Proposal II / 2

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

A. PROPOSAL: Inclusion of *Tursiops aduncus* (Arafura/Timor Sea populations) on Appendix II.

B. PROPONENT: **Government of Australia**

C. SUPPORTING STATEMENT

1. Taxon

1.1_	Class	Mammalia	
1.2	Order	Cetacea	
1.3	Family	Delphinidae	
1.4	Genus and species	*Tursiops aduncus* (Ehrenberg 1833)	
1.5	Common names	English:	Indian Ocean bottlenose dolphin
		Spanish:	unknown
		French:	unknown

2. Biological data

2.1 Distribution

Tursiops aduncus has only recently been accepted as a separate species distinct from *T. truncatus* (Rice 1998), having been formerly considered either a race, an ecotype or as the subspecies *T. truncatus aduncus*. Over all but the coldest parts of its range it is distinguished from *T. truncatus* by the dark spots on the ventral surface of mature animals (Ross and Cockcroft 1990), and the relatively long beak and relatively large flippers (Miyazaki & Nakayama 1989, cited in Rice 1998).

The species is distributed along the south-east coast of Africa from Cape Agulhas, Cape Province north to the Red Sea and eastward through the Persian Gulf, Arabian Sea, Bay of Bengal and throughout coastal waters of south-east Asia, extending north to Taiwan and Japan and south to the waters of northern Australia (Rice 1998). In Australia its range extends from NSW north of Port Macquarie through Queensland and Northern Territory into Western Australia south to Perth (Bannister *et al* 1996). Further work may be required to better define the distribution of the species, especially with regard to the allocation of particular populations to either *T. aduncus* or *T. truncatus*.

Specimens derived from the Taiwanese gillnet fishery in the Arafura Sea have been examined by Ross (unpublished). The animals are small but fit into the end of a cline in size along the coast to east and west. They are assigned to *T. aduncus*, from an examination of the skull features (as described by Ross and Cockcroft 1990) and from genetic samples from the Evolutionary Biology Unit, South Australian Museum. There is also evidence that a large form of *Tursiops* attaining up to 2.4m long (the smaller dolphins average 1.8-2.1 m long) occurs further offshore in the Arafura Sea (from the Taiwanese fishery notes). The affinities of this larger form are uncertain but it is possible that the deeper water populations offshore are also of the *aduncus* genotype. Both small inshore and large offshore bottlenose dolphins that bear spots on the belly have been reported off New Caledonia (GJB Ross pers. comm.).

Although *T. aduncus* is obviously widely distributed in the Indian Ocean and Western Pacific, this proposal targets only the populations within the Timor and Arafura Seas. These populations are known to have been incidentally caught by the shark gillnet fishery in Australian waters in the past (IWC 1994) and may still be incidentally caught in fishery operations.

It should be noted that, like most marine species, our knowledge of the distribution, conservation status and threats facing *T. aduncus* is poor. The conservation status of all small cetaceans in *The Action Plan for Australian Cetaceans* (Bannister *et al* 1996) was given as either K, insufficiently known, or NCA, no category assigned, due to the lack of information for these species. In the absence of definitive data, inclusion of the species on Appendix II of the Convention may be seen primarily as a precautionary measure. The Convention does, however, provide the best vehicle to pursue cooperative conservation and management of the species with the adjoining range states. A research program is required to improve our understanding of *T. aduncus* and related species in this region as well as providing a basis for improved regional management.

2.2 Population

The number and sizes of populations in the Timor and Arafura Seas is not known. Several studies have provided minimum estimates for local populations in Australia but none of these were conducted in northern waters (Bannister *et al* 1996).

The range of distinct genetic populations or stocks of *T. aduncus* along the coast of eastern Australia, estimated from mtDNA analysis of haplotype diversity, is about 200 nautical miles (Hale n.d.). Home ranges off Natal, southern Africa, were estimated to be in the order of 30-40 kms long but there is evidence that large numbers of animals move up and down the coast seasonally through these home ranges (Cockcroft & Ross 1991).

Hale (n.d.) concluded that inshore dolphins in Australian waters are most likely made up of small populations with discrete ranges throughout their distribution, with the potential for localised impacts to seriously affect local populations.

The Scientific Council of the CMS has supported a project proposal for cetacean surveys of the Timor and Arafura Seas between Australia and Indonesia. Australia is developing a proposal, in consultation with Indonesia, for submission to UNEP.

2.3 Habitat

Tursiops aduncus is found in a variety of habitats, and its distribution may be affected by water temperature. Bannister *et al* (1996) describe it as generally inhabiting warmer inshore waters in Australia, often in water <10m depth and possibly ranging to approximately 10km offshore (Bannister *et al* 1996), as opposed to the colder deeper waters favoured by *T. truncatus*. Jefferson *et al*. (1993) described the species as being found primarily in coastal and inshore regions with population density being higher near shore. However, note the comments of Ross above and figures calculated below.

The distribution of catches of *T. aduncus* (60%) and other cetaceans in the Timor and Arafura Seas within the Australian EEZ, interpolated from Harwood and Hembree (1987) and using bathymetric data for the area, shows that most were caught within approximately 220kms of shore, but extending to approximately 300 kms. Depths varied somewhat with location: the majority of cetaceans caught east of 133_E were in water <75m deep, and mostly in water 50-75m deep. Those caught west of 128_W were in water <100m deep, and mostly in water 50-100m deep. Obviously *T. aduncus* occurs in pelagic waters in this region and it would appear that the available habitat for *T. aduncus* may be expanded in warmer tropical waters (GJB Ross pers. comm.) as it is for *T. truncatus* (Jefferson *et al* 1993). It is not clear from this whether there is any temporal or behavioural pattern to these fisheries interactions.

Lear and Bryden (1980) found significantly greater numbers in rocky regions of the coastline with deep water close to shore than in open coast or enclosed bays where the sea bottom shelves more gently, and regular occurrences of animals up to 20km offshore. Cockcroft and Ross (1990) found the major constituents of *T. aduncus* prey are species that occur in inshore reef and sandy-bottom benthic areas, in pelagic shoals and in deeper water (>50m), indicating the distribution of *T. aduncus* in these areas.

In waters off Natal there appears to be distributional segregation of different mass/sex classes of dolphins in the inshore zone (Cockcroft and Ross 1990, 1991). Mature males feed on generally larger prey farther from shore than dolphins of other classes. Lactating females and calves fed close inshore, the females taking a greater variety of prey than other classes while calves take a limited variety of small prey.

Bottlenose dolphins are described as catholic feeders, taking demersal, benthic and reef associated species of teleosts, cephalopods, elasmobranches and crustaceans (Bannister *et al* 1996). They have also been described as opportunistic feeders, taking whatever prey is most abundant at the time (Jefferson *et al* 1993). Cockcroft and Ross (1990), however, found that off Natal only six species made up 60% of the diet, even accounting for seasonal, annual and geographic variations in the exact proportions of these species.

2.4 Migrations

The extent of migrations or seasonal movements by *T. aduncus* in the Timor and Arafura Seas is unknown. Bannister *et al* (1996) state that *T. aduncus sensu lato* is migratory in temperate waters. The ranges of regional populations certainly extend across the boundaries between Australia, Indonesia and Papua New Guinea, evidenced by the fact that catches by the Taiwanese drift gillnet fishery were made up to 300 kms offshore and the maritime boundary between Australia and Indonesia in the Arafura and Timor Seas is less than 200 kms offshore in these areas.

Seasonal variations in the distribution of the species have been noted off Natal (Cockcroft and Ross 1991). The variations have been attributed to environmental fluctuations that affect the distribution and abundance of the dolphin's prey. There was a clear relationship between movements (assessed by rate of capture in shark nets and associated sightings) and seasonal temperature variation. Observations also support an avoidance of turbid water inshore.

3. Threat data

3.1 Direct threats to the populations

Bottlenose dolphins comprised 60% of the identified cetaceans caught incidentally in the Taiwanese drift gillnet fishery in northern Australian oceanic waters, the Timor and Arafura Seas, between 1981 and 1985. An estimated 14,000 cetaceans were caught in this period. No estimate has been attempted for cetacean bycatch in the seven years prior to this (Harwood and Hembree 1987). These estimates of total incidental take were judged to be probably low (IWC 1994). Due to the unacceptably high incidence of cetacean bycatch, the Australian government placed operating restrictions on the fishery and the operators surrendered their licences in 1986.

The fishery then moved into the Indonesian sector of the Arafura Sea, where oceanographic conditions are similar and similar catch rates of cetaceans might be expected (Northridge 1991). It is expected that many of these would be from the same populations that were affected when the fishery operated in Australian waters. In 1987 at least 48 Taiwanese drift net fishing vessels were operating in the Arafura Sea in the Indonesian EEZ (Richards 1994). There is no information available to establish the current distribution of effort in this fishery. FAO fishery production and capture statistics for catch of sharks, skates, rays etc in Indonesian parts of the Indian and Pacific Oceans indicate catch has expanded considerably since 1986. The catch has increased from 34,943 metric tons in 1986 to 59,450 metric tons in 1997 (FAO 1999a). The increase in catch may be due to several, or a combination, of factors but without concerted action to minimise bycatch the impact on *T. aduncus* and other cetacean species may be significant.

An offshore gillnet fishery for sharks, in addition to the Taiwanese fishery, which operates in northern Australian waters had an estimated bycatch of 40-240 dolphins per year (IWC 1994), with Indian Ocean bottlenose dolphins one of the most likely species to be caught. The management responsibilities for this fishery changed in 1995 as a result of agreements reached under the Offshore Constitutional Settlement (Caton *et al* 1997) and no more recent data or estimates of cetacean bycatch for this fishery are available at this time.

Tursiops aduncus may be caught incidentally by the inshore set gillnet fishery for barramundi in estuarine and tidal areas of northern Australia, but no data are available on numbers or species caught (IWC 1994). Capture statistics for this fishery indicate that catch has expanded from 633 metric tons in 1984 to 1,144 metric tons in 1997, operating almost exclusively in Australian Pacific waters. A barramundi fishery also operates in Indonesian waters and catch has expanded considerably, from 12,609 metric tons in 1984 to 49,800 metric tons in 1997 although it is not clear what methods are used. Production in the barramundi fishery in Papua New Guinea has declined over this period from 169 to 35 metric tons of fish caught (FAO 1999a).

Tursiops species are taken as a result of entanglement in shark mesh nets to protect bathers in major cities in New South Wales and Queensland, in aquaculture nets and as result of illegal killing for sport, bait or because of a perceived predation on commercial fish stocks (Bannister *et al* 1996). A gillnet fishery for tuna operates in Indonesian waters from Sumatra but there are no data about cetacean bycatch (IWC 1994). Dolphins may also be attracted to and caught incidentally in trawling operations (Small and Small 1991).

No quantitative information is available on dolphin bycatch in Indonesian or Papua New Guinea fisheries, and there are no data for subsistence or commercial directed catch in these areas. Indian Ocean bottlenose dolphins are incidentally caught in a number of national gillnet fisheries, ie within the EEZ of coastal nations, in the north-eastern Indian Ocean. Although data are generally poor, it is apparent that cetacean mortality is high in some fisheries in this region (Lal Mohan 1994).

3.2 Habitat destruction

The generally coastal habits of *T. aduncus* make it particularly vulnerable to anthropogenic impacts, including habitat degradation (Reeves and Leatherwood 1994). Populations occurring close to major cities may be affected by pollution from effluents, runoff and noise. Environmental degradation through fish farming and aquaculture is also a serious problem in south-east Asia (FAO 1997). Coastal fishing communities are typically characterised by intense competition for scarce resources, which is often associated with unregulated access to these resources, with subsequent damage to marine habitats and adverse economic and social effects to communities (FAO 1999b).

Tursiops aduncus feeds on a wide range of prey species, although a few dominate in the diet. It is clear that both reef species and those of more open, sandy environments are taken (Cockcroft and Ross 1990). Trawling operations in such areas may have an impact on fish stocks and ultimately on their predators, including *T. aduncus*.

3.3 Indirect threats

Populations of *T. aduncus* may have been affected by the alteration of habitat and decline in fisheries resources in Australia (Hale n.d.). Coastal development for urban, agricultural and industrial purposes in Australia, and similar impacts resulting from population pressure in the region, have had an impact on coastal wetland, mangrove and saltmarsh ecosystems (FAO 1996, Hale n.d.). These areas are important nursery and feeding habitats for many fish species that form the prey of bottlenose and other inshore species of dolphins. An estimated 90% of the world's marine fisheries production is dependent on coastal habitats (FAO 1999b).

Similarly, the continued exploitation of fisheries, many on an unsustainable basis, may decrease the available volume of prey and may significantly reduce numbers of some species of particular importance in the diet of dolphins (FAO 1997, Hale n.d.).

The generally inshore distribution of *T. aduncus* makes it particularly susceptible to exposure to chemical contaminants and heavy metal pollution. High levels of organochlorines have been recorded from Indian Ocean bottlenose dolphins off the Natal coast, South Africa (Cockcroft *et al* 1989), an area with high contaminant run-off in earlier years. A review of contaminant loads in marine mammals from Australia found concentrations to be generally an order of magnitude lower (Kemper *et al* 1994). Information on the general levels of contaminant loads among *T. aduncus* populations in the Arafura and Timor Seas region is not available but would be expected to be low unless DDT and associated compounds are still in use. Some organochlorines are known to interfere with both the hormonal and immune systems, and high levels have been associated with reproductive abnormalities and complex disease syndromes in some marine mammals (Reeves and Leatherwood 1994).

Despite high levels of contaminants being found in various populations of marine mammals around the world there is yet to be a direct link established between this and increased animal mortality or reduced population viability (Hale n.d.). There may be a link between these and increased susceptibility to disease and epizootics (Aguilar and Raga 1993). Marine mammals may have a genetic susceptibility to pathogen induced mass mortalities, which it is postulated may play a significant role in the demographic structure of cetacean populations (Bannister *et al* 1996).

3.4 Threats connected especially with migrations

No threats directly linked to migrations are known, although our understanding of seasonal or other movements of *T. aduncus* is extremely limited. The operation of the gillnet fishery in the Timor and Arafura seas may continue to have an impact on the shared populations of the species there.

3.5 National and international utilisation

There is no utilisation of this species in Australia, although there are incidental mortalities. Information on artisanal or commercial utilisation in the adjoining range states, Indonesia and Papua New Guinea, is not available.

4. Protection status and needs

4.1 National protection status

All cetaceans are protected in Australia under State legislation, to three nautical miles offshore, and under the *Whale Protection Act 1980* (the Act) within the Australian Exclusive Economic Zone to 200 nautical miles offshore. The protection given to cetaceans under the Act also applies to Australian citizens overseas, prohibiting them from killing, taking, injuring or interfering with whales. The Act also prohibits foreign whaling vessels from entering Australian ports without written permission.

It is a legal requirement that bycatch of cetaceans in Commonwealth waters of the Australian fishing zone, ie outside the 3 nautical mile State limit, be recorded and reported to the Director of National Parks and Wildlife.

Bottlenose dolphins do not have formal protection under domestic legislation in either Indonesia or Papua New Guinea.

4.2 International protection status

Tursiops truncatus is listed in Appendix II of CITES. The species is still described by the IUCN (1996) as Data deficient (DD), ie information to make a sound conservation assessment is lacking. *T. aduncus* is not listed under CITES or assessed as a separate species by the IUCN, but a similar status would be expected to apply in both cases.

Neither Indonesia nor Papua New Guinea are parties to the CMS, however, both countries are members of regional organisations that address environmental issues. Indonesia is a signatory to the ASEAN Agreement on the Conservation of Nature and Natural Resources. This covers a wide range of environmental matters, and includes recognition of the importance of conserving species, ecosystems and ecological processes, and the need for international cooperation to achieve its aims. Papua New Guinea is party to the South Pacific Regional Environment Programme (SPREP) which provides the framework for addressing environmental issues in the South Pacific region.

4.3 Additional protection needs

The implementation of regional conservation measures effective in the protection of Indian Ocean bottlenose dolphin populations in south east-Asia, in the area where the

Indian and Pacific Oceans meet and different regional agreements are in place, are most effectively pursued through the CMS.

Although only Australia and the Philippines are currently parties to the Convention in the region, other range states can participate in Agreements arising from the Convention without becoming party to the CMS. A regional agreement needs to be developed to facilitate the identification, assessment and conservation of Timor and Arafura Seas populations of *T. aduncus*.

5. Range states

The range states with jurisdiction over the Timor and Arafura Seas are Australia, Indonesia and Papua New Guinea.

6. References

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