CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Inclusion of *Carcharodon carcharias* in Appendix II with a zero annual export quota.

B. Proponent

Australia and Madagascar.

C. Supporting statement

– White sharks (*Carcharodon carcharias*) are very rare, large, active apex predators that are mainly recorded in temperate coastal waters, although the species has an almost global distribution. They are usually encountered on the continental shelf, often very close to shore near pinniped colonies, some of which are important seasonal aggregation sites for white sharks. Despite a scarcity of records from the high seas, recent scientific research has demonstrated that adults spend most of the year in the oceanic environment and can migrate across ocean basins. Juveniles remain closer to shore, but also undertake very long-distance coastal migrations, crossing national boundaries.

– White sharks are particularly slow growing, late maturing and long-lived with a long generation period, small litter size and low reproductive capacity. The productivity ($r_{msy}$) of the white shark, 0.04 to 0.056 (4 to 5.6% annual population increase), is lower than that of many more abundant large sharks. These characteristics make white sharks particularly susceptible to exploitation. Their habit of aggregating at coastal locations and inquisitive nature make them behaviourally as well as biologically vulnerable to target commercial and recreational fisheries.

– The rarity of white sharks means that catch records are rare and population trend data scarce. All data series available (catch per unit effort and catches), however, demonstrate either significant population declines over time or stability (no recovery), even in areas where the species has long been protected. The species has been on the IUCN Red List of Threatened Species for many years.

– White sharks are listed on several international and regional fisheries and wildlife agreements and legally protected in some range states. Sustainable harvesting of such a rare and low-productivity species would be extremely difficult (if not impossible) and would require highly precautionary management, but there is still no national or regional management of fisheries for the species, despite its legal status. The lack of trans-boundary management programmes (essential for a highly migratory species) hampers national conservation and management actions for white sharks.

– White sharks are targeted commercially and by recreational fishers for their highly valuable jaws and teeth, also fins. These products enter international trade. Illegal national and international trade in white shark teeth and fins has been reported. An identification guide is available for teeth and fins, and a highly accurate low cost DNA test can be used, if necessary, to confirm visual identifications.

– An Appendix II listing is proposed for the white shark in accordance with Article II, paragraph 2(a). It meets the criteria in Resolution Conf. 9.24 (Rev. CoP12) criteria A and B i) and ii) of Annex 2a (AC19 Doc. 9) because of the significant and ongoing population declines reported in literature and unpublished data.

– The white shark meets FAO's recommended guidelines for the listing of commercially exploited aquatic species. It lies well inside FAO's lowest productivity category of highly vulnerable species (those with an intrinsic rate of population increase of $< 0.14$ and a generation time of $> 10$ years). Notably some white shark population declines have also exceeded the qualifying

level for consideration for Appendix I listing (a decline to 20% of historic baseline). There is no reason to believe that other stocks are not similarly or more seriously depleted.

– An Appendix II, zero quota listing for the white shark would help ensure that exploitation of this globally threatened species is regulated and monitored and that international trade is not detrimental to its survival. It would also contribute to the implementation of national conservation and management measures, the FAO International Plan of Action for the Conservation and Management of Sharks, UN Fish Stocks Agreement, and the Convention for the Conservation of Migratory Species.

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, 1810b. ?*Squalus (Carcharhinus) lamia* Blainville, 1816. *Carcharias verus* Cloquet, 1817. ?*Squalus (Carcharhinus) lamia* Blainville, 1825. *Carcharias rondeletti* Bory de Saint-Vincent, 1829. *Squalus (Carcharias) vulgaris* Richardson, 1836. *Carcharodon smithii* Müller and Henle, in Agassiz, 1838. *Carcharodon smithi* Müller and Henle, 1839. *Carcharodon rondeletii* Müller and Henle, 1839. *Carcharias atwoodi* Storer, 1848. *Carcharodon capensis* Smith, 1849. *Carcharias vorax* Owen, 1853. *Carcharias maso* Morris, 1898. *Squalus (Carcharias) maou* Lesson, 1830 = *Carcharhinus longimanus* (Poey, 1861). *Carcharodon albimors* Whitley, 1939. (All from Compagno 2001.)

1.6 Common names:

| | |
|---|---|
| English: | White shark, great white shark, white pointer, white death |
| French: | Grand requin blanc, ami, lamea, lamie, lameo, le carcharodonte lamie, le grand requin, pei can |
| Spanish: | Jaquetón blanco, ca mari, marraco, salproig, salproix, gran tiburón branco |
| German: | Lamia, menschen fresser, menchenhai, merviel fras, weisshai |
| Hawaian Islands: | Niuhi |
| Italian: | Squalo bianco, carcarodonte, gagnia, 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 |
| Japanese: | Hohojirozame, hitokiuzame, oshirosame |
| Maltese: | Gab doll |
| Portuguese: | Tubarao branco |
| Red Sea: | Gench, Kersch |

1.7 Code numbers: ---

2. Biological parameters

White sharks are large, rare, warm-blooded apex marine predators. It is estimated that they mature at ~12–18 years and 4–5 m total length in females, 8–10 years and 3.5–4.1 m in males. Maximum length is 6.4 m (for females). Longevity estimates range from 23–60 years. Females give birth at two or three year intervals to litters of 2–10 pups (average ~7) 1.09-1.65 m long after an estimated 12-18 month gestation. There is no maternal care. Despite their large size, pup survival is estimated

to be low. The (theoretical) intrinsic rate of population increase for this species is about 4–5.6% (Cailliet *et al*. 1985, Francis 1996, 1997, Smith *et al*.1998, Wintner and Cliff 1999, Mollet *et al*. 2000.)

**Table 1.** White shark *Carcharodon carcharias* estimated life history parameters (from Francis 1996, 1997, Malcolm *et al*. 2001, Mollet and Cailliet 2002, Smith et al, 1998, Fergusson *et al*. in press)

| | |
|---|---|
| Age at maturity | Female: 12-18 years, male: 8-10 years |
| Size at maturity | Female: 400-500 cm, male: 350-410 cm total length |
| Longevity | ≥23-60 years |
| Maximum size | ≥640 (females larger than males) |
| Size at birth | 109-165 cm total length |
| Average reproductive age | > 20 years? |
| Gestation time | 12-18 months |
| Reproductive periodicity | 2 or 3 years |
| Average litter size | 2-10 pups/litter (average ~ 7) |
| Intrinsic rate of population increase | 0.04-0.056 |
| Generation time | 23 years |
| Natural mortality | 0.125 |

The white shark is widely distributed throughout temperate and sub-tropical regions of the world, and is occasionally found in cold and tropical areas. It is primarily found in the coastal and offshore areas of the continental and insular shelves and offshore continental islands, but recent research suggests that mature adults are probably pelagic in the open ocean for much of the year (Boustany *et al*. 2002, Anon. 2004). Focal points of abundance occur near pinniped colonies off the coasts of California (United States of America), the Cape Province of South Africa, and the Great Australian Bight. It is also commonly recorded from elsewhere in Southern Africa (from Namibia to Mozambique), temperate and subtropical Australia (particularly South Australia), New Zealand, Japan, Northeastern and Northwestern North America (from New Jersey to Maine and from Oregon to Baja California), Central Chile, and the Mediterranean Sea (Fergusson 1996, Fergusson *et al*. in press). Range states are listed and a distribution map (figure 1) provided in Annex A.

2.1 Distribution

Smaller specimens (below 3.5 metres) are mostly reported from temperate coastal waters, with newborn and 0+ young specimens (less than 1.76 metres in length,) 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 pregnant or postpartum white sharks from New Zealand, Australia, Taiwan (province of China), Japan and the Mediterranean Sea (Francis 1996) and Kenya (where a pregnant female was taken in 1996 in an artisanal fishery). This suggests that birth occurs in a wide range of temperate locations worldwide.

The white shark is capable of swimming long distances and for extended periods. Juvenile white sharks remain close to the coast while undertaking long distance migrations (movements of over 3,700 km have been reported along the South African and Mozambique coasts (Anon 2004)). Tagging studies and DNA analyses indicate that trans-oceanic movements can occur, including a shark tracked from California to the Hawaiian Islands (Boustany *et al*. 2002), a possible transit between South Africa and Australasia in male but not female white sharks and evidence of both male and female sharks migrating across the Tasman Sea between Australia and New Zealand (Pardini *et al.* 2001. Anon. 2004).

Research findings suggest that, although some sharks appear to be largely transient, many more are longer-term residents (Strong *et al.* 1992, Klimley and Anderson 1996, Bruce and Stevens 2003, Anon 2004). Individuals may spend several months close to feeding sites and are known

to return seasonally to feeding grounds. 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 re-sighted in their original location (Strong *et al.* 1992). In South Africa, a further ongoing study based on photo identification of individuals in Gansbaai, has identified 805 different white sharks of which 123 individuals have been re-sighted 1307 times over a period longer than one year. The longest recorded period between first and last observation is 5 years and 76 days (a male shark), with 20 different observations during that time (Scholl 2004). The re-sighting of individual white sharks at particular localities is well documented in other areas of the world (Bruce 1995, Anderson and Goldman 1996, Klimley and Anderson 1996, Boustany *et al*. 2002, Anon. 2004). A number of studies have also indicated that there is a degree of spatial segregation of white sharks by age and sex (Strong *et al.* 1992; Bruce 1992; Cliff *et al* 1989 *in* Bruce 1992, Anon. 2004), with females and juveniles frequenting areas that are generally more accessible to fishermen (Murphy 1996, Anon. 2004).

2.2 Habitat availability

Within its range states, the white shark is often reported close inshore to the surfline and even penetrates shallow bays in continental coastal waters. Along the continental shelf, white sharks generally occur near the surface or at the bottom rather than mid water depths (Goldman *et al.* 1996). Tagging studies have also demonstrated that white sharks will swim across ocean basins (Boustany *et al*. 2002, Anon 2004). While white sharks are widely distributed (see figure 1) they appear to be far more commonly reported in some locations, such as the coasts of South Africa, Australia and California, United States, than at others. Captures of pregnant females and neonate pups indicate that some areas could be important pupping grounds. Because coastal areas are a preferred habitat, the population level of the species or of its preferred prey could be affected by coastal habitat degradation, particularly in areas with dense human populations. Prey populations are also likely to be affected by overfishing in many parts of the world.

2.3 Population status

Limited data are available on the size of most white shark populations and/or sub-populations, or on catches and landings of the species. Overall, therefore, the size of the global population is unknown, but the species does appear to be uncommon to rare compared to most other large sharks, comprising from 0.03% (Springer 1963) to 0.5% (Baum *et al*. 2003) of shark records in commercial fisheries, or low to mid hundreds of individual sharks captured annually in a region. Most importantly: large, mature females represent only a very small proportion of the total population, although they are the most important breeding segment of the population. As discussed in section 2.6, it is this section of the population that is most seriously threatened by international trade.

Tagging studies of white sharks off the South African coast between 1989 and 1993 provide average estimates of 1,279 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. ESSS also estimated that around 500 white shark mortalities may occur due to human activities in Australian waters each year (Environment Australia 1996).

Recent tagging off South Australia (70-90 animals tagged) has demonstrated a recapture rate of 4-6% (Stevens and Bruce pers. comm., cited in Fergusson *et al*. in press). This is alarmingly high, in view of the fact that these tag returns came from animals killed in fisheries; more fatalities may not have been reported. Strong *et al*. (1996) and Bruce (1992) reported that 10-30% of free-swimming sharks sighted in South Australia carried remnants of fishing gear or showed signs of damage from capture. Both the Australian and African research demonstrates

at least short-term residency and site-affinity with some pronounced seasonality, coupled to more irregular nomadicity (Anon. 2004).

Pregnant females are rarely reported and 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. 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 (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).

2.4 Population and geographic trends

Estimates of population resilience or productivity ($r_{msy}$) for the white shark of 0.04 to 0.056, calculated by Smith *et al*. 1998 for the species rebounding from a severe population reduction to maximum sustainable yield, are extremely low for a marine fish species. This implies that the white shark is unable to withstand targeted exploitation for long before populations crash (or decline significantly), as indicated by the decline data presented below and summarised in Table 2. Notably, no data sets have been identified that indicate long-term stable or increasing trends (Wildlife Conservation Society, 2004).

**Table 2.** Summary of population trend data

| Year | Location | Data used | Trend | Source |
|---|---|---|---|---|
| 1986-2000 | Northwest Atlantic | US pelagic long line fleet catch data. Catch per unit effort. | 79% decline | Baum *et al*. 2003 |
| 1860-1990s | Adriatic Sea | All known records | >80% decline | Soldo & Jardas 2002 |
| 1966-1993 | KwaZulu Natal, South Africa | Annual catch per unit effort in beach protection nets | > 66% decline | Cliff *et al.* 1996 |
| 1978-1999 | KwaZulu Natal, South Africa | Annual catch per unit effort in beach protection nets | >60% decline (statistically significant) | Dudley 2002 |
| 1950-1999 | New South Wales, Australia | Annual catch per unit effort in beach protection nets | >70% decline since 1950 | Reid and Krogh 1992, Malcolm *et al*. 2001 |
| 1950-1970 | New South Wales, Australia | Average length of sharks caught in nets | Decline from 2.5m to 1.7m | NSW Fisheries, 1997 |
| 1962-1998 | Queensland, Australia | Annual catch per unit effort in beach protection nets and drumlines | 60-75% decline since 1962 | Malcolm *et al*. 2001 |
| 1961-1990 | Southeastern Australia | Capture in sports fishery relative to other large sharks. | 95% decline | Pepperell 1992 |
| 1980-1990 | South Australia | Annual game fishing catch | 94% decline | Presser & Allen 1995 |

Lack of quantitative population data (the result of this species' rarity) also means that quantitative data on population trends are scarce. Comparative data of catch-rates and catch-per-unit-effort (CPUE) are sketchy or lacking for most of the white shark's range, although some regional figures are available. Useful long-term data sets (summarised briefly below) are

available from fisheries data in the Northwest Atlantic, beach meshing programmes in Australia and South Africa, sports fishing records in several States, and more 'anecdotal' information sets that indicate stock declines in recent years in North America, South Africa, Australia and the Mediterranean Sea. Since these are among the most important range areas of the white shark, these may also be representative of trends in other areas where the species is so scarce that inadequate data and inconsistent methodologies make it impossible to undertake detailed trend analyses.

Baum *et al*. (2003) have analysed logbook data from the US pelagic longline swordfish and tuna fleets in the Northwest Atlantic from 1986 to 2000, identifying an estimated 79% decline in CPUE during this period (95% CI: 59 to 89%; trend estimates are not very precise because the species is so rare compared with other large shark species). They found that catch rates declined in the three reporting areas where 80% of the catch of white sharks takes place, while no or very few white sharks have been reported in the other four areas since the early 1990s. No white sharks have been caught in the 4200 sets monitored since 1990 by the U.S. observer programs for pelagic longline fleets in two of those areas where observers had recorded 142 white sharks in 1986-1989.

Data from historical records of white sharks in the upper and mid eastern Adriatic Sea (Croatia) including entrapment of white sharks in tuna traps and other fishing gear, identifiable white shark attacks and reported observations of free swimming sharks, indicates an over 80% decline in the average number recorded annually over the last 130 years (Soldo & Jardas 2002). Average annual numbers reported were 0.9 - 1.6 sharks during each decade in the 1860s-1880s, falling to 0.0 - 0.3 sharks reported per year in the 1960s-1990s (figure 3). Reports of white sharks have declined to near disappearance during the past 40 year period despite considerable growth in tourism and resort development in the area, which have increased opportunities for sightings and interactions.

Declining catch rates in shark nets in Natal (which primarily take adolescent white sharks) have also been reported. A study off the KwaZulu-Natal coast between 1966 and 1993 (see figure 4) recorded a decline in 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). A more recent analysis (Dudley 2002, see figure 5) shows a further and statistically significant declining trend in CPUE between 1978 and 1999 (the species has been legally protected here since 1991) that becomes statistically non-significant when the effect of the yearly sardine run is taken into account.White sharks are also caught in beach meshing nets used in Queensland and New South Wales (Australia), where catch per unit effort has undergone an irregular but clear decline. Captures of white sharks in New South Wales beach nets (517 sharks captured from 1950-1999, with a 1970s peak corresponding to increased effort) *"have shown an almost unbroken decline since the commencement of meshing"* (Reid and Krogh 1992). Concurrently, CPUE has fallen from about 3.5 to < 1 sharks/1000 net sets (> 70%) in the same period (see figure 6; Malcolm *et al*. 2001). Average length of white sharks caught in New South Wales has also decreased, consistent with a decline in stock size and reduced survival of adults (Anon. 1996). The average length of white sharks caught during 1950-70 was 2.5m, falling to 2m in 1970-90 and to 1.7 m in the 1990s (NSW Fisheries 1997). The Queensland Shark Control Program started in 1962 and had caught 631 sharks in nets and on drum-lines by 1998 (Malcolm *et al*. 2001). CPUE is highly variable but has substantially decreased over time by about 60-75% (figures 7 and 8).

Observations of sports fishery captures in Southeastern Australia from 1961 to 1990 indicate that the catch ratio of white sharks to other large sharks (primarily shortfin mako, blue, tiger and, until 1979, grey nurse) declined from 1:22 in the 1960s (4.5% of catch), to 1:38 (2.6% of catch) in the 1970s and 1:651 (0.15% of catch) in the 1980s (Pepperell 1992), a 96% decline in relative abundance. South Australian game-fishing catches averaged around 25 white sharks per year in the 1950s, declining by 94% to an average of 1.4 sharks per year in the ten years to 1990 (Presser and Allen 1995). The recent increase in coastal human populations may have resulted in increased fishing pressure on white sharks, hence these observed population declines, which are also backed by anecdotal reports of declines in recent years from South Australian fishers and divers (Bruce 1992; Strong *et al.* 1992). Other possibilities are that the

decline reflects a reduction in effort (Bruce 1992), shifts in angling further from white shark habitat (Pepperell, 1992), changes in fishing equipment or techniques, changes in the abundance of other sharks, or an increased concern for white shark conservation. Commercial bycatches off Australia may be the largest cause of mortality to Australian white sharks now that the species is legally protected (J.D. Stevens and B. Bruce pers. comm. to Environment Australia).

Studies indicate possible natural fluctuations in 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 white shark abundance from shark nets along the KwaZulu-Natal coast, peaking at four to six year intervals (see figure 4). They do not, however, consider natural fluctuations responsible for the decline over recent decades (Cliff *et al.* 1996); indeed natural fluctuations in population numbers would not be possible at this short time scale for a species with such a low intrinsic rate of population increase.

The above and other evidence of declining populations in many areas are reflected in the listing of 'Vulnerable' globally on the IUCN Red List of Threatened Species (www.redlist.org); see also section 4 below. The rationale for the IUCN Red List assessment (IUCN 2000) 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 may be proven accurate for this shark as further data are collated*." Several regional Red List assessments are currently in preparation.

2.5 Role of the species in its ecosystem

The white shark, as an apex predator, is presumed to play an important role maintaining the stability of the marine ecosystem by, among other things, keeping prey populations in check. The diet of 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). Removal of large predators from the ocean does not necessarily result in increased populations of their prey and other commercially important species lower down the food chain; indeed, just as on land, the reverse may be true. Findings from ecosystem modelling (Stevens *et al*. 2000) show that in certain ecosystems the depletion of apex predator sharks can have negative effects on other species directly or indirectly through the food web. It is difficult to predict accurately what impact a continued decline of the white shark may have on the ecosystem, but, "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).

2.6 Threats

The major impacts on white shark populations are the result of human actions, including:

i) Targeted sports fisheries for game fish records (the aim is to capture the largest animals) and trophies (jaws and teeth).
ii) Opportunistic targeted commercial fisheries for curios (jaws and teeth, which are particularly valuable when taken from the largest, scarcest animals in the population), and other products (particularly fins).
iii) Incidental capture in commercial fisheries, which generally utilise the most valuable products (jaws and fins) even if the remainder of the carcass is discarded.
iv) Artisanal fisheries.
v) Bather protection programmes.
vi) Persecution by other water users (including fishers and fish farmers).
vii) Degradation of the shark's habitat.

viii) Decline in prey abundance due to overfishing.
ix) Disturbance arising from poorly regulated ecotourism operations (possible in some areas).

Compagno *et al*. (1997) also identified the following significant threats to white shark populations: "inadequate protective legislation on a global scale, lack of local enforcement where protective legislation is in place, and disregard of protective measures." This is exemplified by the widespread failure to implement the UN FAO International Plan of Action for the Conservation and Management of Sharks (see Reports of the 18th and 19th meetings of the Animals Committee, and Section 4 below).

As noted above, the biological characteristics of white sharks mean that this species is naturally rare and has a very low intrinsic rate of population increase. This minimises the sustainable yield that may be obtained from any population and makes the species highly susceptible to population depletion as a result of unsustainable rates of harvest and other anthropogenic factors. These animals are also bold and inquisitive in their approach to vessels and fishing gear, which may make them an easy opportunistic target. They may also be targeted when, because of this behaviour, they become a nuisance to fishing operations (Bruce 1992). It is important to note that the population declines described in the previous section were the result of the removal of only small numbers of animals (tens to low hundreds annually).

2.6.1 Target sports fisheries

The publicity gained by some of the earliest big game sports fishers in the 1950s and the film 'Jaws' in the 1970s led to a dramatic increase in interest in game fishing for this shark (Ellis and McCosker 1991), particularly the largest individuals. This direct targeting of 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 release alive the white sharks that they target, sometimes after tagging them, post-release mortality has not been studied. Other sports anglers will undertake expensive international travel in order to target and kill the largest available specimens of this species, often retaining and exporting trophies in the form of jaws and teeth (Anon. 2004). Sports fisheries are thought to kill tens to low hundreds of white sharks annually worldwide, with peaks when local aggregations are targeted (records are incomplete in most regions).

2.6.2 Target commercial fisheries

The overall low abundance of white sharks means that target commercial fisheries are uncommon and usually opportunistic, targeting aggregations when these are located. Because white sharks, though generally rare, appear to show site fidelity, 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, California (United States) suggested that the removal of just four white sharks greatly reduced and possibly eliminated for a while the entire local population of white sharks (Ainley et al. 1985). Mortality levels in target commercial fisheries are probably similar to those in sports fisheries, with irregular peaks when aggregations are discovered and targeted.

2.6.3 Incidental commercial and artisanal fisheries, and marine farming operations

It is often difficult to distinguish between target and bycatch fisheries for white shark products and the distinction is not always useful. This is because the high value of shark products promotes the utilisation of incidentally captured white sharks and discourages avoidance or release of bycatch, sometimes despite legislation prohibiting this practice. The white shark is an incidental catch of fisheries that use longlines, hook-and-line, fixed bottom gillnets, fish traps, herring weirs, trammel nets, harpoons, bottom and pelagic trawls, and purse seines (Compagno 2001). Bycatch mortality is high in nets, but much hook and line bycatch can be released alive if the species is legally protected or there is

no market for the product. Strong et al. (1996) reported that 10% of white shark observed in South Australia carried short remnants (less than 2 metres) of longlines and gill nets. Bruce (1992) found that 30% of white sharks sighted in the lower Spencer Gulf, South Australia, had evidence of a previous encounter with commercial fishing gear. These, of course, were only the fish that showed signs of having survived an encounter with fishing equipment. Overall, it is estimated that low to mid hundreds of white sharks are killed annually as bycatch in each major region of the species' range (e.g. an average of 400 white sharks per year was reported in bycatch of the US pelagic fleet in the northwest Atlantic, from the equator to $50^0$N by Baum et al. 2003). Artisanal fisheries are largely unmonitored and unrecorded and levels of white shark catch unknown, but several reports of their capture in artisanal fisheries exist (Cliff et al. 2000. Zuffa et al. 2002). Fins, jaws and teeth are sold for cash income, the carcass usually utilised for subsistence. Finally, the recent and increasing development of tuna cage farming operations around the world is already leading to white shark mortality, when they brake into the cages to feed and are killed by cage operators (Gorton 2003).

2.6.4 Bather protection programmes

White sharks are one of the potentially dangerous large sharks intentionally targeted by beach meshing programmes for bather protection in South Africa, Australia and New Zealand. These programmes use nets or baited hooks on drumlines to reduce shark populations locally in order to reduce the chance of bathers and sharks coming into contact with each other in the water. The declining catches of this species in beach meshing programmes is described in section 2.4. Compagno (1996, in Marshall and Barnett 1997) documented white shark mortality of 80% from entanglement and drowning in beach-meshing operations in Natal, South Africa (surviving sharks are tagged and released alive in this programme and in New South Wales). These programmes take 10-50 white sharks annually, worldwide (Anon. 2004).

2.6.5 Habitat deterioration, persecution, and prey depletion

Increasing human population and fisheries activities in coastal areas may lead to degradation of important inshore feeding and reproduction habitat for white sharks, as well as depletion of important prey species. The proximity of 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 activity. This innate behaviour increases the likelihood of being killed by humans, intentionally or not. The negative image of the 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 white shark feeding and breeding areas to coastal human populations. Examples include campaigns to kill white shark after shark attacks or in anticipation of such attacks, and disregard of conservation and management measures.

2.6.6 Ecotourism operations

The high-profile image of the white shark has fostered the development of ecotourism operations to observe white sharks in their natural environment by cage diving or from the deck of vessels in several parts of the world (see section 7.2), but the long-term effects that these activities might have on white shark populations are currently unknown. The continuous luring of individual sharks with chum, the occasional ingestion of bait used to attract them to the boat, and habituation to humans could create long term problems for white shark populations. Environmental impact assessments prior to the establishment of ecotourism operations have generally been lacking. Very few countries have regulations to control ecotourism operations and safeguard the white shark populations and aggregation sites affected. Where such regulations do exist (e.g. South Africa, California), these are not always followed or enforced.

3. Utilization and trade

Most shark species are utilised for their meat and fins, sometimes also cartilage, liver oil and hides. The latter are less important white shark products than the teeth and jaws, which have a particularly high economic value (Compagno *et al.* 1997). A jaw of a white shark from Gansbaai, South Africa, recently recovered after being stolen, was valued at USD 50,000. Small jaw sets may be sold for as much as USD 12,500–15,000, and individual teeth for USD425–600 (IUCN Shark Specialist Group 1998, Anon 2004). There is also reportedly a commercial market for neonates (Camhi *et al*. 1998). Fishers generally target the larger, reproductively active sharks for their teeth and jaws, which may have a disproportionately large impact on population numbers, by negatively affecting reproductive potential (Wildlife Conservation Society, 2004). Increased scarcity of white sharks is considered inevitably to result in significantly increased economic value of their jaws and teeth, possibly leading to increased targeting and over-exploitation, as well as growth of a black market for these highly profitable products (Compagno *et al.* 1997).

3.1 National utilization

There is only limited species-specific information regarding utilisation of white sharks, because national fisheries statistics rarely include this uncommon species even if others are identified to species level (and the latter is still unusual). However, white shark is known to be used for fins and leather (but is not necessarily a preferred species for the latter purpose) and its liver oil has generalised uses. The meat is also highly valued in some States (Rose 1996). In South Korea, white shark meat is reportedly the most valuable shark meat with wholesale prices of USD 7.60 per kilogram for class A meat and USD 3.20 for class B (Parry-Jones 1996). Higher prices create a greater incentive to supply the product. As already noted, because of the status that comes from its capture, the most prized products of the white shark are its teeth and jaws, particularly for sale to tourists and tourist shops and increasingly through the internet.

3.2 Legal international trade

It is difficult to ascertain the current level of international trade occurring in 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. In the case of the white shark, jaws and teeth are easy to distinguish and may readily be identified in trade. For example, jaws from a 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). This trade is thought to have been legal, provided that the permits required by exporting and importing states had been obtained. The UNEP World Conservation Monitoring Centre recorded five international shipments of white shark products in 2002 (UNEP-WCMC 2003), following the listing of the white shark by Australia on Appendix III. These shipments are variously described as 'bones', 'skulls' (these categories may have been jaws) and 'teeth' (300 in one shipment).

3.3 Illegal trade

Most range states do not regulate the harvest and trade in white shark products. White sharks are, however, still caught (poached) and traded in States with legislative protection for the species. This includes many of the major range States for the species. This illegal trade concerns the highest value products, which are also the easiest to dry and ship: jaws, teeth and fins. There is, in particular, evidence of the existence of a thriving international trade in jaws and teeth through the Internet, which makes illegal international trade easier (Anon. 2004). Regular advertisements solicit white shark parts in Australian fishing magazines, pointing towards the possibility of an illegal trade within Australia, with illegal exports likely. Compagno (1996 *in* Marshall and Barnett 1997) and Fergusson (1996 *in* Fleming and Papageorgiou 1997) considered that an illegal trade in jaws might exist, 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 op. cit.). There are also reports from cage-dive operators in South Africa that some local fishermen are killing 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). The suspicion that white sharks poaching occurs in South Africa were recently confirmed when a local curio trader was convicted for selling white shark teeth, an illegal activity under current legislation that protects the species in South African waters (Gosling 2003).

3.4 Actual or potential trade impacts

The growing demand for white shark curios and trophies and the highly valuable market for shark fins, all of which value the largest, most vulnerable and least numerous section of the population of this rare species, poses an increasing threat to white shark populations as a direct result of trade.

3.5 Captive breeding or artificial propagation for commercial purposes

White sharks cannot be kept in captivity for more than a few days; no captive breeding exists or is likely.

4. Conservation and management

4.1 Legal status

4.1.1 National

South Africa established the precedent for domestic protection of white shark, when it used fisheries legislation to prohibit the intentional killing or sale of the species on 11 April 1991 (Rose 1996). Namibia followed, becoming the second nation to protect the white shark in 1993.

In Australia, the white shark was listed as vulnerable under the *Environmental 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 and listed as 'vulnerable' on the threatened species legislation of New South Wales, South Australia, Victoria and Tasmania.

In the United States, 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). Commercial catches of white sharks were prohibited throughout the US Atlantic and Gulf coast federal waters from 1997 (although recreational catch and release is still permitted) when the species was identified as highly susceptible to overexploitation (NMFS 1999).

Malta protected the 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. New Zealand has banned commercial targeting of white shark, though they may be sold if taken as by-catch, and limited recreational catches because of concern that the white shark is not sufficiently productive to support target fisheries (Anon. 2004).

Recent scientific findings (Anon. 2004) demonstrating regular long-distance, trans-boundary movements of white sharks indicate that protective measures through national legislation may be an ineffective guarantee of the survival of the species throughout its range. Comprehensive and collaborative regional and international management is essential.

4.1.2 International

Australia listed *Carcharodon carcharias* on CITES Appendix III in October 2001. Trade records for 2002 are available from the UNEP World Conservation Monitoring Centre database (UNEP-WCMC 2003).

The Appendices to the Convention on Migratory Species (CMS) list migratory species that would benefit from conservation measures taken by Range States. In 2002, the Conference of Parties to CMS accepted Australia's proposal to add *Carcharodon carcharias* to both Appendix I (endangered migratory species requiring strict protection measures) and Appendix II (species with an unfavourable conservation status that would benefit from the implementation of international co-operative Agreements for their conservation and management). No information is available on implementation.

The UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks facilitates implementation of the provisions of the UN Convention on the Law of the Sea (UNCLOS) relating to the conservation and management of high seas fish stocks by establishing rules and conservation measures for high seas fishery resources. (UNCLOS is also complemented by the FAO Code of Conduct for Responsible Fisheries and the UN FAO International Plan of Action for the Conservation and Management of Sharks – see section 4.2.2.) Annex I (Highly Migratory Species) of UNCLOS lists "Oceanic sharks: … Family Isurida." Family Isurida is an old name for Family Lamnidae, including *Carcharodon carcharias*. The Fish Stocks Agreement has been in force since December 2001. It calls upon Parties to protect marine biodiversity, minimise pollution, monitor fishing levels and stocks, provide accurate reporting of and minimise by-catch and discards, and gather reliable, comprehensive scientific data as the basis for management decisions. It mandates a precautionary, risk-averse approach to the management of these species when scientific uncertainty exists. The Agreement also directs States to pursue co-operation in relation to listed species through appropriate sub-regional fishery management organisations or arrangements. No information is available on action to implement the conservation and management of species listed on Annex I of UNCLOS; no progress seems to have been made.

The Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean of the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, lists *Carcharodon carcharias* in Annex II, endangered or threatened species, which should receive full legal protection when the Convention is ratified. It is currently only ratified by Malta.

The Bern Convention on the Conservation of European Wildlife and Natural Habitats aims 'to conserve wild flora and fauna and their natural habitats, particular emphasis being given to endangered and vulnerable species'. Animal species listed in Appendix II, including the white shark (but in the Mediterranean only), must be strictly protected by the Parties, and the damage or destruction of their breeding sites prohibited. Parties are also encouraged to prohibit the possession and sale of strictly protected species, and listed species should, in due course, be included under the European Habitats Directive. The Convention is currently only ratified by Malta.

## 4.2 Species management

### 4.2.1 Population monitoring

Several research programmes are monitoring white shark populations and migrations in South Africa, Australia and the United States. The majority are studying short and long-range movements and migrations, identification of critical habitat, relative abundance and, in some cases, the identification of individuals through photographic techniques (Anon. 2004, Boustany *et al*. 2002, www.wcs.org/greatwhitesharks/, www.sharkresearch.org/, www.marine.csiro.au/research/tagging/whitesharks.htm). Some are also attempting to assess and monitor population size and temporal trends, but none are studying or assessing sustainable rates of exploitation from the wild populations.

### 4.2.2 Habitat conservation

Some marine protected areas cover important white shark aggregation sites (e.g. in California), but there are otherwise no specific measures in place for the conservation of their habitats, which are now known to include large high seas areas. Parties to the Bern

Convention (section 4.1.2) will have a mandatory obligation to protect white shark breeding sites in the Mediterranean, once the Convention is ratified.

4.2.3 Management measures

Implementation of the voluntary UN FAO International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks, adopted in 1999) has been very disappointing, as acknowledged in Resolution Conf. 12.6 and at recent meetings of the Animals Committee. The objective of the IPOA-Sharks is to ensure the conservation and management of sharks and their long-term sustainable use through the development of national Shark Management Plans. Very few shark fishing states have prepared Shark Plans, despite the repeated requests from FAO and CITES that they should do so.

It appears that the IPOA-Sharks is most unlikely to deliver regulation of fisheries taking white sharks at unsustainable rates, or the management or conservation of white shark stocks in the foreseeable future. Furthermore, no Regional Fisheries Management Organizations are known to be collecting data on white shark catches, planning or undertaking white shark stock assessments or planning to implement regional management of shared white shark stocks. Even if the IPOA-Sharks is ever fully implemented, CITES may still represent the only established, effective means of monitoring international trade at species level.

Recommended management measures in Australia's White Shark Recovery Plan (Environment Australia 2002) include *inter alia* reducing the impact of commercial fisheries and trade, as well as protecting critical habitat.

The United States' Atlantic Highly Migratory Species Fishery Management Plan (see 4.1.1 above) contains several initiatives for conservation of coastal and offshore habitats utilised by 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.

4.3 Control measures

4.3.1 International trade

The only international trade control measures for white sharks are those conferred by Australia's CITES Appendix III listing. The UNEP World Conservation Monitoring Centre (UNEP-WCMC) international trade records for 2002 include imports to the United States from Australia and South Africa.

4.3.2 Domestic measures

The white shark is legally protected in Australia, South Africa, US Federal and some state waters, Namibia and Malta. These control measures have, in some cases, only a limited impact, as evidenced by the fact that shark teeth and jaws are still freely available from California, South Africa, and Australia despite the current protective legislation (Fergusson *et al.* 1996, Anon. 2004, UNEP-WCMC 2003). Illegal fishing of white sharks during 2003 and the sale of their teeth, jaws and fins has been detected and prosecuted in a couple of cases in the US (Paul Raymond, NOAA, pers. comm. Feb 2004). Furthermore, poaching in South Africa is a problem that needs to be addressed by the local authorities (Gosling 2003).

5. Information on similar species

The jaws and teeth of the white shark, which enter international trade as curios, trophies and ornaments, are extremely distinctive. They are easily identified by non-experts from the triangular shape of the teeth and the characteristic strong serrations on their margins. Other species with similar-shaped teeth have fine serrations on the margins and smaller teeth. Teeth of the bull shark

*Carcharhinus leucas* are most likely to be confused with those of white shark, but are still readily identifiable (see figure 9).

The fins of large specimens of white sharks could be confused, on the basis of their size, with the fins of the whale shark (*Rhincodon typus*) and/or basking shark (*Cetorhinus maximus*), both already listed in CITES Appendix II. Any very large fin is almost certainly from one of these three species. However, colouring patterns of the fins of these three species are an easy way to differentiate between them. The shape and colouring of fins from small white sharks is also very distinct from those of other coastal shark species.

Confirmation of visual identifications is possible with a recently developed, quick, simple and cheap method for the laboratory identification of white shark tissue, using a streamlined PCR technique for DNA analysis (Chapman *et al*. 2003). This enables the presence of white shark products to be determined unequivocally in shipments of fins, skins, meat or any other tissues, within less than 24 hrs.

6. Other comments

Consultation with 77 range States was undertaken in March 2004 by Australia and in April 2004 by Madagascar requesting comment by 18 April and 30 April 2004 respectively. As of 1 May 2004 comments had been received from Canada, Japan, Mexico, New Zealand, and United States of America. Further comments were also received after these dates from Algeria, Argentina and Monaco and have been included herewith [Comments received from all countries have been provided in conformity with Resolution Conf. 9.24 (Rev. CoP12), Annex 6, (see Annex C to this proposal)].

7. Additional remarks

7.1 Ecotourism and white sharks

Vessel-based ecotourism industries focused on viewing white sharks have developed in at least southern Australia, South Africa, California (United States), and off Isla Guadalupe (Mexico). It is likely that aggregations also occur and new industries could become established in other parts of the world (for example, Chile).

These commercial operations are very profitable. South Africa, which licenses 12 white shark cage-diving operators in three designated localities, generates significant revenue from foreign and domestic tourists that visit to see white sharks. A recent socio-economic study of the value of white shark ecotourism (domestic and international) to just one small fishing community identified sale of tickets for shark watching as the single largest source of income to the community from marine-based tourism (nearly 30 Million ZA Rand, USD 4 Million) exceeding receipts from whale watching, recreational fisheries, accommodation and the restaurant trade, without taking into account associated expenditure by white shark tourists (Hara et al. 2003).

It is clear that well-regulated non-consumptive ecotourism can yield greater profits to small coastal communities than can recreational and commercial fisheries for the species.

7.2 Assessment of the white shark against existing and proposed new CITES listing criteria

This proposal for the listing of the white shark on Appendix II of CITES is based on the following assessment of the species' biological status, using CITES listing criteria A and B(i) (namely '*It is known, inferred or projected that unless trade in the species is subject to strict regulation, it will meet at least one of the criteria listed in Annex 1 in the near future' and 'It is known, inferred or projected that the harvesting of specimens from the wild for international trade has, or may have, a detrimental impact on the species by: exceeding, over an extended period, the level that can be continued in perpetuity*)'. This is clearly demonstrated by: a) the trend data presented in section 2.4 and table 2 above, showing population declines of between 60% and 95% in the NW Atlantic, Mediterranean, and Southern Oceans, as a result of unsustainable fishing activity; b) a thriving international trade of high-value parts (jaws, teeth and fins) of this species, and c) the existence of illegal trade in areas where the species is protected. Furthermore, the species is more than 'likely to meet' Appendix I criteria if it is not

included on Appendix II; in fact it already does meet criteria A(i) and (v), namely '*The wild populations is small, and is characterised by* ***at least one*** *of the following I) an observed, inferred or projected decline in the number of individuals or the area and quality of habitat; or v) a high vulnerability due to the species' biology or behaviour (including migration)* and C (i) & (ii), namely a '*decline in the number of individuals in the wild, which has been either: i) observed as ongoing or as having occurred in the past (but with a potential to resume); or ii) inferred or projected on the basis of any one of the following: …….. levels or patterns of exploitation'*.

The CITES listing criteria have undergone a lengthy review, not yet completed when this proposal was drafted. Currently, proposed biological Criterion C for listing on Appendix I requires a marked decline in the population size in the wild, i) observed as ongoing, and ii) inferred or projected on the basis of levels or patterns of exploitation. The draft provides a 'general guideline for a 'marked historical extent of decline … a percentage decline to 5%-30% of the baseline, depending on the reproductive biology of the species.' The 'general guideline for a marked recent rate of decline is a percentage decline of 50% or more in the last 10 years or three generations, whichever is the longer.' The generation time for the white shark is given by Mollet and Cailliet (2002) as 23 years, (i.e. three generations = 69 years). Where quantitative decline data are available (table 2) these greatly exceed both guidelines.

It is quite clear that this species not only meets the criteria for listing on Appendix II.

7.3 Assessment of the white shark against FAO's recommended criteria for listing aquatic species

The FAO recommendations for criteria for listing commercially exploited aquatic species have been developed through a series of technical consultations and approved by FAO's Committee on Fisheries. They acknowledge that large, long-lived, late-maturing species with low fecundity are at a relatively high risk of extinction from exploitation (FAO 2000). Although FAO's recommendations have been taken into account in developing the new CITES listing criteria, they are also considered separately here.

FAO considers that productivity, as a surrogate for resilience to exploitation, is the single most important consideration when assessing population status and vulnerability to fisheries. The most vulnerable species are those with an intrinsic rate of population increase of $< 0.14$ and a generation time of $> 10$ years (FAO 2001). Life history data presented in table 1, Section 2, indicate that the white shark falls into FAO's lowest productivity category, with an intrinsic rate of population increase of 0.04-0.056, a generation time of 23 years, and natural mortality of 0.125. It therefore qualifies for consideration for Appendix I listing if the population has declined to 20% or less of the historic baseline (FAO, 2001). FAO (2001) further recommend that even if a species is no longer declining, if populations have been reduced to near (defined as from 5-10% above the Appendix I extent of decline) to the guideline above on extent of decline, they could be considered for Appendix II listing. The above pages have presented documented evidence of white shark population declines well in excess of these levels.

In summary, as well as meeting the criteria for listing in CITES Resolution Conf. 9.24 (Rev. CoP12) and its proposed revision, the white shark also meets the guidelines recommended by FAO for listing commercially exploited aquatic species.

8. References

Anderson, S.D. and K.Goldman.(1996) *Photographic evidence of white shark movements in California waters*. California Fish and Game 82:182-186.

Anonymous. 2004. White Shark *Carcharodon carcharias*: status and management challenges. Conclusions of the Workshop on Great White Shark Conservation Research. Wildlife Conservation Society, Central Park Zoo, New York, NY, USA. 20-22 January 2004. 7 pp.

Anonymous. 1996. National White Shark Meeting at the Sydney Aquarium, Darling Harbour, 9 September 1996. Record of Meeting.

Australia and United States of America (2000) *Inclusion of Great White Shark Carcharodon carcharias in Appendix I. Proponent: Australia and United States of America.* Eleventh Meeting of the Conference of the Parties, Kenya, 10 to 20 April 2000 IUCN Analyses Doc. No.:11.48

Ainley, D.G., R.P. Henderson, H.R. Huber, R.J. Boekelheide, S.G. Allen & T.L. McElroy. (1985). Dynamics of white shark/pinniped interactions in the Gulf of the Farallones. Memoirs of the Southern California Academy of Sciences 9: 109-122.

Baillie, J. and Groombridge, B. (1996). *1996 IUCN Red List of Threatened Animals*. IUCN Species Survival Commission.

Baum, J. K., R. A. Myers, D. G. Kehler, B. Worm, S. J. Harley, and P. A. Doherty. 2003. Collapse and Conservation of Shark Populations in the Northwest Atlantic. Science 299: 389-392

Boustany, A.M., S.F. Davis, P. Pyle, S.D. Anderson, B.J. Le Boeuf & B.A. Block. 2002. Expanded niche for white sharks. Nature 415: 35-36.

Bruce, B.D. (1992). Preliminary Observations on the Biology of the White Shark, *Carcharodon carcharia*s, in South Australian Waters. *Aust. J. Mar. Freshwater Res.* **4**3. 1-11.

Bruce, B.D. (1995). The protection of the white shark: A research perspective. *Southern Fisheries.* 3: 2. 11- 15.

Bruce, B.D. and Stevens, J.D. 2003. Site fidelity, residence times and home range patterns of white sharks around pinniped colonies. Interim Final Report to Environment Australia Marine Species Protection Program. CSIRO Marine Research, Hobart, Australia.

Cailliet, G.M., Natanson, L.J., Welden, B.A and Ebert, D.A. (1985) Preliminary Studies on the Age and Growth of the White Shark, *Carcharodon carcharia*s, Using Vertebral Bands. *Memoir*s. 9: 49-60.

Camhi, M. (1998). Sharks on the Line. A Statement By State Analysis of Sharks and Their Fisheries. *National Aububon Society, Living Oceans Progra*m. pp158. Islip, New York..

Camhi, M., Fowler, S., Musick, J., Bräutigam, A., and Fordham, S. (1998). *Sharks and their relatives. Ecology and Conservation. Occasional Paper* 20 of the IUCN Species Survival Commission.

Casey, J.G. and Pratt, H.L.Jr. (1985). Distribution of the white shark, *Carcharodon carcharia*s, in the western North Atlantic. *South. Calif. Acad. Sci., Mem.* 9: 2-14.

Chapman, D. D., D. L. Abercrombie, C. J. Douady, E. K. Pikitch, M.J. Stanhope & M. S. Shivji. 2003. A streamlined, bi-organelle, multiplex PCR approach to species identification: Application to global conservation and trade monitoring of the greatwhite shark, *Carcharodon carcharias.* Conservation Genetics 4**:** 415–425

Chen, H.K. (Ed) (1996). An overview of shark trade in selected countries of Southeast Asia. TRAFFIC Southeast Asia, Petaling Jaya. *In* 'The World Trade in Sharks: A Compendium of TRAFFIC's Regional Studies'. TRAFFIC Network Report.

Cliff, G., Dudley, S.F.J. and Jury M.R. (1996). Catches of White Sharks in KwaZulu-Natal, South Africa and Environmental Influences. *In* "*Great White Sharks: The biology of* Carcharodon carcharias" (Klimley, A.P. and Ainley, D.G. Eds.), pp 351-362. Academic Press Inc., California.

Cliff, G., S.F.J. Dudley & B. Davis. 1989. Sharks caught in the protective gill-nets off Natal, South Africa. II. The great white shark *Carcharodon carcharias* (Linnaeus). *South Afr. J. Mar. Sci.* 8: 131-144.

Cliff, G., Van Der Elst, R.P., Govender, A., Witthuhn, T.K. and Bullen, E.M. (1996). First Estimates of Mortality and Population Size of White Sharks on the South African Coast. *In* "*Great White Sharks: The biology of* Carcharodon carcharias" (Klimley, A.P. and Ainley, D.G. Eds.), pp 393-400. Academic Press Inc.,California.

Cliff, G., L.J.V. Compagno, M.J. Smale, R.P. Van Der Elst & S.P. Wintner. 2000. First records of white sharks, *Carcharodon carcharias*, from Mauritius, Zanzibar, Madagascar and Kenya. South African Journal of Marine Science 96: 365-367.

Compagno, L.J.V. 2001. *Sharks of the World. An annotated and illustrated catalogue of shark species known to date. Volume 2: Bullhead, mackerel and carpet sharks (Heterodontiformes, Lamniformes and Orectolobiformes). FAO Species Catalogue for Fishery Purposes* No. 1, Vol. 2. Food and Agriculture Organization of the United Nations, Rome.

Compagno, L.J.V., Marks, M.A. and Fergusson, I.K. (1997). Threatened fishes of the world: *Carcharodon carcharias* (Linnaeus, 1758) (Lamnidae). *Environmental Biology of Fishes* 50: 61-62.

Dudley, S. 2002. Shark catch trends and effort reduction in the beach protection program, KwaZulu-Natal, South Africa. Northwest Atlantic Fisheries Organization. Scientific Council Meeting - September 2002. NAFO SCR Doc. 02/124. 21 pp.

Ellis, R. and McCosker, J.E. (1991). *Great White Shar*k. Stanford University Press, Stanford, California.

Environment Australia. 1996. Advice to the Minister for the Environment from the Endangered Species Scientific Subcommittee (ESSS) on a proposal to add a species to Schedule 1 of the Endangered Species Protection Act 1992. Canberra.

Environment Australia. 2002. White Shark *Carcharodon carcharias* Recovery Plan. Environment of Australia, Commonwealth of Australia, Canberra.

FAO. (1999). International Plan of Action for reducing incidental catch of seabirds in longline fisheries. International Plan of Action for the conservation and management of sharks. International Plan of Action for the management of fishing capacity. FAO, Rome. 26 pp. URL: http://www.fao.org/fi/ipa/manage.asp

FAO. (2000). An appraisal of the suitability of the CITES criteria for listing commercially-exploited aquatic species. FAO Fisheries Circular No. 954. FAO, Rome.

FAO. (2001). Report of the second technical consultation of the CITES criteria for listing commercially exploited aquatic species. FAO Fisheries Report No. 667. FAO, Rome.

Fergusson, I. K. & IUCN Shark Specialist Group (1998) *Review of the Great White Shark Carcharodon carcharias URL:* http://www.zoo.co.uk/~z9015043/gws_conserv.htm

Fergusson, I.K. (1996). Distribution and Autecology of the White Shark in the Eastern North Atlantic Ocean and the Mediterranean Sea. *In* "*Great White Sharks: The biology of Carcharodon carcharias*" (Klimley, A.P. and Ainley, D.G. Eds.), pp 321-345. Academic Press Inc., California.

Fergusson, I.K., Compagno, L.J.V., and Marks, M. *In press*. White Shark *Carcharodon carcharias*. *In*:. Fowler, S.L., Camhi, M., Burgess, G.H., Cailliet, G.M., Fordham, S.V, Cavanagh, R.D., Simpfendorfer, C.A. and Musick, J.A. *In press*. Sharks, rays and chimaeras: the status of the chondrichthyan fishes. IUCN SSC Shark Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK.

Ferreira, C.A. and Ferreira, T.P. (1996). Population Dynamics of White Sharks in South Africa. *In* "Great White Sharks: The biology of *Carcharodon carcharia*s" (Klimley, A.P. and Ainley, D.G. Eds.), pp 381-391. Academic Press Inc., California.

Fleming, E.H. and Papageorgiou, P.A. (1997). *Shark Fisheries and Trade in Europe*. TRAFFIC, Europe.

Francis, M.P. (1996). Observations on a Pregnant White Shark with a Review of Reproductive Biology. *In* "Great White Sharks: The biology of *Carcharodon carcharia*s" (Klimley, A.P. and Ainley, D.G. Eds.), pp 157 - 172. Academic Press Inc., California.

Francis, M.P. (1997). Reproductive strategy of white sharks, *Carcharodon carcharias*. Shark News 9: 8-9.

Gadig, O.B.F. and Rosa, R.S. (1996). Occurrence of the White Shark along the Brazilian Coast. *In* "Great White Sharks: The biology of *Carcharodon carcharia*s" (Klimley, A.P. and Ainley, D.G. Eds.), pp 347-350. Academic Press Inc., California.

Goldman, K.J., Anderson, S.D., McCosker, J.E., and Klimley, A.P. (1996) Temperature Swimming Depths and Movements of a White Shark at the South Farallon Islands, California. *In* "Great White Sharks: The biology of *Carcharodon carcharia*s" (Klimley, A.P. and Ainley, D.G. Eds.), pp 111-120. Academic Press Inc., California.

Gordon, I. (1995). Great White Hunted. *Habitat Australi*a. Oct. 9-10.

Gorton, S. 2003. Shark examined. The Port Lincoln Times, Feb 4, 2003. http://portlincoln.yourguide.com.au/detail.asp?class=news&subclass=local&story_id=207306&category=General+News&m=2&y=2003

Gosling, M. 2003. Great White sharks under attack by curio pirates. Cape Times. Online Edition. October 17, 2003. http://www.flmnh.ufl.edu/fish/organizations/SSG/newsletter.htm. Last updated May 12. 1999.

Hara, M., Maharaj, I., and Pithers, L. 2003. Marine-based Tourism in Gansbaai: A Socio-economic Study. Department of Environmental Affairs, Internal report. South Africa.

IUCN (2000). Red List of Threatened Species. www.redlist.org

IUCN Shark Specialist Group (1998) *Shark News*: Newsletter of the IUCN Shark Specialist Group.

Klimley, A.P. and Anderson, S.D. (1996). Residency Patterns of White Sharks at the South Farallon Islands, California. *In* "Great White Sharks: The biology of *Carcharodon carcharia*s" (Klimley, A.P. and Ainley, D.G. Eds.), pp 365-373. Academic Press Inc., California.

Lai Ka-keong, E. (1983). Shark fins – processing and marketing in Hong Kong. *Infofish Marketing Digest* (5/83): 35-39.

Last, P.R. and Stevens, J.D. (1994). *Sharks and Rays of Australia*. CSIRO Division of Fisheries.

Malcolm, H., B. D. Bruce and J. D. Stevens. 2001. A review of the biology and status of white sharks in Australian waters. CSIRO Marine Research, Hobart. 113 pp.

Marshall, N.T. and Barnett, R. (1997). *Trade in Sharks and Shark Products in the Western Indian and Southeast Atlantic*. TRAFFIC East/South Africa.

Mollet, H.F. and Cailliet, G.M. 2002. Comparative population demography of elasmobranchs using life history tables, Leslie matrices and stage-based matrix models. *Mar. Freshwater Res*., 53, 503-516.

Murphy, R.C. (1996). A Plea for White Shark Conservation. *In* "Great White Sharks: The biology of *Carcharodon carcharia*s" (Klimley, A.P. and Ainley, D.G. Eds.), pp 5-6. Academic Press Inc., California.

NMFS. 1999. Final Fishery Management Plan for Atlantic Tuna, Swordfish, and Sharks. Highly Migratory Species Management Division, Office of Sustainable Fisheries, National Marine Fisheries Service Silver Spring, Maryland.

NSW Fisheries. (1997). Great white shark protection in NSW, *Fishnote*, Rober Bell (ed), DF68:1-2

Pardini, A.T., C.S. Jones, L.R. Noble, B. Kreiser, H. Malcolm, B.D. Bruce, J.D. Stevens, G. Cliff, M. Scholl, M. Francis, C.A.J. Duffy & A.P. Martin. 2001. Sex-biased dispersal of great white sharks. *Nature* 412, 12 July 2001:139-140.

Parry-Jones, R. (1996). TRAFFIC report on shark fisheries and trade in South Korea. *In* Phipps, M.J. (Comp.). TRAFFIC [East Asia] report on shark fisheries and trade in the East Asian region. TRAFFIC East Asia – Taipei. *In* 'The World Trade in Sharks: A Compendium of TRAFFIC's Regional Studies'. TRAFFIC Network Report.

Pepperell, J.G. (1992). Trends in the Distribution, Species Composition and Size of Sharks Caught by Gamefish Anglers off South-eastern Australia, 1961-90. *Australian Journal Marine and Freshwater Research.* **4**3. 213-225. http://portlincoln.yourguide.com.au/detail.asp?class=news&subclass=local&story_id=207306&category=General+News&m=2&y=2003

Presser, J. and Allen, R. (1995). Management of the white shark in South Australia. SA Fisheries Management Series, Paper 6, May 1995. Primary Industries, South Australian Department of Fisheries, Adelaide.

Reid, D.D. and Krogh, M. (1992). Assessment of Catches from Protective Shark Meshing off New South Wales Beaches Between 1950 and 1990. *Aust. Journal Maine and Freshwater Research.* **4**3. 283-296.

Rose, D.A. (1996). *An overview of world trade in sharks and other cartilaginous fishes*, A TRAFFIC Network Report. TRAFFIC International, Cambridge, United Kingdom.

Scholl, M.C. 2004. Long-term individual photographic identification methodology and population structure of great white sharks (*Carcharodon carcharias*) at Dyer Island, South Africa. Abstract. Workshop on Conservation Research of great white sharks. 20-22 January, 2004. New York. Wildlife Conservation Society.

Smale, M.J. (1996). Trade in shark and shark products in South Africa, *In* 'The World Trade in Sharks: A Compendium of TRAFFIC's Regional Studies'. TRAFFIC Network Report.

Smith, S. E., Au, D. W. and Show, C. 1998. Intrinsic rebound potentials of 26 species of Pacific sharks. *Marine and Freshwater Research* 49(7): 663-678.

Soldo, A., & I. Jardas. 2002b. Occurrence of great white shark, *Carcharodon carcharias* (Linnaeus, 1758) and basking shark, *Cetorhinus maximus* (Gunnerus, 1765) in the Eastern Adriatic and their protection. *Periodicum Biologorum* 104 (2):195-201.

Springer, S. 1963. Field observation on large sharks of the Florida-Caribbean region. Pp. 95-113 in: Gilbert, P.W. (ed.) *Sharks and Survival*. D.C. Heath and Co., Boston

Stevens, J.D., R. Bonfil, N. Dulvy & P. Walker. 2000. The effects of fishing on sharks, rays, and chimaeras (chondrichthyans), and the implications for marine ecosystems. ICES Journal of Marine Science 57: 476-494.

Stoessell, T. (1993). 'Investigation of the International Shark fin Trade'. Unpublished Report, TRAFFIC USA.

Strong, W.R. Jr., Murphy, R.C., Bruce, B.D. and Nelson, D.R. (1992). Movements and Associated Observations of Bait-attracted White Sharks, *Carcharodon carcharia*s: A Preliminary Report. *Aust. J. Mar. Freshwater Res* **4**3. 13-2*0.*

Strong, W.R. Jr., Nelson, D.R., Bruce, B.D. and Murphy, R.D. (1996). Population Dynamics of White Sharks in Spencer Gulf, South Australia. *In* "Great White Sharks: The biology of *Carcharodon carcharias*" (Klimley, A.P. and Ainley, D.G. Eds.), pp 401-414. Academic Press Inc., California.

Wintner, S.P. & G. Cliff. 1999. Age and growth determination of the white shark, *Carcharodon carcharias*, from the east coast of South Africa. Fishery Bulletin 97: 153-169.

Wildlife Conservation Society 2004. White Shark *Carcharodon carcharias*: status and management challenges. Conclusions of the Worlshop on Great White Shark Conservation Research. Wildlife Conservation Society. Central Park Zoo, New York. NY. 20-22 January 2004.

World Conservation Monitoring Centre. 2003. CITES trade statistics derived from the UNEP-WCMC CITES Trade Database, the UNEP – World Conservation Monitoring Centre, Cambridge, UK.

Zuffa, M., G. Van Grevelynghe, A. De Maddalena & T. Storai. 2002. Records of the white shark, *Carcharodon carcharias* (Linnaeus, 1758), from the western Indian Ocean. South African Journal of Science 98: 347-349.

**Range states and territories** (from Compagno 2001)

Western Atlantic: Newfoundland to Florida, Bahamas, Bermuda, Cuba, northern Gulf of Mexico; also Brazil and Argentina. Eastern Atlantic: Possibly England, also France and Bay of Biscay, to Gibraltar, the entire Mediterranean Sea (absent from Black Sea), Madeira, Canary Islands, Senegal, Gambia, Ghana, possibly Zaire, Angola, Namibia, South Africa (Northern and Western Cape Provinces); also Gough Island. Indo-West Pacific: South Africa (Eastern Cape and KwaZulu-Natal Provinces), Mozambique, Tanzania (Zanzibar), Kenya, Seychelles, Madagascar, Mauritius, possibly Red Sea and Persian Gulf (Kuwait?), Sri Lanka, possibly Indonesia, Australia, New Zealand (including Norfolk, Stewart, and Chatham Islands), New Caledonia, Philippines (Mindanao, Palawan), China, Taiwan (province of China), Japan, North Korea, South Korea, Russia (Siberia, possibly Sea of Okhotsk and Bering Sea), Bonin Islands (Tanna Island). Central Pacific: Marshall Islands, Hawaiian Islands, open ocean between Polynesia and South America. Eastern Pacific: Bering Sea and Gulf of Alaska to Gulf of California, including Canada (British Columbia) and the entire Pacific coast of the United States (Washington, Oregon, California, Alaska), and much of Mexico, also Panama, Ecuador, Peru, Chile, and Galapagos Islands.

**Figure 1.** Distribution of *Carcharodon carcharias* (white shark). Source: Compagno 2001.

**Key:** Dark red is confirmed range, light red suspected or unconfirmed range. Note: Some areas of confirmed distribution are plotted with a very thin line, enlargement of the electronic view of the map below is recommended for better resolution.

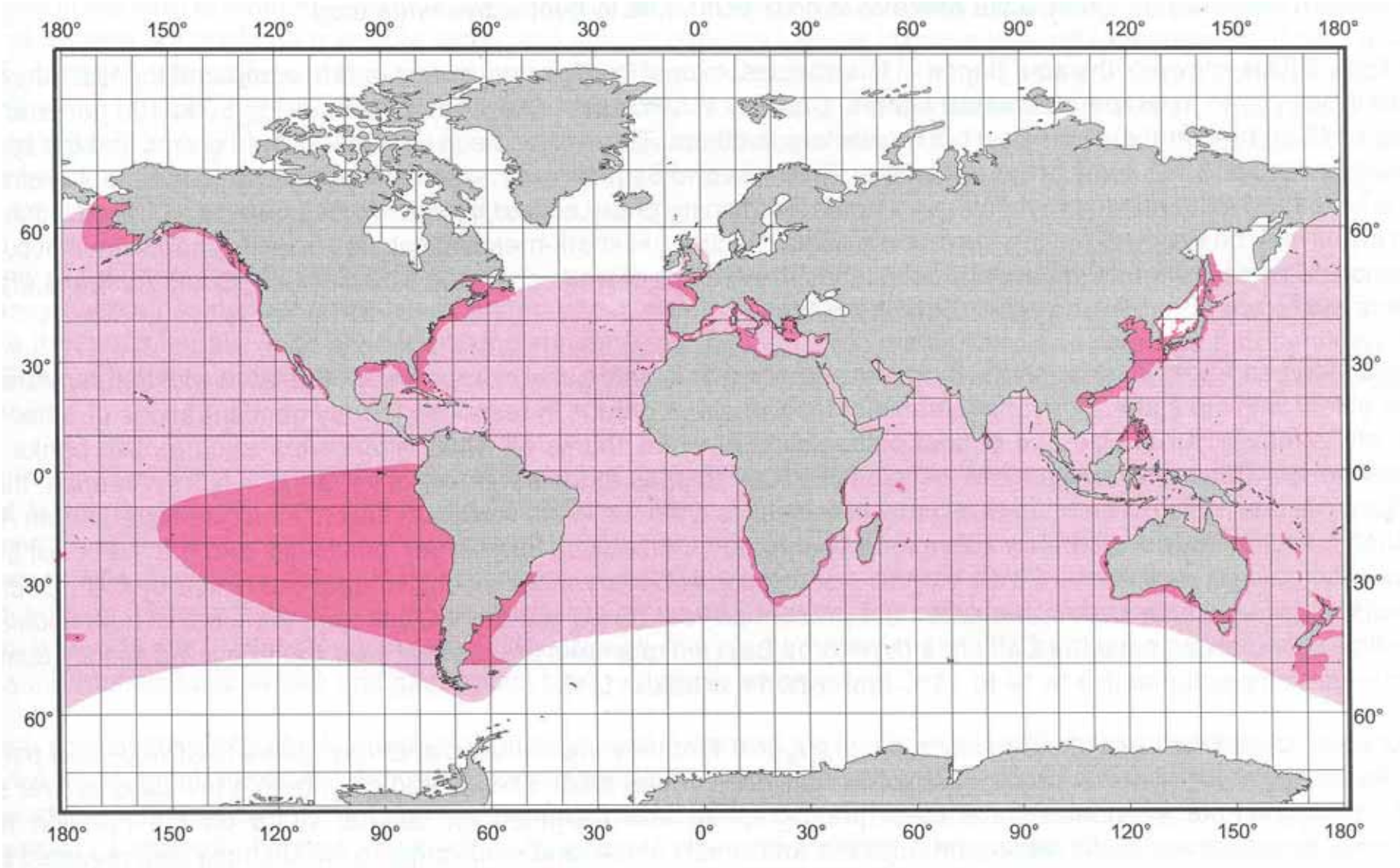


**Figure 2.** Decline in estimated relative abundance of white sharks in the NW Atlantic (initial relative abundance set to one, left panel). Estimated annual rate of change in white shark catch rates in nine different areas of the Northwest Atlantic (right panel). Source: Baum *et al*. 2003.

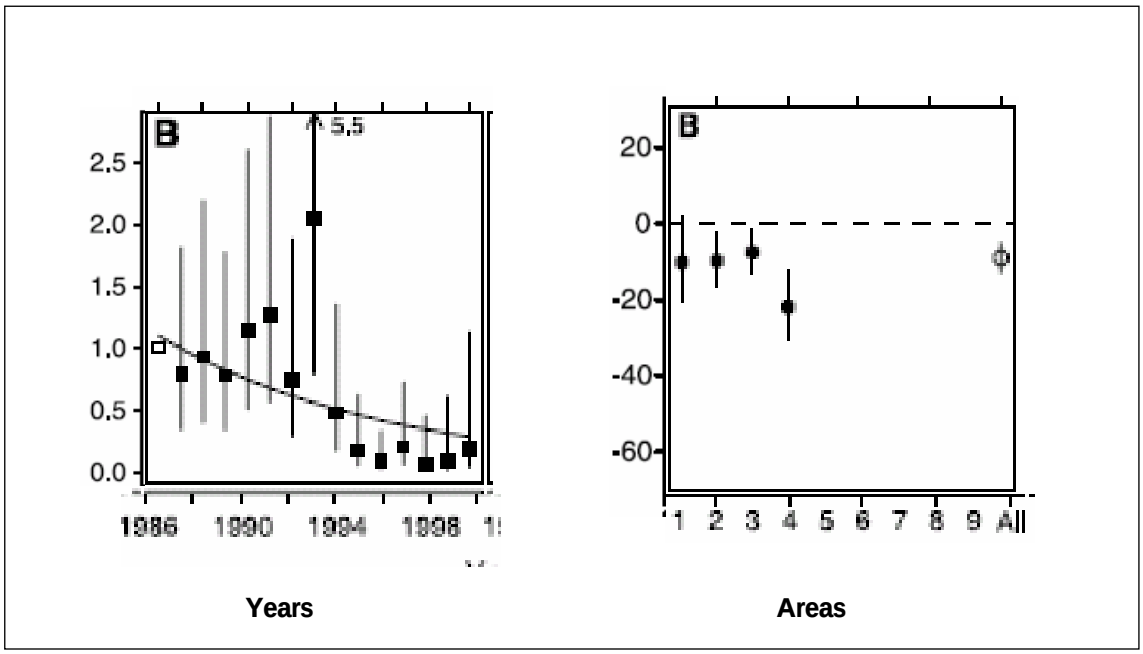



**Figure 3.** Average number of white sharks reported per year for different decades in the Croatian coast of the Adriatic Sea (Eastern Mediterranean Sea). From data in Soldo and Jardas, 2002.

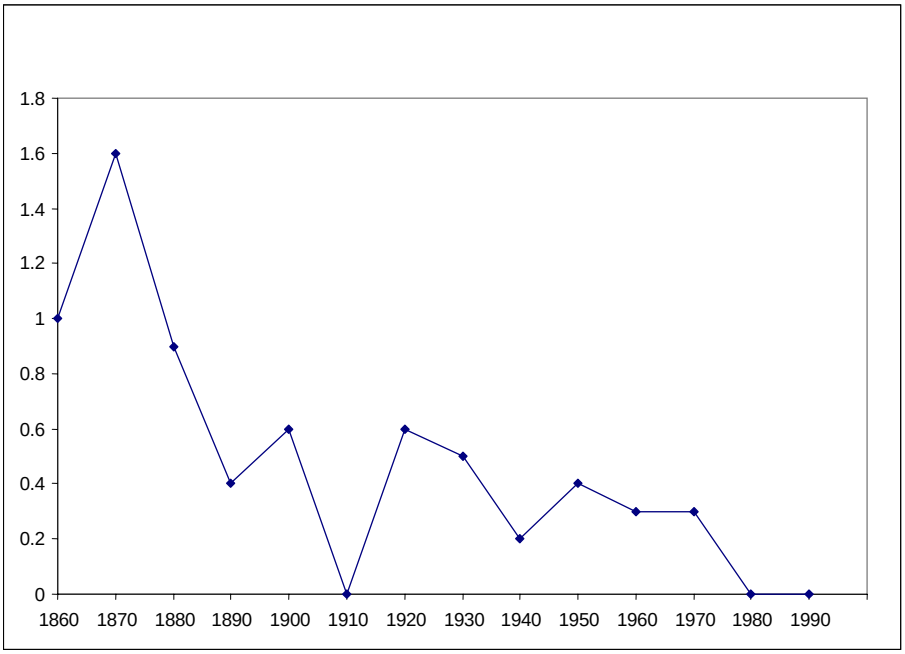


**Figure 4.** Numbers of white sharks caught per km of net and year, in the protective meshing program of the Natal Sharks Board. Source: Cliff, Dudley and Jury 1996.

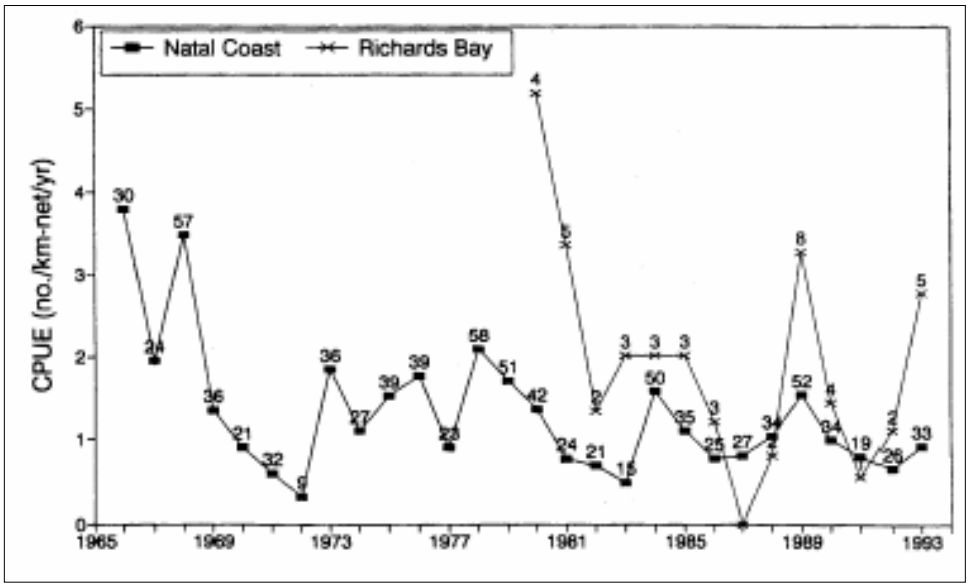



**Figure 5.** Catch and CPUE for White Sharks caught annually in kwaZulu-Natal shark nets, 1978-1999. Top plot includes all catch data, bottom plot excludes catches taken during June and July (sardine run). Regression line shows significant decline in CPUE against time. Source: Dudley 2002.

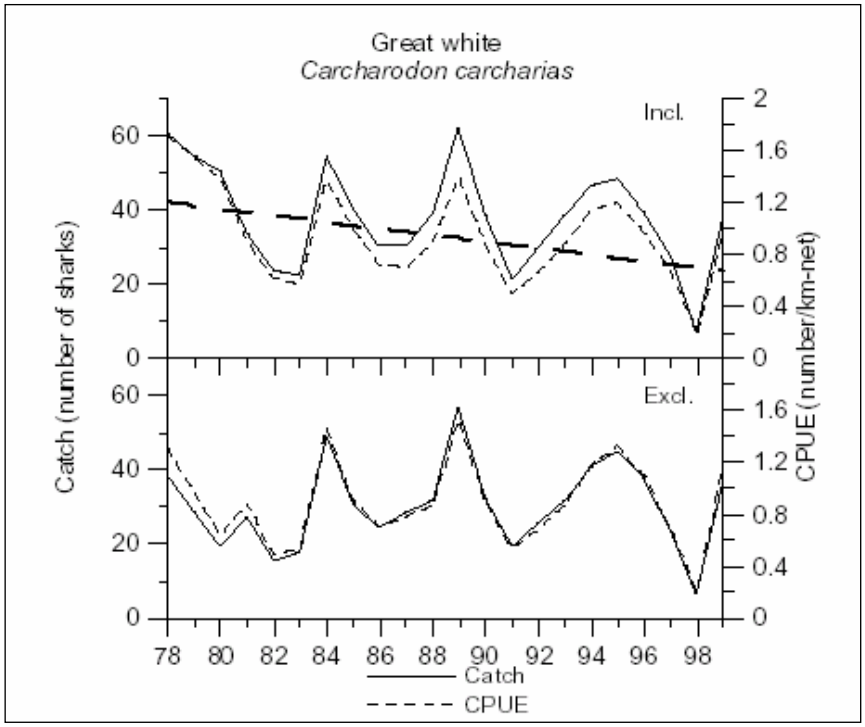


**Figure 6.** Catch per unit effort of white sharks caught in the New South Wales shark control programme 1950-2000. Source: Malcolm *et al*. 2001 with data from NSW Fisheries. (Increased catches in the 1970s occurred during a period of increased fishing effort at new sites).

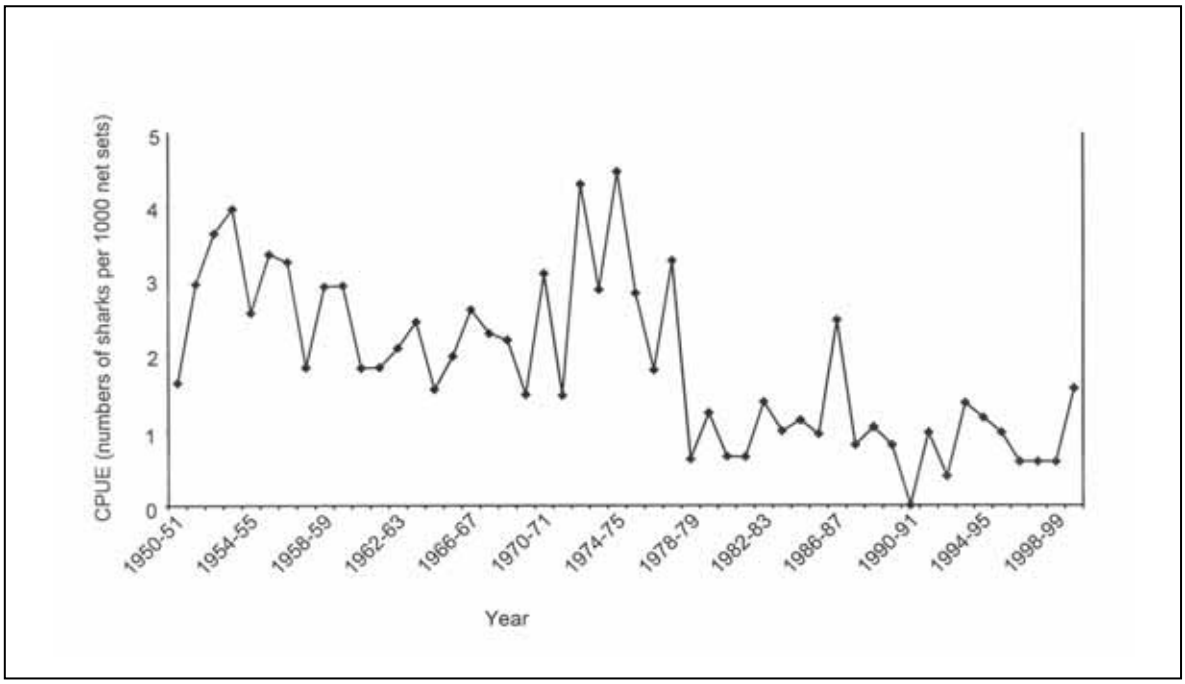



**Figure 7.** Catch per unit effort of white sharks caught in nets of the Queensland shark control programme 1962-1998. Source: Malcolm *et al.* 2001.

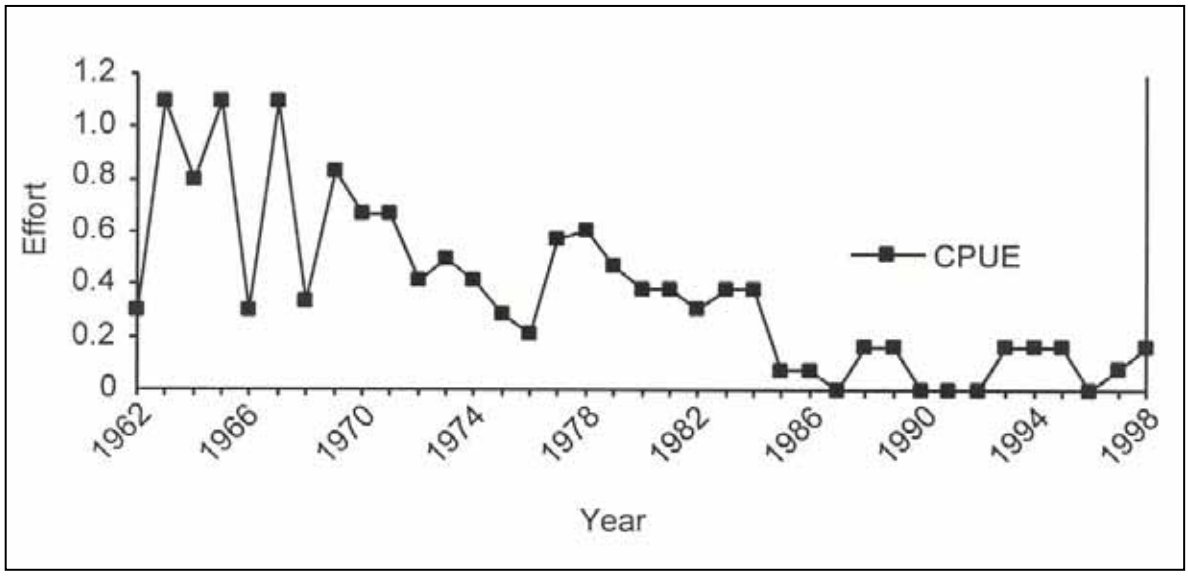


**Figure 8.** Catch per unit effort of white sharks caught in drum-lines of the Queensland shark control program 1962-1998. Source: Malcolm *et al.* 2001.

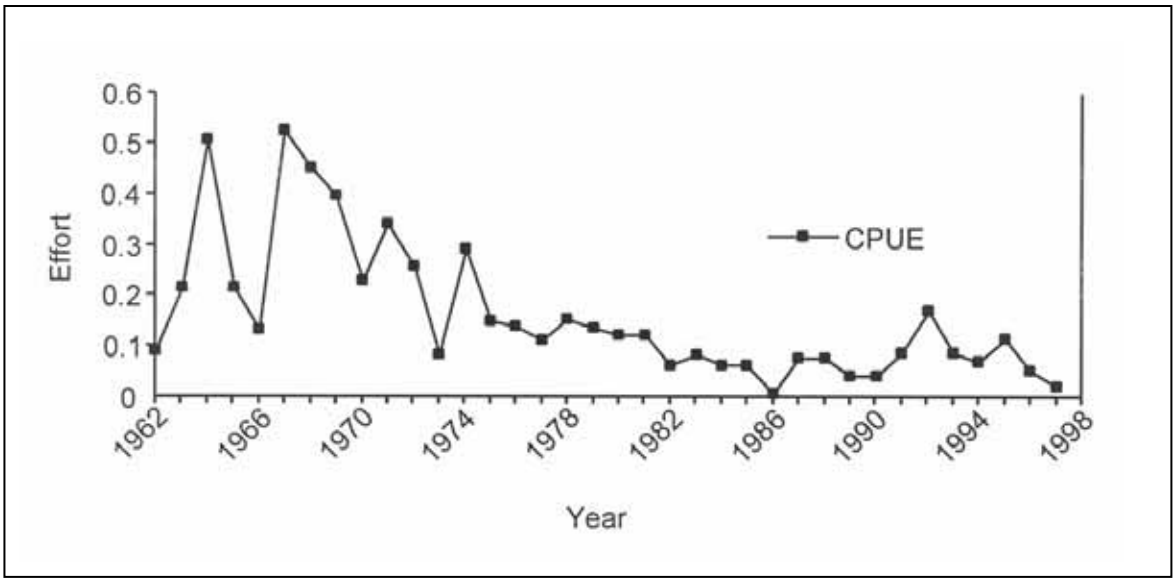
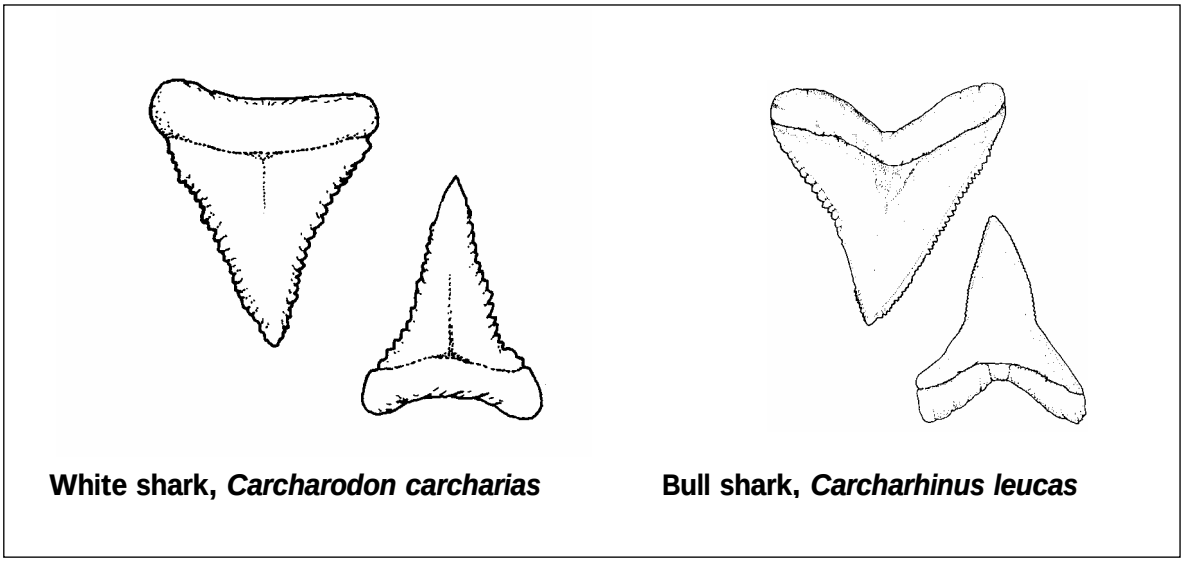



**Figure 9.** Left: upper and lower teeth of the white shark, *Carcharodon carcharias,* showing the characteristic triangular shape and coarse serration of the margins. Right: upper and lower teeth of the bull shark *Carcharhinus leucas* showing indentation of the margins and fine serrations.



Comments from range States

**From:** Victoria Lichtschein [vlichtsc@medioambiente.gov.ar]
**Sent:** 05 May 2004 20:00
**To:** julien.colomer@deh.gov.au
**Cc:** Carlos Merenson
**Subject:** Great White Shark proposal

Dear Mr. Colomer:

I have received a letter and attached proposal for the listing of the Great White Shark (Carcharodono carcharias) on Appendix I of the CITES Convention.

I apologise for answering rather late (I imagine you must have already submitted your proposal before the May 5 deadline), but anyway, as a range state for the Great White Shark, we aknowledge having been consulted and provide the following remarks:

1. The presence of this shark species in the Argentine Sea is only occasional.
2. There are no records of capture of Great White Skarks in scientific surveys, so that there is no available information on geographic range or abundance int he Argentinean continental shelf

3. The species is not subject to trade in Argentina. Although commercial vessels may eventually capture individuals of Carcharodon carcharias, skark species are not reported to species level in catch reports

I hope this is useful to you.

Best regards,

Victoria Lichtschein
Coordinadora de Conservación de la Biodiversidad
Autoridad Administrativa CITES - ARGENTINA
San Martín 459 - 1004 Buenos Aires
ARGENTINA
Tel.: 54 11 4348 8551
Fax: 54 11 4348 8554
Correo electrónico: vlichtsc@medioambiente.gov.ar <mailto:vlichtsc@medioambiente.gov.ar>

EMBASSY
OF THE PEOPLE'S DEMOCRATIC
REPUBLIC OF ALGERIA

JAKARTA

سفارة
الجمهورية الجزائرية
الديمقراطية الشعبية
جاكرتا

No. 093/JKT/04

The Embassy of the People's Democratic Republic of Algeria presents its compliments to the Ministry of Foreign Affairs and Trade of Australia and with reference to the note sent by the Australian Department of Environment and Heritage to the Algerian Ministry of Agriculture and Rural Development, regarding a proposal for the inclusion of the Great White Shark (Carcharodon Carcharias) in CITES-Appendix-I range states, has the honour to inform that the Algerian relevant authorities have agreed to support the Australian proposal.

The Embassy of the People's Democratic Republic of Algeria avails itself of this opportunity to renew to the Ministry of Foreign Affairs and Trade of Australia the assurances of its highest consideration.

Jakarta, 16th April 2004

Ministry of Foreign Affairs and
Trade of Australia
Canberra

# FAC-SIMILE

Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis
Diretoria de Fauna e Recursos Pesqueiros
Coordenação Geral de Fauna

Convenção sobre o Comércio Internacional de Espécies da Fauna e Flora Selvagens em Perigo de Extinção
Convention on International Trade in Endangered Species of Wild Fauna and Flora
Autoridade Administrativa/Management Authority

Para/To: Mr. Julien Colomer
Migratory and Marine Species Section
Department of te Environment and Heritage
Fax: 61.2.6274-2455

De/From: Francisco Luiz Camara Tavares
Management Authority
Tel.: 51 61 316 1675 Fax: 51 61 316 1067/316 1719

Nº de folhas/pages: 01 Data/Date: 30/04/2004 Número/Number: 03

Dear Sir,

In attention to your consultation concerning the Great White Shark species *Carcharodon carcharias*, we made consultation to the Expert Center of Research and Management of the South and Southeast Brazilian Coast (CEPSUL) and were informed of the following:

- This species is rare in the Brazilian coast, and there are only 13 records of occurrence during the XIX century. Its biology is few known and it has one of the lowest rate growth and low fecundity. It is classified as "vulnerable" by IUCN, and it suffers great pressure of the international market of whalebone.

Therefore, the Brazilian CITES Management Authority strongly supports the proposal of Australia to list this species in Appendix I of CITES.

Best regards,

**Francisco Luiz Camara Tavares**
Management Authority

6139985200

Fisheries and Oceans Canada / Pêches et Océans Canada

2004-007-00562

200 Kent Street,
Ottawa, Ontario
Canada K1A 0E6

By Fax: +61 2 6274 2455

Mr Julien Colomer
Migratory and Marine Species Section
Department of the Environment and Heritage
GPO Box 787
Canberra ACT 2600
Australia

**Re: Great white shark (*Carcharodon carcharias*)**

Dear Mr. Colomer:

This is in response to your recent letter to the CITES Management Authority at Canadian Wildlife Service, asking for information on the above in relation to your draft Appendix I listing proposal for possible consideration at the upcoming Conference of Parties meeting in Thailand. Fisheries and Oceans Canada is the CITES Scientific Authority for marine species in Canada.

*C. carcharias* does occur in Canadian waters, both Atlantic and Pacific coasts, but their occurrence is sporadic and occasional. They are occasionally taken as bycatch, for example in pelagic longline fisheries on the Scotian Shelf and Grand Banks (Atlantic). They are not a target species for fisheries. On average we might have reports of one or two per year, or less, in each of the Atlantic and Pacific regions. There is no known trade and given their very occasional occurrence there is no management plan for this species, although we do have management plans for other large shark species on the Atlantic coast and for dogfish on both Atlantic and Pacific coasts. Given the very infrequent occurrence of this species we do not do biological monitoring and would not be able to contribute any information on population status at this point.

I hope this is helpful in your efforts to compile information on the status of this species. If any other information comes to light I will forward this to you.

Yours sincerely,

Howard Powles
CITES Scientific Authority
(Fish)

cc: Brian Wong, CITES Management Authority, Fisheries and Oceans
Jean Robillard, CITES Management Authority, Canadian Wildlife Service

FISHERIES AGENCY
MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES, GOVERNMENT OF JAPAN
2-1, 1-Chome, Kasumigaseki, Chiyoda-ku, Tokyo 100-0013, Japan TEL:03-3502-8111 EXT:

April 20, 2004

TRIM REG. No: 0030/2004
Date: 27.4.04
Initial: CB

Ms. Anne-Marie Delahunt
Assistant Secretary
Wildlife Conservation Branch
CITES Management Authority of Australia
(Fax: +61-2-6274-2455)

**Re: Response to the proposal of the Australian Government (Department of the Environment and Heritage) for the inclusion of the Great White Shark in CITES Appendix I--range state consultation**

Dear Ms.Delahunt:

Your letter of February 20, 2004 addressed to the Ministry of Economy, Trade and Industry (METI) regarding a draft proposal to list the Great White Shark in Appendix I of CITES has been referred to me for response. Our basic position and specific remarks are as follows:

1. **Basic position**

At the outset I would like to express the strong concerns of the Government of Japan regarding the increasing attempts to include non-endangered commercially exploited marine species in the Appendices of CITES. Management of sharks and other marine species is the responsibility of specialized fisheries organizations such as the FAO and Regional Fisheries Management Organizations (RFMOs). In addition, the FAO has established an International Plan of Action for the Conservation and Management of Sharks (IPOA-sharks) in 1999 and is promoting the responsible management and sustainable use of these resources.

As pointed out in your proposal, no global population assessment of this species has been carried out. However, under the circumstances where only five cases of trade existed since its inclusion in Appendix III at the initiative of your country in October 2001, it is highly unlikely that international trade

is adversely affecting the survival of this species. None of the criteria for the inclusion of species in the Appendices are satisfied.

Further, even supposing that, as also pointed out in your proposal, there is a possibility that trade from the United States and South Africa are not controlled adequately, that should not be used as the reason to impose excessive global regulations, such as inclusion in Appendix I.

Japan has made a reservation with respect to the inclusion of the Great White Shark in Appendix III based on the principle that any species not threatened by international trade and not likely to become so should not be included in Appendices. This species is not subjected to commercial fisheries. Further, no evidence is provided on the impact of international trade on the resources under the circumstances where there is virtually no actual international trade in this species. For this reason, inclusion of this species in Appendix I is not appropriate. (The same reason applies even to the inclusion in Appendix II.)

**2.Specific remarks**

(1) Biological characteristics

a) Estimate of the number of individuals

I would like to point out again our concern with your proposal that no global estimate of the number of individuals of this species has been carried out. Some figures for the estimated number of individuals cited in the proposal pertain only to the stock migrating to the area near Australia. Further, the proposal describes the decline in the number of individual of this species on a global level based on (i) analysis of trends in some particular areas; (ii) changes in the proportion of this species in shark fisheries; and (iii) some anecdotal information. All these are insufficient as the basis for the inclusion even in Appendix II.

In this context I would note especially that since this species is highly migratory and distributed throughout an extensive range, the estimation of the changes in population abundance should be carried out with caution. The assertion in your proposal that this species is in a critical condition is without scientific foundation.

b) Low reproductive rate

In the proposal, it is asserted that this species is highly vulnerable to fishing mortality because of its low reproductive rate. However, the effect on mortality of human activities is relatively small if the original population is large even when the reproductive rate is low. It is an over-statement to call for protection based only on the low reproductive rate in the absence of knowledge on the global population.

2) Impact of fisheries on the species

The proposal expresses the concern that the following results would occur by leaving the trade in the shark jaws and fins to continue:

-fisheries targeting high-value shark jaws, and

-increasing fishing pressure on the species following the increasing trade in shark fins on a global scale.

However, no concrete evidence is provided to show to what extent these developments would impact the population of Great White Sharks. In Japan, there exist no directed fisheries for this species. It is caught only incidentally by such devices as set nets. Further, the impact from bycatch is considered to be minimal because:

-this species is rarely caught in the pelagic longline fishing, and

-only one or two cases of bycatch in set nets have been reported annually.

Your consideration of the above is appreciated.

Sincerely,

Masayuki KOMATSU
Director
Resources and Environment Research Division

COURTESY TRANSLATION OF THE ATTACHED OFFICIAL LETTER

**JULIEN COLOMBER**
**MIGRATORY AND MARINE SPECIES SECTION**
**DEPARTMENT OF THE ENVIRONMENT AND HERITAGE**
**GPO BOX 787**
**CANBERRA ACT 2700**
**AUSTRALIA**

I refer to your letter regarding the proposal for the inclusion of the Great White Shark (*Carcharodon carcharias*) in CITES Appendix I, to which the proposal draft was attached, asking for comments and further information we as range state may have on their conservation status, impact of harvesting or impact of international trade on wild populations of Great White Shark in Mexican waters.

Therefore, I am attaching to this letter biological and fisheries information available in Mexico for the abovementioned species.

May we also suggest, after consulting several national experts, that the species be included in Appendix II as a first step, according to the available information on international trade. This would also increase the odds of the proposal to be accepted at CoP13.

Best regards,

**On behalf of the**
**General Director of Wildlife**
**Margarita Alba Gamio**

**CITES Management Authority**
**Ministry for the Environment and Natural Resources (SEMARNAT)**

COURTESY TRANSLATION OF THE ANNEX

ANNEX- Situation of the white shark in Mexico

**1. Legal Status of the Species**

At the moment, the Great White Shark (GWS) in Mexico is classified as a Threatened Species (A) in accordance with a national Act (Norma Oficial Mexicana NOM-059-ECOL-2001), that establishes the degree of protection that native wild species of the country require and the categories of risk and specifications for their inclusion, exclusion or change. In particular, those species or populations classified as Threatened could become endangered of disappearing in the short or medium term, if factors that have a negative effect in their viability continue, by deteriorating or modifying their habitat or diminish directly the size of their populations, and therefore require special protection measures.

This impliesa that GWS management and capture in Mexico should be carried out according to Article 87 of the General Law of the Ecological Balance (LGEEPA), as well as articles 85, 87 and other applicable of the General Law of Wild Life (LGVS). In particular, LGEEPA establishes that exploitation of wild populations of threatened or endangered species is not allowed, except in the cases in which their controlled reproduction and the development of populations of the species is guaranteed. LGVS also indicates that capture of individuals of endangered species will only be authorized for developing restoration, repopulation and reintroduction activities. The number of catches authorized in these cases will depend on the results of the population studies or stock assessment. Also, it is necessary to present: (a) approaches, measures and actions for controlled reproduction and the development of populations in their natural habitat, that will be included in the management plan; (b) specific measures and actions in order to counteract the factors that have led to diminish populations or deteriorate their habitat; and (c) a study of the population that contains rigorous estimates of the rates of natality and mortality. In the case of endangered or threatened populations, both the study and the management plan will be endorsed by a recognised person or organisation, in accordance to regulations.

Work is currently being done in a Project of National Act (Norma Oficial Mexicana PROY-NOM-029-PESC-2004), on responsible fishing for sharks and rays and specifications for their capture, in Mexican waters and for ships bearing the Mexican flag in international waters. A part of this Act specifically recognizes the need for the conservation of shark species, and in particular for establishing special protection measures for species like whale shark (*Rhincodon typus*), basking shark (*Cethorhinus maximus*) and the GWS (*Carcharodon carcharias*). It is also recognized that their populations require protection actions at the international level. Among such measures is the possibility of giving maximum protection to these species upon prohibiting their capture and, in case they are caught incidentally, they be returned to the water and cannot be retained, either dead or alive. As a consequence, they won't be the used for human consumption nor for sale.

**2. Records and sightings of GWS**

Few scientific records of the presence of the GWS (*Carcharodon carcharias*) in Mexican waters exist, nevertheless there is indirect and anecdotic evidence of the presence of this species in the Northwest coasts of the of the country. The few available scientific records come mostly from the Gulf of California and the Western coast of the Baja California Peninsula. Seemingly the first documented record of the capture of a male GWS (1,960mm of total length -LT) was reported by Kato in 1965, in front of the coasts of Mazatlán, Sinaloa, on January 25$^{th}$ 1964 (mentioned by Klimley, 1985). That paper also mentions the capture of another 4 GWSs, one in front of San José Island, (a female of 2.685 mm LT) at the north of La Paz, in Baja California Sur, inside the Gulf of California, and the three remaining individuals were captured in front of Punta Santo Domingo, in Sebastián Vizcaíno Bay (in the same State, but in the Western coast of the Peninsula), in front of the Pacific Ocean. These three sharks, with sizes varying between 1,219mm and the 1,321mm of LT, were caught with a gillnet on July 17$^{th}$, 1981. Except for the record of Kato, none of these sharks was examined by biologists.

More recently, three GWS were recorded as part of the study carried out by the research group in the Laboratory of Fisheries Ecology of Centre for Scientific Research and Professional Studies (CICESE) and on the life histories of elasmobranchs that live in waters of the Northern Gulf of California, including the Marine Protected Area of the Upper Gulf. This study includes catch and landing data of small ships as well as the trips of commercial fishing on commercial fishing vessels. On July 27$^{th}$ 2002, a dissected

head of a GWS was examined. It was caught (with a gillnet) by a minor fishing vessel at the beginning of that month, southeast of San Felipe, Baja California (BC). Based on the size of the teeth it was calculated to measure 2.500 mm of LT. On the other hand, a trawler ship registers the capture of 2 individuals of this species on September 5th of 2003, which were examined attentively. These sharks were captured in successive hauls in a zone called the "Wagner Basin," at an esteemed depth of between 96 and 107 m, in front of the coasts of San Felipe, BC. The first was a juvenile female of 2.245 mm of LT with a weight of 85.5 Kg., while the second, was a juvenile male, of 2.350 mm of LT (Sosa *et al*, in print.). Based on the growth curve calculated by Wintner and Cliff (1999) these sharks were thought to be about 18 months old. The female was examined in a laboratory while the male was examined on board of the ship, being later on processed like any shark: filleted for sale as fresh fish. Recently, another juvenile white shark was caught in the same zone (in front of San Felipe, BC, in the Wagner Basin).

Another recent record was that of a GWS, caught inside yellowfin tuna aquaculture facilities in front of the Coronado Islands, in the border with the U.S.A. Photographs of this individual were obtained, showing that it was a big female, of approximately more than 5.000 mm of LT. It was not examined by scientists.

Current information shows that most of the GWSs that have been recorded inside the Gulf of California until now have been immature sharks, of less than 2.500 mm of LT, which could corroborate Dr. Klimley's hypothesis (1985) that points out that Mexican waters, including the Gulf from California, could be a zone of birth and upbringing for this species.

There is also available information on six records from 1981 in the south-western and eastern zone of the Gulf of California, whose sizes are between 2,350-3,500 mm LT, which were mostly immature sharks of both sexes (Galván *et al.*, in print).

Based on the above mentioned facts and the little available information on the population status of the species in Mexico, it could be pointed out that the species is not very abundant (rare) in Mexico and even low levels of catch would have a significant impact in their populations.

**3. Fisheries**

In Mexico no commercial fishery is directed to the GWS. Most records come from by-catch, both in artisanal and industrial fishing vessels. Fishing methods include gillnets, trawl nets and longlines. However once the animals are dead, their jaws and fins are taken, the first for their sale as "trophies" and the second for the shark fin trade of, given their significant size. The rest of the body is processed for meat. Teeth and jaws of GWSare generally offered to tourists, who pay high prices for them, generating a certain expectation among Mexican fishermen.

Given the confirmed records of caught GWS and considering anecdotic information, it is possible that around 6-10 individuals are caught per year in the Gulf of California, although these figure could be underestimated, because these catches are not recorded by commercial crafts. It is very likely that the Gulf of California represents the last sanctuary of GWSs in Mexican waters.

No sport fishing for this species exists either. However, given the presence of this species in the coasts of Baja California and in the Islands, both coastal and oceanic, it is very likely that sport fishermen (both Mexican as North American) are interacting with this species. In the case of Guadalupe Island, eco-tourism companies offer tours for GWS watching. The impact of this activity on the GWS is ignored, as well as if these sharks are temporary or permanent residents in this zone.

So in spite of the fact that a there is no directed fishing for this species in Mexico (it is basically incidental fishing), products and by-products like jaws, teeth and fins could reach high prices in the international market and it is necessary to establish regulations in order to protect their populations. Many of the sharks that are fished "incidentally" or "accidentally" are captured still alive and it would be possible to return them to the ocean without harm.

**4. International Trade**

According to international trade data from the Secretary of Environment and Natural Resources (SEMARNAT), there are several records of commercial transactions at the international level for products

and by-products of GWS in Mexico. Among these there are exports, imports and re-exports, and the main destinations are Japan, the United States of America, Germany and Italy. The main product managed in these transactions have been skins, either raw and salted or prepared for their use in the leather industry, and there are some records of dry fins. On the other hand, the main by-product is quality shoes (e.g. boots). Chart 1 summarizes the commercial movements that involve this species. Unfortunately there are no computerized records previous to 1998, hence trade has probably existed before but it has not been recorded. The presented information also excludes the souvenirs trade, meaning products such as teeth and jaws, that are normally bought for tourists or collectors and then taken to their countries of origin; activity which is known to occur, but without official record.

**Chart 1. Exports, Imports and Re-exports of products and by-products of GWS registered for Mexico**

| **Exports** | | |
|---|---|---|
| 1999 | Skins | 4,676 pieces |
| | Shoes | 120 pairs |
| 2000 | Dry fins | 28 Kg. |

| **Re-exports** | | |
|---|---|---|
| 1998 | Skins | 821 pieces |
| 1999 | Skins | 352 pieces |

| **Imports** | | |
|---|---|---|
| 1999 | Skins | 13, 202 pieces |

20 April 2004

Mr Julien Colomer
Migratory and Marine Species Section
Department of the Environment and Heritage
GPO Box 787
Canberra ACT 2601
AUSTRALIA

**PROPOSAL FOR THE INCLUSION OF THE GREAT WHITE SHARK IN CITES APPENDIX I – RANGE STATE CONSULTATION**

Dear Mr Colomer

Thank you for the opportunity to comment on Australia's draft proposal to include *Carcharodon carcharias*, the Great White Shark, on Appendix I of CITES. We have consulted affected government departments, scientific experts, the fishing industry and NGOs on the proposal and their comments have been incorporated into our overall comment on the proposal.

First, some technical points with respect to your submission.

The Executive Summary, first bullet point, makes definite statements about the reproduction of Great White Sharks that go beyond the available data. The estimates of gestation period and length of the reproductive cycle are essentially guesses. This is adequately qualified in section 2.3, paragraph 3, but the uncertainty in these parameter estimates has been dropped from the Executive Summary.

Section 2.4, paragraph 2. The apparent decline in Great White Shark numbers off NSW may be partly explained by a change in fishing behaviour, with fishers working further from shore in later years. This point was noted by Pepperell and should be included in this document, as it significantly affects the interpretation of the data.

Section 2.6, paragraph 2, and elsewhere. Although some Great White Sharks certainly return repeatedly to the same location, this pattern is usually seasonal. Tagging and genetic results now confirm that some, perhaps many, Great White Sharks rove distances of thousands of kilometres. So their home ranges are very large, and it is misleading to say that they form local populations. Nevertheless, if a large proportion of the population does "home" to specific small sites at the same time each year, the effect may be the same; i.e. heavy fishing in a small area could impact on the whole stock as if it was a local population.

Section 3.2. We disagree with Lai Ka-Keong's quoted opinion that Great White Shark fin is regarded as the preferred fin for shark fin soup in Hong Kong. We wonder if, in fact, Lae Ka-Keong was not referring to Great White Shark fins but to the fins of other white shark species. We are advised that there are others that are preferred more, such as the fins of Tiger and Reef Shark. In addition (referring to Section 5), fins from a Great White Shark do not resemble those from the Whale or Basking Shark; there is a considerable difference in size. Because the Great White Shark is widely and sparsely distributed, it follows that it is seldom caught/landed in quantity that would provide sufficient to be traded as a stand-alone species. Generally the fins are graded on size and mixed with other species, e.g. Hammerheads. The high value trade is not in fins but in jaws and teeth of the Great White Shark.

General comments.

The case for an Appendix I listing is not clearly made. The declines observed in some populations are not large, in percentage terms, relative to those in many other fished species. However, given that Great White Sharks have a small initial population size (by virtue of the fact that they are apex predators), precautionary management is warranted. The biggest threat to their populations is probably incidental fishery bycatch rather than targeted fishing. Large mature Great White Sharks are however, particularly vulnerable to small directed fisheries (be they legal or illegal) at sites where they are known to seasonally aggregate and the value of the jaws and teeth are such that there is considerable financial incentive to fishers to target them at these sites. The development of fisheries of this nature could rapidly deplete the population of reproductively mature fish.

The experience in New Zealand is that the bulk of Great White Sharks taken here are actually immature fish taken as bycatch in coastal set net and longline fisheries. Much of this commercial bycatch is already largely unreported and therefore unmanaged. The reason for this non-reporting is the lack of suitable codes for landed state (i.e. heads or jaws), conversion factors (i.e. length-total weight, fin weight-total weight) and the fact that they form only a minor part of the overall catch.

An Appendix I listing might therefore not have the desired effect. It is highly likely that Great White Sharks would continue to be taken as bycatch and killed as a nuisance species by fishers and that commercial fishers would simply stop reporting catches of Great White Sharks and co-operating with researchers. The consequence of that would be that any hope for the effective management of this species would have been lost.

Countries with the largest populations of Great White Sharks already have legislative protection which prevents the deliberate killing of Great White Sharks. If the catching prohibitions already in force do not provide the desired control, and presumably these are accompanied by measures that prohibit or control the export of jaws or Great White Shark parts, then an Appendix I listing may not assist much except for stopping importing countries from importing jaws (or fins). If that is thought to be an important issue, and Australia believes that listing would address what is mostly an illegal trade, then that argument should be developed and set out more clearly in the submission to the COP.

New Zealand believes that improved domestic control measures by range states for the Great White Shark might be the most effective method for protecting the species.

These would include:

- a prohibition on commercial target fishing;
- improved reporting of bycatch;
- effective monitoring of commercial exports and imports, which would be achieved by an Appendix II listing coupled with the provision of appropriate tariff codes;
- a requirement for fishers to release white sharks alive where this is safe and practical. This requirement should not prohibit fishers from landing dead sharks – experience with similar regulations for marlin indicates that if dead sharks cannot be landed, commercial fishers will not report capture and the opportunity to obtain data and scientific samples would be lost. Most domestic boats that catch Great White Sharks are unlikely to carry observers, therefore it would be impossible to obtain this information any other way;
- regular monitoring of trade, landings and catch data by fisheries officials for evidence of illegal target fishing or trade;
- prohibition of recreational fishing for Great White Sharks. There is evidence that game fishers are prepared to pay a premium to target white sharks for their jaws and teeth;
- removal of protective beach meshing. In the view of some, catch levels of Great White Sharks in “shark protection nets” may be approaching bycatch levels from fisheries and they also take relatively large numbers of other harmless or less dangerous species;
- active research on Great White Shark habitat requirements and fishery interactions;
- encouragement for the development of eco-tourism at known Great White Shark aggregation sites as an alternative to killing them;
- prohibition of killing of all sharks around fish farms.

Although we cannot give a final indication on whether New Zealand would support Australia’s bid for an Appendix I listing of the Great White Shark until this has been confirmed by Ministers, we can indicate at this stage that our inclination would be in favour of supporting an Appendix II listing rather than an Appendix I listing for the Great White Shark.

Yours sincerely

Wilbur Dovey
Senior CITES Officer
Biodiversity Recovery Unit
Department of Conservation

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

APR 21 2004

Mr. Julien Colomer
Migratory and Marine Species Section
Department of the Environment and Heritage
GPO Box 787
CANBERRA ACT 2600
Australia

*VIA FACSIMILE +61 2 6274 2455*

Dear Mr. Colomer,

I am writing in response to a letter form Ms. Anne-Marie Delahunt dated February 20, 2004, to Dr. Peter Thomas of the U.S. Fish and Wildlife Service. In that letter, Ms. Delahunt solicited range state input from the United States regarding Australia's proposal to list the white shark (*Carcharadon carcharias*) in Appendix I of the convention on International Trade in Endangered Species (CITES). Our office, the U.S. CITES Scientific Authority, has responsibility for reviewing such proposals in consultation with our National Marine Fisheries Service (NMFS). We are still in our public consultation process for the 13th meeting of the Conference of the Parties to CITES (COP13), and thus cannot convey a final U.S. position on your proposal; however, we would like to share some information and viewpoints on the proposal.

My staff and other colleagues in NMFS have reviewed your proposal thoroughly, and discussed it with other experts at the 20th meeting of the CITES Animals Committee (AC20, March 29 – April 2, 2004; Johannesburg, South Africa) as per Resolution Conf. 12.6. During this review, we also reached the conclusion that white sharks have experienced declines in several portions of the range, and that fisheries were a significant factor in these declines. It appears, as Australia indicates in the proposal, that white sharks are relatively rare as marine apex predators and are vulnerable to overexploitation via both direct harvest and bycatch. The size of the global white shark population remains unquantified, yet localized stock declines appear large based on the limited data available.

During the AC20 discussions of your proposal, attendees had difficulty in directly inferring that a large international trade in white shark products is driving stocks inexorably to extinction. Although hampered by a lack of species-specific trade data and population assessments, the AC20 discussants concluded that white sharks appeared to meet the criteria for listing in Appendix II of CITES. This conclusion was based in part on the outcomes of a recent workshop on white sharks hosted by the Wildlife Conservation Society (WCS) and input provided by a WCS scientist at AC20. In short, it appeared that the most recent

information on white shark declines and current trade volumes did not qualify the species for Appendix I, as per Res. Conf. 9.24, Annex 1 and the Annex 5 revisions suggested by the Food and Agriculture Organization (FAO) Committee on Fisheries.

We hope you find this input helpful in your deliberations over submitting the white shark proposal at COP13. If you have any questions, or would like to discuss this further, please contact me at +01 703 358 1708 or at Roddy_Gabel@fws.gov. The United States appreciates this opportunity to comment on your proposal, and we look forward to working with Australia again as colleagues at COP13 this October.

Sincerely,

Robert Gabel, Chief
Division of Scientific Authority

cc: Nancy Daves, National Marine Fisheries Service