Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES)

A. Proposal

Inclusion of ***Carcharodon carcharias*** **(Great White Shark)** in Appendix III in accordance with Article II.3.and in accordance with the provisions of Article V. This proposal addresses the relevant criteria outlined in Resolution Conf. 9.25(rev).

B. Proponent

Australia

C. Summary

Australia proposes to list the Great White Shark *(Carcharodon carcharias)* in Appendix III in accordance with Article ll.3. and in accordance with the provisions of Article V. Appendix III includes all species which any Party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation, and as needing the cooperation of other Parties in the control of trade. Including the Great White Shark in Appendix III will require Australia to issue CITES permits to allow trade and require all other parties trading in the species to issue a Certificate of Origin. The requirement for permits to be issued and observed by importing Parties will assist Australia to regulate trade in specimens and enable all Parties to gain a greater understanding of trade in the species and any parts or derivatives of the species.

The Great White Shark is a widely distributed species of coastal and offshore shelves in temperate and sub-tropical areas. It is thought to have local populations that show some evidence of migratory behaviour. It is a large (5 m) marine predator, vilified for its occasional attacks on humans. It is thought to have a low reproductive rate, reaching sexual maturity at 9-10 years of age and producing between two and ten pups after a 12 month gestation period once every two to three years. The species is relatively long-lived. The Great White Shark is uncommon compared to other sharks and evidence from protective beach netting in Australia, California and South Africa as well as game fishing and commercial captures are all reporting declining captures of the Great White Shark indicating that the population of the species is in decline. Evidence suggests that the population may have declined by at least 20% over the last three generations. In some areas the species is considered to have declined by substantially more than this over that period. In New South Wales alone, a study on sharks caught by gamefish anglers showed the ratio of white sharks to all species caught in gamefish catches in New South Wales declined from 1:22 in the 1960's to 1:38 in the 1970's to 1:651 in the 1980's (Pepperell 1992).

The species is not targeted by large commercial pelagic fisheries, but is taken as bycatch. In addition to bycatch, the main sources of recorded mortality seem to be sport fishing and the curio trade. The high prices for teeth and jaws in the curio trade are thought to stimulate directed take of this species in coastal fisheries. However, the general trade in shark fins has increased substantially since the 1980s.

In response to concerns about the increasing trade in shark fins, the FAO Committee on Fisheries (COFI) has recognised the need for improved management of shark fisheries adopted the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks). This Plan, although voluntary in nature, encourages nations to assess their shark resources, take action to manage directed and incidental fisheries and to develop regional action plans. Australia however was only one of 17 nations out of 125 nations that stated it was preparing a National Plan of Action on sharks (NPOA – Sharks) at the Conference of Fisheries (COFI) in February 2001.

The Great White Shark is assessed by IUCN – the World Conservation Union as 'Vulnerable' on the *IUCN Red List of Threatened Species* (www.redlist.org, IUCN 2000). In Australia, the Great White Shark is fully protected in Commonwealth waters under the Environment Protection Biodiversity Conservation Act 1999, where it is listed as a vulnerable species. It is also protected in South Australian, Victorian and

Tasmanian waters, protected with an exemption for beach netting in New South Wales and Queensland waters, and protected from commercial fishing in Western Australian waters.

Trade in the Great White Shark is currently restricted due to its listing as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*, and the *Wildlife Protection (Regulation of Exports and Imports) Act 1982*. The species is protected by specific legislation in several range States.

D. Criteria for listing on Appendix III

Resolution 9.25 (Rev) states that a Party when considering the inclusion of a species in Appendix III, should:

a) ensure that:

i) the species is native to its country;

Response:
The Great White Shark is native to Australia and largely occurs in southern Australian waters. These waters are regulated by the Commonwealth (which generally has jurisdiction over all waters beyond 3 nautical miles of the low water mark, and all waters surrounding external territories) and the states of Victoria, Tasmania, South Australia, New South Wales, Queensland and Western Australian.

ii) its national regulations are adequate to prevent or restrict exploitation and to control trade, for the conservation of the species, and include penalties for illegal taking, trade or possession and provisions for confiscation;

Response:
National regulations to prevent or restrict exploitation are adequate to meet this criterion for the Great White Shark. The Commonwealth, State and Territory Acts have penalties for taking, possession and trade and provisions for confiscation of the Great White Shark. The Great White Shark is fully protected in Commonwealth, South Australian, Victorian and Tasmanian waters, protected with an exemption for beach netting in New South Wales and Queensland waters, and protected from commercial fishing in Western Australian waters.

Trade in the Great White Shark is currently restricted due to its listing as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*, and its listing on the schedules of the *Wildlife Protection (Regulation of Exports and Imports) Act 1982.*

The following table summarises the legislation that protects white sharks or identifies their status as needing particular conservation in Australia.

Jurisdiction	**Act**	**Section Summary**	**Date of Declaration**
Comm.	*Environment Protection Biodiversity Conservation Act 1999*	**Part 13 Div 1** Listed as 'vulnerable' species with prohibition on taking, trade, keeping, moving, killing and injuring.	16 July 1999
Comm.	*Wildlife Protection (Regulation of Exports and Imports) Act 1982*.	Part 2 Div 1 Prohibition of certain exports and imports Export of species declared under Schedule 1 prohibited.	17 December 1997
SA	*Fisheries Act 1982*	**S.42** A person must not take a fish declared by regulation to be protected	1 January 1998
Vic	*Fisheries Act 1995*	**S.71** A person must not take, injure, damage, destroy, possess, keep, display for reward, release or sell any protected biota	4 August 1998

Tas	*Living Marine Resources Management Act 1995*	**S.135(2)** A person must not take any protected fish	Initially declared under previous Act in 1995.
NSW	*Fisheries Management Act 1994*	**Part 7a** Protected Species under Schedule 5 (Species vulnerable to extinction) **S.8** Fisheries Closure Notification- taking of white sharks prohibited by all methods in all waters except approved shark meshing contractors for scientific purposes	Protected under Section 7a on 14 May 1999 Gazetted January 1997 Section 8.
WA	*Fisheries Resources Management Act 1994*	**S.46** A person must not take, possess, sell or purchase, consign, bring in to the state: any totally protected fish	November 1997
Qld	*Fisheries Act 1994*	**S.78 (1)** A person must not unlawfully take, possess or sell a regulated fish	18 July 1997

iii) its national enforcement measures are adequate to implement these regulations; and

Response:
Commonwealth, State and Territory fisheries legislation is rigorously enforced through both boat patrols and landings and trade checks.

Trade in specimens is enforced by the Australian Customs Service and Environment Australia and at border points.

Australia has also developed Great White Shark Identification Sheets to assist in the identification of this species and any parts or derivatives of the species (Attachment A)

iv) for species that are traded for their timber, consideration is given to including only that geographically separate population of the species for which the inclusion would best achieve the aims of the Convention and its effective implementation, particularly with regard to the conservation of the species in the country requesting its inclusion in Appendix III;

Response:
Not relevant in this case.

b) determine that, notwithstanding these regulations and measures, there are indications that the co-operation of the Parties is needed to control illegal trade;

Response:
There are adequate indications (from professional fishing magazine advertisements and the internet) that illegal take and trade in products of Great White Shark occurs in and from Australia. A substantial percentage of these products would be sold overseas.

c) inform the Management Authorities of other range States, the known major importing countries, the Secretariat and the Animals Committee or the Plants Committee that it is considering the inclusion of the species in Appendix III and seek their opinion on the potential effects of such inclusion; and

Response:
Great White Sharks were considered for listing on Appendix II at the recent Eleventh meeting of the Conference of Parties, Kenya, April 2000. Australia's concern over the status of Great White Sharks and its efforts to have this species listed on Appendix II is considered sufficient in notifying member parties of its efforts to reduce threats to the species through listing on Appendix III. Letters have been received from South Africa and New Zealand supporting our intention to list the Great White Shark on Appendix III.

The European Union has been advised of Australia's intention to list on Appendix III. The current chair and vice chair of the Animals Committee are from these jurisdictions.

C. Supporting Statement

1. Taxonomy

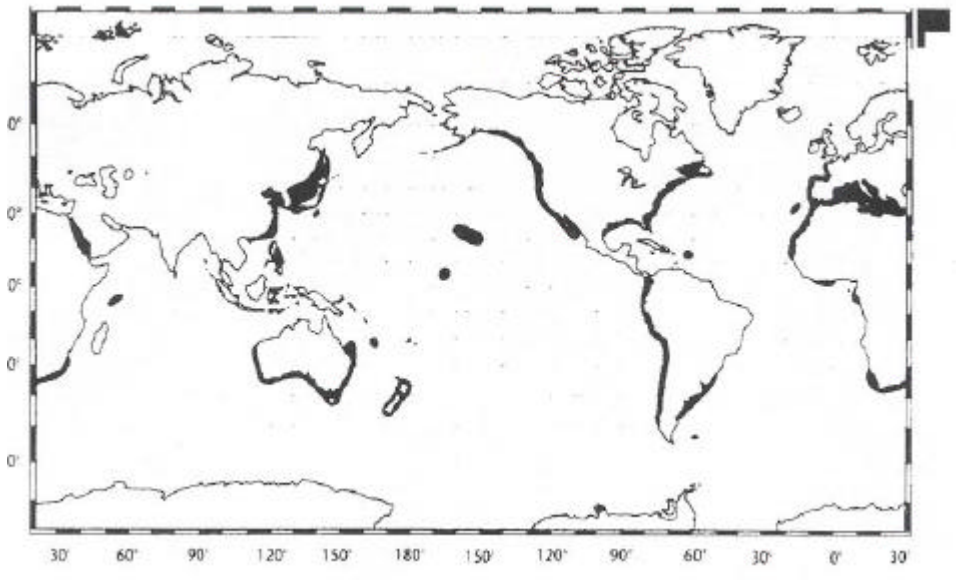
1.1 Class	Elasmobranchii
1.2 Order	Lamniformes
1.3 Family	Lamnidae
1.4 Species	Carcharodon carcharias
1.5 Scientific Synonyms	*Carcharias lamia* Rafinesque, 1810; *Carcharias verus* Cloquet, 1822; *Carcharias rondeletti* Bory de St. Vincent, 1829; *Squalus (Carcharias) vulgaris* Richardson, 1836; *Carcharodon smithii* Agassiz, 1838 or Bonaparte, 1839; *Carcharias atwoodi*, Storer, 1848; *Carcharodon capensis* Smith, 1849; *Carcharias vorax* Owen, 1853; *Carcharias maso* Norris, 1898 (not *Squalua (Carcharias) maou* Lesson, 1830); *Carcharodon albimors* Whitley, 1939 (Food and Agriculture Organisation of the United Nations 1999).
1.6 Common Names	Great White Shark, White shark, White pointer, White death, (English) Grand requin blanc, Ami, Lamea, Lamie, Lameo, le Carcharodonte lamie, le Grand requin, Pei can (French); Jaquetón blanco, Ca mari, Marraco, Salproig, Salproix, Gran tiburón branco, (Spanish); Squalo bianco, Carcarodonte, Cagnia, Cagnesca grande, Cagnia, Caniscu, Carcarodonte lamia, Carcarodonte di rondelet, Imbestinu, Lamia, Masinu feru, Pesce cane, Pesca can, Pesce can grande, Pesciu can, Pisci cani grossu, Pisci mastinu (Italian); Weisshai, Menschen fresser, Menchenhai, Merviel fras (German); Hohojirozame, Hitokiuzame, Oshirosame (Japan); Lamia (German); Niuhi (Hawaiian Islands); Gab doll (Malta); Tubarao branco (Portuguese) Gench, Kersch (Red Sea).

2. Biological Parameters

2.1 Distribution

The Great White Shark is widely distributed, and located throughout temperate and sub-tropical regions in the northern and southern hemispheres. It is primarily found in the coastal and offshore areas of the continental and insular shelves and offshore continental islands. The Great White Shark is most abundant near the pinniped (Northern Elephant seals or sea-lions) colonies along the Central California Coast, the shelf waters of the mid-Atlantic Bight, the Great Australian Bight and the Cape and KwaZulu-Natal provinces of South Africa (Fergusson 1996) (see Figure 1). For a more in-depth list of range states, see Appendix A.

Figure 1: Dominant distribution of Carcharodon carcharias (Great White Shark). Source: Last and Stevens 1994



Smaller specimens (below 3 metres) are mostly restricted to temperate waters, with newborn and 0+ young (less than 176 centimetres in length, Cailliet *et al.* 1983 *in* Francis 1996) specimens reported from New Zealand, Australia, South Africa, the eastern North Pacific, the western North Atlantic, and the Mediterranean

(Francis 1996). There have been reports of embryos and pregnant or postpartum Great White Sharks from New Zealand, Australia, Taiwan, Japan and the Mediterranean Sea (Francis 1996) and Kenya (where a pregnant female was taken in 1996 in an artisanal fishery) (Natal Sharks Board). This indicates that parturition probably occurs in a wide range of mostly temperate locations worldwide.

The Great White Shark is capable of swimming long distances and for extended periods. For example, offshore tracking of a large shark with sonic tags indicated that it moved 190 kilometres in 2.5 days at an average cruising speed of 3.2 kilometres per hour (Carey *et al.* 1982 *in* Bruce 1992). Great White Sharks have been recorded at least 500km from where they were originally sighted off the Californian coast. (Anderson and.Goldman 1996). While Great White Sharks are considered to be a migratory species within their home range, it is possible that they may also move in and out of these areas on a seasonal basis (Fergusson 1996). There is evidence that some larger non-breeding individuals have a wider temperature range and penetrate tropical waters where carcharinid sharks are located, and may also pass through the waters off oceanic islands. Captures of adult specimens at the Azores Islands indicate that some degree of transoceanic migrations over considerable distance may occur (Compagno 1984a *In* Fergusson 1996). In the case of the Azores this may be as a (largely) west-to-east nomadic journey within the Gulf Stream from North America (Fergusson 1996: 337). Rare mid-ocean records are also known from the Pacific, at the Hawaiian, Marshall, and Easter islands (Fergusson 1996), and there have been reports of sightings of the shark in the tropical south-west Indian Ocean, including Madagascar, Mauritius and Kenya (where a pregnant female was taken in 1996 in an artisanal fishery) (Natal Sharks Board). All the sharks in these cases appear to be large (greater than 4 metres). This suggests that equatorial waters may be a deterrent to large-scale movement but not a complete barrier. A possible mechanism is tropical submergence, where the shark descends into and travels within deeper, cool oceanic waters across the equatorial zone. Consequently, populations may not be genetically isolated (Fergusson 1998).

Studies of Great White Sharks sighted at pinniped colonies indicate that the sharks appear to be largely transient, with a few longer term residents (Klimley and Anderson 1996, Strong *et al.* 1992). Individuals are known to return to feeding grounds annually on a seasonal basis. A number of studies indicate that some populations appear often to be small and highly localised, with a high degree of site attachment. For example, in one study in the Spencer Gulf area (South Australia), 36% of sharks were resighted always in their original location (Strong *et al.* 1992). A further study in South Africa found that of 147 Great White Sharks tagged, 30 individuals were resighted a total of 59 times one of which was resighted 10 times. Of the 30, all but two were resighted at the same area in which they were originally observed (Ferreira and Ferreira 1996). The resighting of individual Great White Sharks at particular localities is well documented in other areas of the world (Bruce 1995), such as Western Cape (South Africa) (Cliff *et al* 1996) and California (Klimley and Anderson 1996). A number of studies have also indicated that there is a degree of spatial segregation of Great White Sharks by sex (Strong *et al.* 1992; Bruce 1992; Cliff *et al* 1989 *in* Bruce 1992), with females frequenting areas that are generally more accessible to fishermen (Murphy 1996). One study off the coast of South Australia recorded a predominance of females off inshore islands, and a predominance of males adjacent to offshore islands (Strong *et al.* 1992). This segregation can fluctuate with location and over time (Strong *et al.* 1996).

2.2 Habitat Availability

Within its range states, the Great White Shark is often found close in shore to the surfline and even penetrates shallow bays in continental coastal waters. In waters along the continental shelf, Great White Sharks generally occur near the surface or at the bottom from 16 to 32 metres depth rather than mid water depths(Goldman *et al.* 1996). While Great White Sharks are widely distributed (See Figure 1) they appear to be far more common in some locations such as South Africa, Australia and United States of America than at others. Particular areas are also seen as important pupping grounds.

Coastal areas are a preferred habitat, and the population level of the species could be affected by coastal habitat degradation. The risk of this occurring is heightened as much of the species habitat is in areas with dense human populations. Beach meshing, often employed in areas of the Great White Shark's preferred habitats, also threatens to reduce population numbers. Great white sharks caught by beach meshing programs are usually small (less than 3 metres), and in many cases, particularly off eastern Australia, are smaller than 2 metres. This suggests that these programs operate close to pupping grounds or in juvenile nursery habitats. However, while beach meshing undoubtedly is detrimental to smaller specimens, the widespread occurrence of similar small sized Great White Sharks in areas where beach meshing is not undertaken suggests that nursery habitats are also probably widespread in Australia (B.Bruce, CSIRO, pers. comm.).

2.3 Population Status

Available data on absolute or total population numbers for the Great White Shark is extremely limited. As large commercial fishing fleets do not target Great White Sharks, information on the volume of catches and landings is poor. As such, its population status is uncertain. What is apparent from work done on sharks, however, is that it is uncommon to rare compared to most sharks. It appears to be relatively scarce compared to most other widely distributed species and there is considerable anecdotal evidence from game fishing and beach meshing statistics to demonstrate that the population is in decline. This is reflected in the fact that the Great White Shark is listed as 'Vulnerable' on the 2000 IUCN World Conservation Union Red List of Threatened Species (www.redlist.org). This listing recognises that a decline of at least 20 per cent has been observed, inferred or suspected over the last 10 years, or over three generations. The Red List assessment states "The white shark is a widely but sparsely distributed top predator with a very low reproductive potential (late maturity and small litter size) and high vulnerability to target and bycatch fisheries (commercial and recreational), some of which supply products (fins, jaws and teeth) for international trade. Where detailed population data are available, these indicate that the abundance and average size of white sharks have declined. The species is now effectively protected in some parts of its range, where it may be Lower Risk (conservation dependent). A global status of Endangered (A1cd; A2cd) may be proven accurate for this shark as further data is collated."

Pregnant females are rarely reported. Little is known therefore about the reproductive rate and behaviour of the species. Compagno *et al.* (1997) reported that the species may have an unusually low fecundity rate for elasmobranchs, with both a long gestation period and with relatively few adult females being pregnant at any one time. Great White Shark females do not reproduce before reaching 4.5 – 5.0 metres in length and have a relatively small litter of around two to ten pups (sometimes as high as 14) (Francis 1996). It is thought that they do not reproduce every year, and that their gestation time is longer than 12 months (Camhi *et al.* 1998). This is typical of many K-strategists, making them vulnerable to exploitation. ('K-strategist' species are defined has having slow development, relatively large size, and producing only a small number of offspring at a time.)

Tagging studies of Great White Sharks off the South African coast (for the region Richards Bay in KwaZulu-Natal to Struis Bay in Western Cape) between 1989 and 1993 provide average estimates of 1279 sharks in the region (Cliff et al. 1996), while Strong *et al.* (1996) have estimated that there could be approximately 200 at Dangerous Reef in South Australia (in an area of approximately 260 km^2). The Endangered Species Scientific Subcommittee (ESSS) in Australia, considered that the Australian population met the requirements for listing as 'vulnerable' that is, the population numbered fewer than 10,000 mature individuals, and that it has undergone a continuing decline of at least 10% over the past three generations (about 30 years). ESSS also estimated that around 500 Great White Shark mortalities may occur due to human activities in Australian waters each year.

New South Wales, South Australia, Victoria and Tasmania have all listed Great White Shark as 'vulnerable' on their threatened species legislation.

2.4 Population and Geographic Trends

Although there are no quantitative estimates of Great White Shark global population size, there are a number of trend analyses, local population estimates, and anecdotal information sets that indicate stock declines in recent years. Reliable data comes from a number of sources including beach meshing programs, gamefish captures and catch per unit effort information from commercial captures. A number of studies, and anecdotal evidence in North America, South Africa and Australia, all indicate that numbers are declining. As the studies available have been in Southern Australia, U.S.A. and South Africa – the major range areas of the Great White Shark – they are likely to be indicative of similar trends elsewhere. There is a however a relative scarcity of long term monitoring and studies of populations outside of these areas, and inconsistent methodologies make it difficult to compare data.

Sport-fishing data from the east coast of North America and south-eastern Australia indicate declines in the proportions of Great White Sharks taken relative to other shark species caught over the last several decades (Bruce 1992; Casey and Pratt 1985). For example, a study by Pepperell (1992) recorded a decline in the number of Great White Sharks relative to other sharks caught by game fishermen off the coast of south-eastern Australia of 1:22 in the 1960s, to 1:38 in the 1970s to 1:651 in the 1980s (other sharks largely consisted of shortfin, mako, blue, tiger and, until 1979, grey nurse). This decline in numbers is also reflected in sport

fisheries data from the eastern United States, where the proportion of Great White Sharks taken relative to other shark species dropped from 1:67 in 1965 to 1:210 in 1983 for the mid-Atlantic Bight (Casey and Pratt 1985).

Anecdotal evidence from South Australian fishers and divers also shows a decline in number of Great White Sharks in recent years (Bruce 1992; Strong *et al.* 1992). These claims are supported by a reported decrease in the capture of Great White Sharks from game fishing activities in South Australia from around 25 Great White Sharks per year in the 1950s, to an average of 1.4 sharks per year in the 10 years to 1990 (94.4% decline) (Presser and Allen 1995). It is possible that the relative decline in Great White Shark captures may be due to other factors such as: shifts in angling further from Great White Shark habitat (Pepperell, 1992), changes in fishing equipment or techniques, changes in the abundance of the other sharks, or an increased concern for Great White Shark conservation. Alternatively, the recent increase in coastal human populations may have resulted in increased fishing pressure on Great White Shark and subsequent population declines.

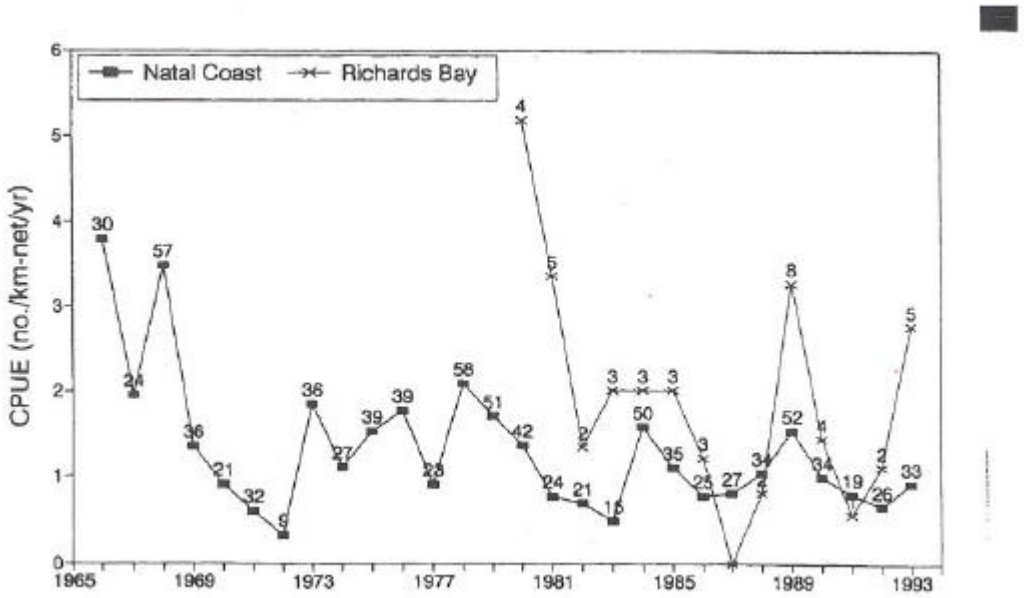


Fig 2 Source: Cliff G., Dudley, S.F.J. and Jury, M.R. (1996)

Declining catch rates in shark nets in Natal have also been reported. A longitudinal study off the KwaZulu-Natal coast between 1966 and 1993 (see figure 2) saw a decline in Great White Shark numbers, with the authors calculating the decline in the latter part of the study (between 1973 and 1993) as significant (Cliff *et al.* 1996). Great White Sharks are also caught in beach meshing apparatus used in Queensland and New South Wales. A total of 498 great white sharks have been captured by beach meshing between 1950 and 1996 (average of 11 per year). Captures of white sharks in New South Wales meshes *" have shown an almost unbroken decline since the commencement of meshing in 1937"* (Reid and Krogh 1992). Catch per unit effort (CPUE) from beach meshing in New South Wales and Queensland has shown a gradual and irregular decline and there has also been a decrease in average length of Great White Shark caught in NSW, consistent with a decline in the fishery (Anon, 1996). The average length of Great White's caught between 1950-70 was 2.5m, 2m between 1970-90 and down to 1.7 m in the 1990's (NSW Fisheries, 1997).

Studies indicate that there are possibly natural fluctuations in Great White Shark abundance in some areas, thought to be related to temperature and (to some extent) life stage. For example, Cliff *et al.* (1996) noted a cyclical trend of Great White Shark abundance from shark nets along the KwaZulu-Natal coast, peaking at 4 to 6 year intervals (see figure 2). The authors however, do not consider natural fluctuations responsible for the decline over recent decades (Cliff *et al.* 1996).

2.5 Role of Species in its Ecosystem

The Great White Shark is an apex predator, and therefore, it is presumed to play an important role in the marine ecosystem by, among other things, keeping the population of their prey in check, and aiding the maintenance of genetic fitness of its prey. The diet of Great White Sharks smaller than about 3 metres consists mainly of a variety of teleost and elasmobranch fishes, while marine mammals are a major part of the diet for larger sharks (Last and Stevens 1994; Cliff *et al.* 1996). It is difficult to predict accurately what impact a continued decline of the Great White Shark may have on the ecosystem, "in the absence of more precise information, however, the roles of these fishes should not be underestimated. Indiscriminate removal of apex predators from marine habitats could disastrously upset the balance within the sea's ecosystems" (Last and Stevens 1994: 7).

2.6 Threats

The major impacts on Great White Shark populations are largely a result of human actions including

- direct and incidental fishing pressure,
- decline in the abundance of its prey,
- protective beach meshing,
- intensified targeted commercial and sports fisheries for trophies,
- degradation of the shark's habitat, and
- incidental catch of the species in commercial and artisanal fisheries.

Increasing human population in coastal areas may lead to degradation of important inshore feeding and reproduction habitat for Great White Sharks. The proximity of Great White Shark habitat to human populations further increases the chances of sharks being killed in targeted fisheries or as a by-catch. The species is known to actively investigate human behaviour. They are bold and inquisitive in their approach to vessels and fishing gear. This innate behaviour increases the likelihood of being killed by humans, intentionally or not. The negative image of the Great White Shark and the fear it inspires in humans often precipitates unwarranted killing of the species. The impact of these actions is made worse by the proximity of Great White Shark staging and breeding areas to coastal human populations. Examples include: campaigns to kill Great White Shark after shark attacks, disregard of conservation and management measures, and eradication measures such as beach-meshing. Compagno 1996 (in Marshall and Barnett 1997) documented Great White Shark mortality of 80% from entanglement and drowning in beach-meshing operations in Natal, South Africa. As mentioned above, Great White Sharks mature late, have few young with few adult females pregnant at one time, and have long gestation periods (Camhi *et al.* 1998**).** These characteristics make them vulnerable to over-exploitation and minimise the amount of sustainable yield that can be obtained from the stocks.

Because Great White Sharks, though generally rare, appear to form local populations, the species is highly vulnerable to over-exploitation if there is strong fishing pressure within that area. Evidence suggests they can easily be exploited to the point of extinction, even where relatively few are regularly removed from an environment. For example, research off the Farallon Islands suggested that the removal of just four Great White Sharks greatly reduced, and possibly eliminated the entire local population of Great White Sharks (Ainley *et al. In* Cailliet *et al.* 1985). Direct pressure on Great White Shark populations comes from their being targeted for their teeth, jaws and fins, or when they become a nuisance to fishing operations (Bruce 1992). Great White Shark teeth and jaws have significant economic value (Compagno *et al.* 1997). A jaw of a Great White Shark from Gans Bay, recently recovered after being stolen, was valued at US$50,000. Small jaws may be sold for as much as US$15,000, and individual teeth from small sharks for US$600 (IUCN Shark Specialist Group 1998). There is also reportedly a commercial market for neonates (Camhi *et al.*).

Basic economics would indicate that as Great White Shark populations continue to decline, the economic value of these curios will increase, possibly leading to increased targeting, and over-exploitation, as well as growth of an underground sales network or black market for highly lucrative Great White Shark products (Compagno *et al.* 1997).

Fishers generally target the larger sharks for their teeth and jaws, which could have a significant impact on population numbers in the long term. The Great White female reaches sexual maturity only when she is approximately 4.5 to 5 metres long, compared to males that reach sexual maturity at 3.5 to 4 metres long, when about twelve or fourteen years old (Camhi *et al.* 1998). Hence it is the reproductively active females and larger males that are being targeted.

An increased trade in shark products in general promotes the catch of the Great White Shark as incidental catch of other shark and other fisheries. The Great White Shark is an incidental catch of fisheries that use longlines, hook-and-line, fixed bottom gillnets, fish traps, herring weirs, and trammelnets, harpoons, and bottom and pelagic trawls, as well as purse seines (Food and Agriculture Organisation of the United Nations 1999). Strong *et al.* (1996) found through studies in South Australia, that 10% of Great White Shark were observed bearing short remnants (less than 2 metres) of longlines and gill nets. Bruce (1992) found in the lower Spencer Gulf, South Australia, that 30% of Great White Sharks sighted had evidence of a previous encounter with commercial fishing gear. These, of course, were the fish that had survived their encounter with fishing equipment.

A further direct threat to the Great White Shark is from sports fishing. Big game sports fishers such as Alf Dean and Bob Dyer from the 1950s, and the film 'Jaws' in the 1970s, led to a dramatic increase in game fishing for this shark (Ellis and McCosker 1991). This direct targeting of Great White Sharks, together with developments in fishing equipment and growth in human population and affluence, is likely to have increased its mortality rate in recent decades. While some sports fishers will release alive the white sharks that they target, others travel long distances in order to target this species as a trophy. Such trophies (mainly jaws and teeth) will often be imported to the recreational fisher's home country.

Inadequate population data means that it is almost impossible to know what percentage of the shark population is being killed, and what chances it has to recover from these losses. In light of this lack of data, it is imperative that precautionary measures be considered in assessing this proposal. Finally, inadequate protective legislation on a global scale, lack of local enforcement where protective legislation is in place, and disregard of protective measures all form significant threats to shark population numbers (Compagno *et al.* 1997).

3. Utilisation and Trade

3.1 National Utilisation

Some of the uses for sharks species in general include meat, skins, organs, and tissues for human consumption, liver oil extracted for vitamins, carcass used for fishmeal and fertiliser, skin for leather, cartilage for medicines, fins for shark-fin soup and even meat or small specimens for fish bait. Information regarding the utilisation of Great White Sharks in particular is often limited, as national fisheries statistics usually do not include this species, or as it is hard to differentiate from other shark by-products (Rose 1996). However, Great White Shark is known to be used for leather (but is not necessarily a preferred species) and its liver oil has generalised uses (Rose 1996). As noted above, the most prized products of the Great White Shark are its teeth and jaws, particularly for sale to tourists and tourist shops, and the status that comes from its capture. Jaws from a Great White Shark caught in New Zealand were recently purchased by a UK collector, who also had offers for jaws from animals caught off Chile and Mexico (Fergusson *et al.* 1996).

There is evidence of the existence of an international trade in jaws and teeth through the Internet. The Internet makes international illegal trade easier. Frequent and regular advertisements soliciting Great White Shark parts in Australian Fishing Magazines also point towards the possibility of an illegal trade within Australia, with illegal exports likely.

3.2 Legal International Trade

It is difficult to ascertain the current level of trade occurring in Great White Shark products. In many cases, shark products are not identified down to species level. There is also a significant amount of misreporting of trade. For example, in 1993, South Africa recorded no export of shark fins to Taiwan, whereas Taiwan records show 3.28 tonnes of shark fin imported from South Africa.

The illegal trade in fins contributes to a further underestimate in trade figures. The shark fin market is very competitive, with criminal gangs involved, and a proportion of fins is traded despite being illegal exports (Smale 1996).

The increasing trade in shark fins is reflected in FAO records, where international shark fin imports were recorded at 31 tonnes in 1980, and 335 tonnes in 1990, with the average value also increasing over this period (Stoessell 1993). Hong Kong fin traders have indicated during some surveys that they prefer Great White Shark fins to those of other species (Lai Ka-Keong 1983), while in Taiwan they are considered of medium grade (Chen 1996). Grading of shark fins depends on their size, thickness and their fin-needle content (Lai Ka-Keong 1983). The quality and quantity of fin needles differ between species, and so do their prices and grades. Higher

grades demand higher prices and create a greater incentive to supply. As Hong Kong is an important importer, exporter, re-exporter and processor of shark fins, the way they grade Great White Shark fins is significant. The fins are also known to be in trade in Singapore (Rose 1996). Generally, however, Great White Shark fins in trade are not identified, especially in customs coding, and often imports and exports of shark fins are not recorded at all (Rose 1996). In South Korea, Great White Shark meat is reportedly the most valuable meat from shark species, with wholesale prices of US$7.60 per kilogram for class A meat and US$3.20 for class B (Parry-Jones 1996).

3.3 Illegal Trade

It is thought that an illegal trade in jaws may exist (Compagno 1996 *in* Marshall and Barnett 1997), with parts being sourced from nations where they are protected. For example, "It is believed that curio or marine specialty shops throughout the EU sell or import shark products such as teeth and preserved jaws. An avid collector of preserved shark jaws, vertebrae and other body parts has imported these into the UK from North and South America" (Fergusson 1996 *in* Fleming and Papageorgiou 1997). There is also reports from cage-dive operators in South Africa that some local fishermen are killing Great White Sharks at sea despite the shark's protected status, removing their jaws and fins, and selling them to East Asian flagged longliners (IUCN Shark Specialist Group 1998). Most range states do not regulate the harvest and trade in Great White Shark products. Great White Sharks are however still caught and traded in States with legislative protection for the species. The States include the major range States for the species.

3.4 Actual or Potential Trade Impacts

With a growing trade generally in shark fins, and a high value for shark curios, especially for the larger specimens, Great White Sharks are potentially under increasing threat as a direct result of trade.

3.5 Captive Breeding or Artificial Propagation for Commercial Purposes

It has thus far proved impossible to keep Great White Sharks in captivity for any significant period of time. This is due to many constraints including the difficulties associated with capture, transport (it must keep moving in order to breathe), its size and rarity, sensitivity to slight electrical impulses and its temperament in captivity. The longest a Great White Shark has been held in captivity was three days (Ellis and McCosker 1991). Captive breeding is thus not a viable option in the near future.

4. Conservation and Management

4.1 Legal Status

4.1.1 National

South Africa established the precedent for domestic protection of Great White Shark, when it prohibited the intentional killing or sale of the species on 11 April 1991 (Rose 1996). Namibia followed South Africa, by becoming the second nation to protect the Great White Shark in 1993.

In Australia, the Great White Shark was listed as vulnerable under the *Environment Protection Biodiversity Conservation Act, 1999*, and is therefore protected in Commonwealth waters. It is also protected under fisheries legislation in the waters of all States and Territories of Australia. The Great White Shark has been listed as 'vulnerable' on the threatened species legislation of New South Wales, South Australia, Victoria and Tasmania.

In the US, the species first received temporary legal protection in California in 1993; this was confirmed under state legislation in 1997. It is also protected in Florida State waters (Camhi et al 1998). The Magnuson-Stevens Fishery Conservation and Management Act is the primary domestic legislation governing management of U.S marine fisheries. Until recently, Atlantic sharks (including Great White Sharks) were managed under a 1993 Fishery Management Plan (FMP) which permitted limited harvest of Great White Sharks. Commercial catches were prohibited throughout the US Atlantic and Gulf coast federal waters from 1997 (although recreational catch and release is still permitted). Acting under the authority of the Magnuson-Stevens Act, the U.S Secretary of Commerce, through the U.S National Marine Fisheries Service, replaced the 1993 shark FMP with a new policy that covered Atlantic tunas, swordfish, and sharks in April 1999. This new FMP continues the prohibition on the landing and sale of Great White Shark throughout its range in U.S waters of the Atlantic ocean and adjacent seas (U.S Fish and Wildlife Service 1999). New Zealand has a ban on commercial targeting of Great White Shark, though the sharks may be sold if taken as by-catch (National Institute of Water and Atmospheric Research Ltd, New Zealand). Malta protected the Great White Shark in 2000 and is still the only Mediterranean State to have ratified the listing of this species on Appendix II of the Barcelona Convention in 1995.

4.1.2 International

In 1996 the World Conservation Union (IUCN) listed the Great White Shark as Vulnerable on its Red List of Threatened Species. This was confirmed on the Red List of 2000.

There is an increasing volume of sharks caught for food and other shark products. Twenty-six countries now report over 10,000 mt of shark catch. Of these, only United States, New Zealand and Australia have domestic arrangements for shark management or research programs.

The International Plan of Action on Sharks was produced in 1998 by the FAO but few of its member countries have produced national action plans. Australia currently has a draft National Plan of Action on Sharks.

There are no international trade regulations on Great White Sharks and no international agreements to cooperate on Great White Shark conservation.

4.2 Species Management

4.2.1 Population Monitoring

South Africa has informed Environment Australia that there are a number of research projects currently underway in parts of Africa that aim to help our understanding of the rate of mortality and population size of the Great White Shark. However, a lack of uniformity between the projects, and possible antagonisms between research groups means that the projects are restricted to smaller sample groups from which it is difficult to draw conclusions (Natal Sharks Board). The Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO) is currently studying the migration, biology, and abundance of the Great White Shark. While the majority of this work is occurring in South Australia, studies are extending to other Australian waters. There is also detailed research underway on the Californian coast of the USA.

4.2.2 Management Measures

In Australia, Environment Australia is drafting a National Recovery Plan for the species (under the *Environment Protection Biodiversity Conservation Act, 1999*), and the CSIRO project mentioned above may also establish a basis for Great White Shark conservation and management. Some of the management measures recommended in the draft National Recovery Plan for the Great White Shark include developing and trialing of non lethal shark control alternatives to beach meshing and drumlines with a view to phasing out bottom set shark netting programs of shark control and regulating for the management of shark finning. Recovery Plans are also in development in Victoria, New South Wales, South Australia and Tasmania.

The April 1999 U.S shark/tunas/swordfish FMP (mentioned previously) contains several habitat conservation initiatives for coastal and offshore habitats utilised by Great White Sharks. These include ways to mitigate the impact of fishing gear, marine sand/minerals mining, offshore oil and gas operations, coastal development, dredging and disposal of dredge material, agriculture, aquaculture, navigation, marinas and recreational boating, and ocean dumping. This FMP bans the landing and sale of Great White Shark in the U.S species range, mandates detailed logbook reports from commercial shark fishermen, and limits Great White Shark sportfishing to catch and release (U.S Fish and Wildlife Service 1999).

In 1994, the 9th Conference of the Parties (COP) to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) adopted a Resolution (Res.Conf. 9.17) on the Biological and Trade Status of Sharks in response to growing concerns that some shark species were overexploited and threatened through an increasing international trade. *Inter alia*, this Resolution requested FAO and other organisations to establish programmes to collate biological and trade data on sharks.

In response to the issues highlighted during implementation of the CITES Resolution the FAO has prepared an International Plan of Action for the Conservation and Management of Sharks (IPOA-SHARKS) which was adopted at the 23rd meeting of the FAO Committee on Fisheries (COFI) in 1999. The objective of the IPOA-SHARKS is to ensure the conservation and management of sharks and their long-term sustainable use (FAO Fisheries Department 1999). The plan requires States concerned with the management and conservation status of shark species, to actively identify and report on species-specific biological and trade data on sharks caught in their waters and by their vessels in foreign waters. It also encourages states to adopt, by the COFI meeting in February 2001, a National Plan of Action for the conservation and management of shark stocks *(Shark-plan)* if

sharks are regularly caught in their waters, or by their vessels. Only a small number ie 17 of the 125 shark fishing states are known to have started the development of a national plan of action.

4.3 Control Measures

4.3.1 International Trade

There are no international trade regulations on Great White Sharks and no international agreements to cooperate on Great White Shark conservation.

4.3.2 Domestic Measures

While there are protective measures in place in Australia, South Africa, US Federal and some state waters, Namibia and Malta, the control measures in place have, in some cases, limited impact, evidenced by the fact that shark teeth and jaws are still freely available from California and South Africa, despite the current trade bans. (Fergusson *et al.* 1996).

5. Information on Similar Species

The jaws and teeth of the larger individuals of Great White Shark are distinctive and easily identified by a non-expert. A non-expert can identify the jaws of smaller Great White Sharks, though there is the potential for some confusion with other coastal shark species, especially tiger sharks.

The fins of large specimens of this species are most easily confused with the fins of the Whale shark and Basking shark. A large fin is almost certainly from one of the three species. The fins of smaller individuals of the species may potentially be confused with other coastal shark species. To date identification sheets have been prepared for the Great White Shark and Basking Shark.

Appendices

A. Range States

The range states for the great white shark are:

Western Atlantic: Newfoundland (Canada) to Florida (U.S.A.)Bahamas, Cuba, Northern Gulf of Mexico, Brazil and Argentina. Eastern Atlantic: France to Mediterranean, Madeira, Canary Islands, Senegal, Ghana, Congo, Liberia, Western Cape Province, South Africa. Western Indian Ocean: South Africa, Kenya & other coastal states, Seychelles Islands, Red Sea. Western Pacific: Siberia (Russia), Japan, the Koreas, China, Bonin Islands, the Philippines, Indonesia, Australia (Queensland, New South Wales, Victoria, Tasmania, South and Western Australia), New Zealand, New Caledonia. Central Pacific: Marshall Islands, Hawaiian Islands. Eastern Pacific: Gulf of Alaska to Gulf of California, Panama to Chile (Food and Agriculture Organisation of the United Nations 1999).

Attachments

Attachment B Commonwealth legislation
Environment Protection Biodiversity Conservation Act 1999
Wildlife Protection (Regulation of Exports and Imports) Act 1982.

Attachment C. Great White Shark Identification Sheets

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