni* as Data Deficient.
The Cetacean Specialist Group judged that there was inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate (IUCN, 2000).

4.1 National protection status

National legislation protecting *B. edeni* 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.

B. edeni is protected from commercial 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.

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, an agreement implementing the Convention on Biological Diversity, 1992, in the marine environment, 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.

International trade in *B. edeni* products has been controlled since 1986 by the listing of the species in CITES Appendix I. However, the former commercial whaling nations of Brazil, Japan, Peru and

USSR entered reservations against this listing, thus for these countries this species remains on Appendix II. There are concerns that some large consignments reported as "Cetacea spp." contained Bryde's whale products (Holt, 1982; IUCN, 1991).

4.3 Additional protection needs

As noted above, the IUCN lists *B. edeni* as data deficient. Because the pre-whaling global population is unknown, there is no evidence of the extent to which past whaling reduced the population, or to suggest that population numbers have recovered (IUCN, 1991). Additionally, the species is subject to a number of ongoing threats. Because the species is a "K strategist," it will take a longer period of time to recover from any further impacts.

The main vehicle for the protection and conservation of *B. edeni* 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 *B. edeni* would also be compromised. This is because Japan entered a reservation against the listing of *B. edeni*, and are thus not bound by the Convention. Further, some Parties have regularly proposed the downlisting of great whales from Appendix I to Appendix II of CITES.

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 *B. edeni* 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. *B. edeni* 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

Putative countries of origin are all those with coastlines in tropical and warm temperate waters. In view of the confusion with sei whales, a list of previously published records is unlikely to provide any accurate representation of those countries with responsibility for the *B. edeni* in their waters (IUCN, 1991). Other countries may also have conservation responsibilities through trade or the registration of shipping.

The IUCN (2000) lists the following countries as range states:
Angola, Argentina, Australia, Brazil, Chile, China, Fiji, French Polynesia, Grenada, Indonesia, Iraq, Japan, Kenya, Madagascar, Malaysia, Mexico, Mozambique, New Zealand, Pakistan, Peru, Saudi Arabia, Senegal, Seychelles, Solomon Islands, South Africa, Sri Lanka, Taiwan – Province of China, United Republic of Tanzania, United States.

Of these, the following are Parties to the CMS:
Argentina, Australia, Brazil, Chile, Kenya, New Zealand, Pakistan, Peru, Saudi Arabia, Senegal, South Africa, Sri Lanka, United Republic of Tanzania.
Also, Madagascar is a Signatory to the Convention.

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