Australian Government

Department of the Environment

2011 NOMINATION – *Carcharhinus longimanus*

Section 1 - Legal Status, Distribution, Biological, Ecological

Conservation Theme

1. Not applicable - there is no conservation theme for the 2011 assessment period.	**N/A**

Taxonomy

2. *What are the* ***currently accepted scientific and common name/s*** *for the species (please include Indigenous names, where known)?* *Note any other scientific names that have been used recently. Note the species authority and the Order and Family to which the species belongs (Family name alone is sufficient for plants, however, both Order and Family name are required for insects).*	Scientific name: *Carcharhinus longimanus* (Poey, 1861) Kingdom: Animalia Phylum: Chordata Class: Chondrichthyans Subclass: Elasmobranchii Order: Carchariniformes Family: Carchcharhinidae Genus: Carcharhinus Species: longimanus Common names: Oceanic Whitetip shark; Brown Milbert's sand bar shark; Brown shark; Nigarno shark; and Whitetip whaler.
3. *Is this* ***species conventionally accepted****? If not, explain why. Is there any controversy about the taxonomy?*	Yes, this species is conventionally accepted.
4. *If* ***the species*** *is* ***NOT conventionally accepted****, please provide:* *(i) a taxonomic description of the species in a form suitable for publication in conventional scientific literature;* ***OR*** *(ii) evidence that a scientific institution has a specimen of the species and a written statement signed by a person who has relevant taxonomic expertise (has worked, or is a published author, on the class of species nominated)****,*** *that the person thinks the species is a new species.*	n/a
5. *Is this species* ***taxonomically distinct*** *(Taxonomic distinctiveness – a measure of how unique a species is relative to other species)?*	The oceanic whitetip shark, *Carcharhinus longimanus*, is the only truly oceanic species of the Carcharhinus genus with a worldwide distribution in warm tropical and subtropical waters (Compagno 1984 in Camhi et al., 2009, p. 23).

Area of occupancy

Legal Status

6. *What is the species' **current conservation status** under Australian and State/Territory Government legislation?*	*C. longimanus* is not listed under any Australian or State/Territory Government legislation. In the development of a CITES Shark Species of Concern list in 2010, Australia agreed with prioritization of hammerheads as a group, as well as sandbar, dusky, and oceanic whitetip sharks. According to Australia, this species may meet the CITES criteria in the northwest Atlantic, but there are unlikely to be sufficient data to demonstrate this for other regions. (Shark Advocates International, 2011) The *National Plan of Action for the Conservation and Management of Sharks* (Shark plan) (2004) characterizes *C. longimanus* as **low risk-near threatened (LR-nt).** It is also considered a **shark of concern** by the government elected Shark Advisory Group.
7. *Does the species **have specific protection** (e.g. listed on an annex or appendix) under other legislation or intergovernmental arrangements, e.g. Convention on International Trade in Endangered Fauna and Flora (CITES), Convention on Migratory Species (CMS).*	Under the International Union for Conservation of Nature (IUCN) Red List, *C. longimanus* is listed globally as *vulnerable*, and *critically endangered* for populations in the Northwest and Western Central Atlantic (Baum et al., 2009). It is listed under the United Nations Convention on the Law of the Sea (UNCLOS) 1982 Annex 1 as a *highly migratory species* (UN, 1982). The oceanic whitetip is further listed as a highly migratory species under the 1995 UN Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA). The Agreement specifically requires coastal States and fishing States to cooperate and adopt measures to ensure the conservation of these listed species. To date, there is little progress in this regard. (Baum et al., 2009)

Area of occupancy

Description

8. *Give a brief description of the species' **appearance**, including size and/or weight, and sex and age variation if appropriate; social structure and dispersion (e.g. solitary/clumped/flocks).*

C. longimanus is a stocky shark from the family *Carcharhinidae*. The body is greyish bronze to brown in colour with a whitish underside. Distinguishable features of *C.* longimanus include a large rounded first dorsal fin and very long and wide paddle-like pectoral fins; and distinctively whitish-tipped first dorsal, pectoral, pelvic, and caudal fins; a short and bluntly rounded nose; and small circular eyes with nictitating membranes. (United States and Palau, 2010)

The appearance of the *C. longimanus* is easily distinguished from other sharks. This stocky shark has a short head, bluntly rounded nose and small circular eyes with nictitating membranes. The first dorsal fin is very large with a rounded tip, originating just in front of the free rear tips of the pectoral fins. The second dorsal fin originates over or slightly in front of the anal fin origin. Possessing broadly rounded tips, the pectoral fins are very large and elongated. This species has unmistakable whitish-tipped first dorsal, pectoral, pelvic, and caudal fins. These white markings are sometimes accompanied by white mottling on the fins or black markings in young individuals. There may also be a dark saddle-shaped marking present between the first and second dorsal fins. The body of the oceanic whitetip shark is greyish bronze to brown in colour, depending upon geographical location. The underside is white, with a yellow tinge on some individuals. (United States and Palau, 2010)

Other distinctive features include body fusiform with low interdorsal ridge present; labial furrows short, confined to mouth corners; upper teeth serrated, broadly triangular and erect, with lowers more slender, erect and serrated; first dorsal-fin origin just anterior to pectoral-fin free rear tips; pectoral-fin anterior margin 20-30% of total length, maximum width 1.9-2.3 in anterior margin; first dorsal-fin height 9-17% of total length; and tooth count 30-31/27-29 (Last, P.R. and Stevens, J.D., 2009, p.265).

C. longimanus are high trophic level predators predominantly existing in open ocean ecosystems. They are a surface-dwelling, oceanic-epipelagic shark. Cortes (1999) calculated the trophic level for *C. longimanus*, based on diet, was 4.2 (max.=5.0). (United States and Palau, 2010)

From reproductive studies conducted, *C. longimanus* have a suggested reproductive cycle of 2 years, with a 9-12 month gestation period; litter sizes ranging from 1 to 14, with a mean of 5-6 embyros; pups born ranging from 55-75 cm; and females maturing at around 168-196 cm and males at 175-189 cm, corresponding to an age of 4-5 years and 6-7 years in the western equatorial Atlantic (Lessa et al., 1995) (Seki et al., 1998). (United States and Palau, 2010). Smith *et al.* (1998) found that due to their relatively fast growth and early maturation, *C. longimanus* have a moderate rebound potential.

Refer to Table 1 for life history parameters for *C. longimanus*.

There is no data on size class and sex distribution for populations of *C. longimanus* (IUCN, 2006). Distribution is estimated to depend on size and sex, with nurseries appearing to be oceanic (Seki et al., 1998).

Oceanic whitetip shark life history parameters have been studied in the north Pacific and southwest Atlantic Ocean. Seki et al. (1998) studied the age, growth and reproduction of the oceanic whitetip in the North Pacific Ocean and determined growth rates in both males and females to be 0.10 yr-1. In the western equatorial Atlantic Ocean, Lessa et al. (1999) calculated growth rates between 0.08-0.09 yr-1. Theoretical maximum sizes range from 325 to 342 cm total length (TL) (Lessa et al. 1999; Seki et al. 1998, respectively). Using vertebral sections, a maximum age of 13 years was determined (Lessa et al. 1999).

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	Few reproductive studies are available for oceanic whitetip sharks. Seki et al. (1998) suggested a 2-year reproductive cycle with a 9-12 month gestation period. Litter sizes ranged from one to 14 with a mean of 5-6 embryos depending on geographic location. Litter size was found to increase with maternal size in the northwest Atlantic Ocean but this was based on a small sample size (Backus et al. 1956). Pups are born at a size between 55 and 75 cm TL. In the north Pacific, females become mature at about 168-196 cm TL and males at 175-189 cm TL corresponding to an age of 4-5 years, respectively (Seki et al. 1998). Lessa et al. (1995) found both sexes mature at 180-190 cm TL (age 6-7 years) in the western equatorial Atlantic Ocean. Last and Stevens notes that *C. longimanus* are born at 60-65cm and usually attains about 300cm (although there is a recof of a 350cm specimen), and that males mature at 175-195cm and females at 180-200cm (2009, p.266). Using a demographic method that incorporates density dependence, Smith et al. (1998) determined that oceanic whitetip sharks have a moderate intrinsic recovery potential when compared to 26 other species of sharks. Cortés (2008), using a density independent demographic approach, calculated that population growth rates were low to moderate when compared with eight other pelagic species. Furthermore, estimates of the intrinsic rate of increase for this species (r=0.09-0.07 yr-1) indicated that oceanic whitetip populations are vulnerable to depletion and will be slow to recover from over-exploitation based on FAO’s low productivity category (<0.14 yr-1) (FAO 2001; Musick et al., 2000 in United States and Palau, 2010, p.4). Genetic studies have not been conducted for this species. Limited conventional tagging studies in the northwest Atlantic Ocean indicate movements between the Gulf of Mexico and the Atlantic coast of Florida, Cuba, the mid-Atlantic Bight from the Lesser Antilles to the central Caribbean Sea, and east to west along the equatorial Atlantic Ocean (Kohler et al. 1998). The maximum distance travelled was 2,270 km. There is no information on the size class and sex distribution of oceanic whitetip shark populations. (United States and Palau, 2010) **Refer to Figures 1a and 1b for images of *C. longimanus*.**

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9. *Give a brief description of the species' **ecological role** (for example, is it a 'keystone' or 'foundation' species, does it play a role in processes such as seed dispersal or pollination).*	Despite its worldwide distribution and frequent appearance in most high-seas fishery catches in tropical areas, little attention has been paid to oceanic whitetip shark biology and ecology, with only a handful of papers focusing on the species (Camhi et al., 2009, p.129). While there is little available data on the specific ecological role, *C. longimanus* plays an important role as an apex predator of the open ocean. Substantial evidence indicates that large assemblages of sizeable and efficient predators exert considerable influence on food web structure, diversity and ecosystem regulation, thus performing some keystone functions (Baum and Myers, 2004; Paine, 2002; Myers et al, 2007). For instance, having few natural predators, sharks help to regulate and maintain the balance of marine ecosystems as they feed on mid-trophic level predators and omnivores, directly limiting their populations, in turn affecting the lower trophic prey species of those animals, and so on to grazers, plants and algae (Griffin et al, 2008; Bascompte et al, 2005; Stevens et al, 2000; Myers et al, 2007). ECOSIM models of the Venezuelan shelf, the Alaska Gyre and the French Frigate shoals in Hawaii indicate the removal of sharks would significantly alter the relative abundances of species from lower trophic levels (Stevens et al, 2000). As switch predators, sharks may vary their prey targets when abundance is low, thereby allowing multiple prey species' populations to persist concurrently (Sergio et al, 2006; Griffin et al, 2008). Furthermore, sharks tend to target the sick and the weak members of prey populations, removing weaker genes from the pool, thereby maintaining the overall genetic fitness of prey populations. Apex predators have also been documented to influence the spatial distribution of potential prey as fear of predation causes some species to alter their behaviours regarding habitat use and activity level, leading to shifts in abundance in lower trophic levels, ultimately maintaining or enhancing biodiversity. They exert additional influence by providing essential food sources for scavengers (Frid et al, 2007; Griffin et al, 2008).

Australian Distribution

10. *Describe the species' **current and past distribution in the Australian distribution** and, if available, attach a maps noting the source and the datasets used to create these.*	*C. longimanus* distribution ranges between 30ºN and 35ºS across all offshore tropical and subtropical waters (IUCN, 2006). Local reports state that, once extremely common, numbers for *C. longimanus* are now in steep decline (NSW DPI, n.d.). **Refer to Figure 2 for the most recent distribution map available of *C. longimanus* in Australia; and Figure 3 for the most recent data extent mapping created for *C. longimanus* distribution in Australia.** As a pelagic shark throughout Australian waters, *C. longimanus* are generally restricted to warmer waters from Sydney north to central Western Australia. They are absent from Gulf of Carpentaria. (DAFF, n.d.) The 2009 Shark Assessment Report shows that *C. longimanus* is a prominent species in the Eastern Tuna Billfish Fisheries (ETBF) (Bensley et al., 2009). Within the Pacific Ocean, preliminary data from Japanese research and training tuna longliners (H. Nakano, unpublished) indicate that oceanic whitetips are most abundant in a belt between 10N and 10S, are common between 20N and 20S, and can occur up to about 30N in the northwestern Pacific. These data also show that pregnant females occur mainly in a wide area of the North Pacific between 140W and 150E, with higher concentrations in the central part of this distribution just about 10N. Newborn sharks occur between the equator and 20N, but mainly in a narrow strip just about 10N in the central Pacific, coincident with higher concentrations of pregnant females. This suggests that the area between 150W and 180W and just about 10N might be a pupping ground for

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	oceanic whitetip sharks. (Camhi et al, 2009, pp.129-130)
11. *What is the* ***extent of occurrence*** *(in km^2) for the species (described in Attachment A); explain how it was calculated and provide information on data sources.*	
a. *What is the* ***current*** *extent of occurrence?*	There is insufficient data to determine exact values for the current extent of occurrence of *C. longimanus* in Australia. However, data for Australia details that the oceanic whitetips extent is cosmopolitan in tropical and warm temperate seas and covers mainly northern Australian waters but recorded south to about Cape Leeuwin (western Australia) and Sydney (New South Wales). The distributional limit off southern Australia is uncertain, but a single specimen was recorded south-west of Port Lincoln (South Australia). Not yet recorded from the Torres Strait, Gulf of Carpentaria and Arafura Sea. Coeanic and pelagic from the surface to at least 150m deep; may occur close inshore where the continental shelf is narrow. (Last, P.R. and Stevens, J.D., 2009, p.266) Furthermore, As a pelagic shark throughout Australian waters, *C. longimanus* are generally restricted to warmer waters from Sydney north to central Western Australia. They are absent from Gulf of Carpentaria. (DAFF, n.d.) The 2009 Shark Assessment Report shows that *C. longimanus* is a prominent species in the Eastern Tuna Billfish Fisheries (ETBF) (Bensley et al., 2009). Further, the oceanic whitetip occurs within line fisheries within their Australian extent of distribution (QLD DPIF, 2009). Most recent mapping (figures 2 and 3) illustrates *C. longimanus* extends all along all coast of Australia excluding the Gulf of Carpentaria and all but one small patch along the southern coast. **Refer to figures 2 and 3.** Further catch data can be retrieved online through the Bureau of Rural Science's interactive Commercial Fisheries and Coastal Communities Mapper. **Refer to Figure 4 for recent commercial catch data maps for *C. longimanus* in Australia (comparing 2000 and 2002 records).** It should be noted that the data available from these sources only account for *reported* catch, and thus exclude illegal and unreported landings, which are likely to form a substantial proportion of overall catch in many locations.
b. *What data are there to indicate* ***past declines*** *in extent of occurrence (if available, include data that indicates the percentage decline over the past 10 years or 3 generations whichever is longer)?*	Commercial catch data from The Atlas of Australian Marine Fishing and Coastal Communities *C. longimanus* datasets indicate decreased catches from 2000 to 2002 (Figure 4). From this, and visible catch extent records seen Figure 4, it can be speculated that extent of occurrence has correspondingly been in decline. It should be noted that the data available from these sources only account for *reported* catch, and thus exclude illegal and unreported landings, which are likely to form a substantial proportion of overall catch in many locations, and therefore amplifying declines in extent of occurrence. There is not sufficient data available to enable reliable estimates to be inferred on past declines in the extent of occurrence within Australia's EEZ due to the lack of data establishing baseline abundances of naturally

	occurring populations of large sharks in Australia's waters prior to the onset of industrialized commercial fishing (Baum and Myers 2004; Castro et al 1999; Walker 2007). Further, as a wide-ranging semi-pelagic species capable of roaming vast distances over its lifetime, it is not likely that declines will be readily observed in a spatial or geographical context, as the steep population declines being documented are not driven by loss of habitat as such, but rather by targeted capture and bycatch mortality. Thus declines are reflected in the *density* of the population occurring *within* its spatial/geographical extent of occurrence, rather than in the spatial extent of occurrence itself. Nonetheless, evidence reflecting declines in population density exists, but is limited within Australian waters. For population decline in the greater Pacific, according to Inter-American Tropical Tuna Commission, oceanic whitetip shark are most commonly taken as bycatch by the purse-seine fishery in the eastern Pacific Ocean. Information on bycatch of sharks collected by observers between 1993 and 2004 indicates oceanic whitetip shark make up 20.8% of the total shark bycatch. Total observed numbers over the 11-year period indicated up to 32,000 sharks were caught in combined dolphin, unassociated and floating object purse-seine sets. Sampling coverage of the Eastern Pacific Ocean purse-seine fishery by IATTC observers for non-mammal bycatch varied by set type, but was generally greater than 60% of the sets of large vessels since 1994 (IATTC 2002, IATTC 2004). The lowest sampling coverage for non-mammal bycatch occurred in 1993, with coverage of 41% for dolphin sets, 46% for floating-object sets, and 52% for unassociated sets. Between 1993 and 2004, IATTC observers recorded shark bycatch in 23% of all sets. Therefore, due to the incomplete sampling coverage of the purse-seine fisheries by IATTC observers and the fact that of those fisheries sampled, data from only a portion of the sets were reported, bycatch for oceanic whitetip shark in purse-seine fisheries is much larger than what observers recorded. For longline fisheries, Bonfil (1994) estimated annual catches of oceanic whitetip sharks in the Pacific Ocean using the hooking rates obtained in the 1950s (from Strasburg 1958) applied to the current fishing effort. This produced estimates of 7,253 oceanic whitetip sharks (about 145 mt) taken annually as bycatch in the North Pacific, and 539,946 sharks (1,799 mt) in the central and South Pacific. (Unites States and Palau, 2010, p.7)
c. *What data are there to indicate **future changes** in extent of occurrence (if available, include data that indicates the percentage decline over 10 years or 3 generations whichever is longer (up to a maximum of 100 years in the future) where the time period is a continuous period that may include a component of the past)?*	There is currently no data available to indicate future changes in extent of occurrence for *C. longimanus*. However, data referred to in question 11b indicates past declines in extent of occurrence. As the period for this decline spans over a relatively small time frame (two years) it can be inferred that, since 2002, a decline in the extent of occurrence has continued.
12. *What is the **area of occupancy** (in km^2) for the species (described in Attachment A); explain how it was calculated and provide information on data sources*	
a. *What is the **current** area of occupancy?*	Cosmopolitan in tropical and warm temperate seas; mainly northern Australian waters but recorded south to about Cape Leeuwin (western Australia) and Sydney (New South Wales). The distributional limit off southern Australia is uncertain, but a single specimen was recorded south-west of Port Lincoln (South Australia). Not yet recorded from the Torres Strait, Gulf of Carpentaria and Arafura Sea. Coeanic and pelagic from the

	surface to at least 150m deep; may occur close inshore where the continental shelf is narrow. (Last, P.R. and Stevens, J.D., 2009, p.266) Refer to question 11 responses for further information.
*b. What data are there to indicate **past declines** in area of occupancy (if available, include data that indicates the percentage decline over the past 10 years or 3 generations whichever is longer)?*	There is no readily available data that demonstrates past declines in the geographical area of the species' occupancy within Australian waters due to the absence of reliable baseline estimates of abundances of naturally occurring populations of *C. longimanus* and other large sharks prior to the onset of industrialized commercial fishing. Refer to question 11b responses for further information.

*c. What data are there to indicate **future changes** in area of occupancy (if available, include data that indicates the percentage decline over 10 years or 3 generations whichever is longer (up to a maximum of 100 years in the future) where the time period is a continuous period that may include a component of the past)?*	There is currently no data available to indicate future changes in area of occupancy for *C. longimanus*. Data referred to in question 11b indicates past declines in extent of occurrence. As the period for this decline spans over a relatively small time frame (two years) it can be inferred that, since 2002, a decline in the extent of occurrence has continued.
13. *How many **natural locations** do you consider the species occurs in and why? Where are these located? Provide latitude, longitude, map datum and location name, where available, in an attached table.* *The term 'location' defines a geographically or ecologically distinct area.*	As a pelagic shark throughout Australian waters, *C. longimanus* are generally restricted to warmer waters from Sydney north to central Western Australia. They are absent from Gulf of Carpentaria. (DAFF, n.d.) The 2009 Shark Assessment Report shows that *C. longimanus* is a prominent species in the Eastern Tuna Billfish Fisheries (ETBF) (Bensley et al., 2009). Further, the oceanic whitetip occurs within line fisheries within their Australian extent of distribution (QLD DPIF, 2009). Cosmopolitan in tropical and warm temperate seas; mainly northern Australian waters but recorded south to about Cape Leeuwin (western Australia) and Sydney (New South Wales). The distributional limit off southern Australia is uncertain, but a single specimen was recorded south-west of Port Lincoln (South Australia). Not yet recorded from the Torres Strait, Gulf of Carpentaria and Arafura Sea. Coeanic and pelagic from the surface to at least 150m deep; may occur close inshore where the continental shelf is narrow. (Last, P.R. and Stevens, J.D., 2009, p.266)
14. *Give **locations of other populations**: captive/propagated populations; populations recently re-introduced to the wild; and sites for proposed population re-introductions. Note if these sites have been identified in recovery plans. Provide latitude, longitude, map datum and location name, where available, in an attached table.*	There is no evidence in the scientific literature of any captive/propagated populations, and therefore there are unlikely to be any reintroduced populations.
15. *Is the species' **distribution severely fragmented?** What is the cause of this fragmentation? Describe any biological, geographic, human-induced or other barriers causing this species' populations to be fragmented.* *Severely fragmented refers to the situation in which increased extinction*	The lack of population data for the species makes it difficult to determine the degree of species' distribution.

risk to the taxon results from most individuals being found in small and relatively isolated subpopulations (in certain circumstances this may be inferred from habitat information). These small subpopulations may go extinct, with a reduced probability of recolonisation.	
16. *Departmental Use Only:*	

Global Distribution

17. *Describe the species' **global distribution**.*	The oceanic whitetip shark is one of the most widely distributed shark species, usually found far offshore between about 30° North and South in all oceans (SSN, 2010). It is found in epipelagic tropical and subtropical waters between 20°North and 20°South latitude, but can be found up to about 30° North and South latitude during seasonal movements in the summer months (Backus et al. 1956). This species is a surface-dwelling, oceanic-epipelagic shark. It is usually found offshore in the open ocean, on the outer continental shelf, or around oceanic islands in deep water. It has been recorded to a depth of 152m. It is commonly found in waters warmer than 20°C waters (range 18-28°C) with one record from 15oC. Tropical Pacific records of pregnant females and newborns are concentrated between 20oN and the equator, from 170oE to 140oW. Young oceanic whitetip sharks have been found well offshore along the southeastern coast of the United States, suggesting that there may be an offshore nursery over this continental shelf (Compagno 1984, Fourmanoir 1961 Last and Stevens 1994, Bonfil *et al*. 2008). (Untied States and Palau, 2010) Studies by Backus et al (1956) in the western North Atlantic and Strasburg (1958) in the eastern Pacific Ocean were among the first to describe the distribution, abundance , size structure, diet, behaviours, sex segregation, and reproduction of the oceanic whitetip shark. However, nearly 30 years passed before Saika and Yoshimura (1985) further reported on the natural history of this species, and theirs was a limited analysis of the ecology and biology of populations in the western Pacific Ocean. The latest contributions to our knowledge of this species come from a pair of papers, Baum et al. (2003) and Baum and Myers (2004), describing declines in shark populations in the Northwest Atlantic and Gulf of Mexico. (Camhi et al, 2009, p.129) The International Union for Conservation of Nature *Red Listing* (Baum et al., 2009) for *C. longimanus* provides a full list of countries where the species range exists. The species range includes the western Atlantic Ocean from Portugal to the Gulf of Guinea and possibly the Mediterranien Sea; in the Indo-Pacific from the Red Sea and the coast of East Africa to Hawaii, Saamoa, Tahiti and the Tuamoto Islands; and in the eastern Pacific Ocean from southern California in the United States south to Peru (United States and Palau, 2010). *C. longimanus* is also listed to range within the following FAO (Food and Agriculture Organisation of the United Nations) Marine Fishing Areas – Atlantic (eastern central; northeast; northwest; southeast; southwest; western central), Indian Ocean (western; eastern), and Pacific (southeast; southwest; western central; eastern central; northwest; northeast) (Baum et al., 2009). **Refer to Figure 5 for a map showing global range for *C. longimanus*** **Refer to Table 2 for a summary of population and abundance trend data for *C. longimanus*.**

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18. *Give an overview of the* ***global population****'s size, trends, threats and security of the species outside Australia.*	**Depending on the area and study, oceanic whitetip shark populations have experienced declines of 60-70% in the northwest and central Atlantic Ocean and up to a 10-fold decline in abundance from baseline in the central Pacific Ocean.** (United States and Palau, 2010, p.2) Several populations of the shark appear already to meet the criteria for inclusion in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix I with historical declines to <10% of baseline, which for this low-productivity species is within the guidelines in *Resolution Conf. 9.24 (Rev. CoP14)* for the application of decline to commercially exploited aquatic species. Other stocks are of unknown status, but in many areas are subject to heavy fishing pressure and may be expected to show similar changes to monitored populations. It would appear, therefore, that the species meets the criteria for inclusion in Appendix II in that regulation of international trade is required to ensure that the species does not become eligible for inclusion in CITES Appendix I. (TRAFFIC, 2010) Ecological Risk and Productivity Assessments determined that oceanic whitetip sharks ranked 4th in their susceptibility to pelagic fisheries among 11 other Atlantic Ocean species (Cortés et al. 2008). Abundance trend analyses of catch-rate data have reported large declines in abundance for some populations. In the northwest and western central Atlantic regions, analysis of logbook data indicated declines of 60-70% since 1992. A standardized catch-rate analysis of data from U.S. pelagic longline surveys in the mid-1950s and U.S. pelagic longline observer data in the late-1990s in the Gulf of Mexico estimated a decline of 99% over four generations for this species. In the central Pacific Ocean, a comparative study of survey data from pelagic longlines from the 1950s and observer data in the 1990s indicated a 90% decline in biomass. Nominal catch rates for the oceanic whitetip shark from purse-seine sets on floating objects, unassociated sets and dolphin sets all showed decreasing trends since 1994. Where data are available, they show the species is severely depleted. An analysis of the U.S. pelagic longline logbook data, which covers the Northwest and Western Central Atlantic regions, led to decline estimates of 60-70% between 1992 and 2000. An analysis of the Gulf of Mexico, using data from U.S. pelagic longline surveys in the mid-1950s and U.S. pelagic longline observer data in the late-1990s, estimated a decline of 99% over this forty-year period. (SSN, 2010) **Taken together, it is likely this low-productivity species (r<0.14) has declined to at least 15-20% of baseline (1950s) in northwest Atlantic and central Pacific Oceans.** (United States and Palau, 2010, p.2) This formerly widespread and abundant large oceanic shark is subject to fishing pressure virtually throughout its range. It is caught in large numbers as a bycatch in pelagic fisheries, with pelagic longlines, probably pelagic gillnets, handlines and occasionally pelagic and even bottom trawls. Its large fins are highly prized in international trade although the carcass is often discarded. Fishery pressure is likely to persist if not increase in future. Outside of the areas detailed below, this species is under similar fishing pressure from multiple pelagic fisheries, there is no data to suggest that declines would and have not have also occurred in these areas, given there are similar fisheries throughout the range. The oceanic whitetip shark is assessed as Critically Endangered in the north-west and western

	central Atlantic because of the enormous declines that have been reported. Declines of 70% over 8 years in the north-west and western central Atlantic regions and 99.3% over a forty year time period in the Gulf of Mexico highlight this species' vulnerability (Baum et al, 2009). (Dunstan, A., 2008)

19. *Explain the* ***relationship*** *between the Australian population and the global population, including:*	
a. *What* ***percentage*** *of the global population occurs* ***in Australia****;*	As there are no stock assessments available for the species (United States and Palau, 2010), relative population size in unknown and it is therefore difficult to determine the percentage of the global population in Australia.
b. *Is the Australian population* ***distinct****, geographically* ***separate*** *or does part or all of the population move in/out of Australia's jurisdiction (give an overview; details in Movements section);*	There is insufficient data to distinguish the relation between Australian and global populations.
c. *Do* ***global threats*** *affect the Australian population*?	As global threats to oceanic whitetip are common throughout all populations, (Refer to question 44 responses for more details), it can be inferred that such threats will affect Australian populations. For example, targeted fishing and added bycatch adds to already decreasing global stocks of *C. longimanus* in Australia. Furthermore, despite insufficient data on Australian populations, it can be assumed that activities posing global threats, such as overfishing in unregulated fisheries and a high demand for their fins, also affect Australian populations. **Where data trends are not available, but where unregulated fisheries exist and are a source of supply for the international trade [as in Australia], stocks are likely to be declining.** (SSN, 2010)

Surveys and Monitoring

20. *Has the species been* ***reasonably well surveyed****?* *Provide an overview of surveys to date and the likelihood of the species' its current known distribution and/or population size being its actual distribution and/or population size. Include references documenting the current known distribution and location records and survey methodology where available.*	Until recent decades, the demand for shark meat/products was fairly limited, and therefore there was little commercial interest in funding research to determine biological parameters and population estimates for fisheries management. Furthermore, researchers were discouraged by logistical problems with studying sharks and as a result, most ichthyologists and fishery scientists favoured teleosts over sharks for their studies. Though the situation is changing, biological data nonetheless remains limited (Castro et al 1999). As a result, the majority of fishing induced shark mortality occurred as bycatch, and as such a large proportion (over 50% of estimated global catch according to Stevens et al (2000)) of unintended shark catch was discarded and never recorded (Camhi 2009). While many gaps in bycatch data exist, Bonfil (1994) estimated that by the end of the 1980s approximately 12 million elasmobranchs (up to 300,000t) were taken as bycatch annually on the high seas alone, with 4 million taken in driftnet fisheries and over 8 million on tuna fishery longlines primarily from Asia. The species composition of these catches is virtually unknown, other than that most were sharks (Camhi 2009). The need for improved reporting of shark catch was elucidated by increasing global reports of steep declines in shark catch following the

	development of targeted fisheries, primarily for shark fin, and reporting mechanisms of bycatch and directed fisheries began to be implemented. However using fisheries data to inform abundance estimates is unreliable and problematic. Most theoretical stock assessment models are based on the life history parameters of teleosts, as such parameters large sharks are either unknown or debated (Castro et al 1999). Consequently, attempts at shark stock assessment have been few and the results have been questionable or severely flawed. Underreporting is rife, and illegally obtained catch is not recorded at all. Where catch is recorded, it has very rarely been recorded to species level (Camhi 2009). Further, information regarding effort is frequently absent from fishery statistics, making the interpretation of landings statistics difficult. Where fisheries have maintained high quality records and statistics, they are often reluctant to publish such data, for fear it will induce restrictions on their fishing activities (Castro et al 1999). Thus the likelihood of abundance estimates informed by fisheries derived data being accurate is low, particularly in light of the lack of baseline estimates for comparison. No stock assessments have been conducted for the species, in large part because of the lack of historical catch and abundance indices. Evaluation of the conservation status of this species is hampered by the limited availability of standardized catch and abundance data, and the resulting absence of stock assessment studies. In 1995, ICCAT began requesting that parties submit their shark data using a form that lists eight species of pelagic sharks, including the whitetip. However, ICCAT recognized that many countries had difficulties in doing this. In the 2001 posting of the ICCAT shark database, only 5 countries reported oceanic whitetip catches. (Camhi et al., 2009, p.136) **Refer to Figure 6 for catch records of Oceanic Whitetip reported to ICCAT's shark database.** Where data are available, they show the species is severely depleted. An analysis of the U.S. pelagic longline logbook data, which covers the Northwest and Western Central Atlantic regions, led to decline estimates of 60-70% between 1992 and 2000. An analysis of the Gulf of Mexico, using data from U.S. pelagic longline surveys in the mid-1950s and U.S. pelagic longline observer data in the late-1990s, estimated a decline of 99% over this forty-year period. Where trend data are not available, but where unregulated fisheries exist and are a source of supply for the international trade, stocks are likely to be declining rapidly. For this reason, IUCN classifies the Northwest Atlantic and Western Central Atlantic populations (for which data exist) as Critically Endangered, while the global population (for which data are scarce) as Vulnerable. In IUCN's estimation, if data from areas outside the Northwest and Western Central Atlantic were available**, the global population would probably be shown to have experienced declines similar to those of the Northwest and Western Central Atlantic, since fisheries for the species are similar in both areas. In other words, it is likely that the species meets the definition of Critically Endangered throughout most of its range**. (SSN, 2010)
21. *For species nominated as extinct or extinct in the wild, please provide details of the* ***most recent*** *known* ***collection****, or authenticated*	***Not applicable***

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sighting *of the species, and whether additional populations are likely to exist and the basis for this assertion. Provide latitude, longitude, map datum and location name, where available.*	
22. *Is there an ongoing* ***monitoring programme****? If so, please describe the extent and length of the programme.*	In 1995, ICCAT began requesting that parties submit their shark data using a form that lists eight species of pelagic sharks, including the whitetip. However, ICCAT recognized that many countries had diffuclties in doing this. In the 2001 posting of the ICCAT shark database, only 5 countries reported oceanic whitetip catches. (Camhi et al., 2009, p.136) Most states/territories in Australia, including NSW, Queensland, South Australia, and Western Australia, have a game fish tagging program run by the government fisheries department. However, these do not specifically target oceanic whitetip. There are no other known monitoring programs.

Life Cycle and Population

23. *What is the species' total population size in terms of* ***number of mature individuals****? How were population estimates derived and are they reliable? Are there other useful measures of population size and what are they?* In the absence of figures, terms such as common, abundant, scarce can be of value.	There are no stock assessments available for this species and, as such, relative population size is unknown (United States and Palau, 2010). This species, together with the silky shark *Carcharhinus falciformis* and blue shark *Prionace glauca*, has often been described as one of the three most abundant species of oceanic sharks and large marine animals (Compagno 1984, Taniuchi 1990, Bonfil 1994, Castro *et al*. 1999). Recent observations, however, indicate that this species that was formerly nearly ubiquitous in water deeper than 180 m and above 20°C (Castro *et al*. 1999) is now only occasionally recorded (e.g., Baum and Myers 2004, Domingo 2004). The population dynamics and structure of this species are unknown. Distribution appears to depend on size and sex and the nursery areas appear to be oceanic (Seki *et al*. 1998). Larger individuals are caught deeper than smaller ones and there is geographic and sexual segregation (Anderson and Ahmed 1993). Longline catches in the Central Pacific show that this species definitely increases in abundance as a function of increasing distance from land, and, unlike the silky shark *Carcharhinus falcifomis*, it does not congregate around land masses (Compagno in prep.). In the Northwest and Western Central Atlantic enormous declines are estimated to have occurred. Two estimates of trends in abundance from standardized catch rate indices have been made from independent datasets. An analysis of the US pelagic longline logbook data between 1992 and 2000, which covers the Northwest and Western Central Atlantic regions, estimated declines of 70% (Baum *et al*. 2003). An analysis of the Gulf of Mexico, which used data from US pelagic longline surveys in the mid-1950s and US pelagic longline observer data in the late-1990s, estimated a decline of 99.3% over this forty year time period (Baum and Myers 2004). When trends in abundance from the former analysis are extrapolated back to the mid-1950s, they match the latter analysis almost exactly (99.8%). Over a period of three generations (30 years), the estimated decline is 98%. However, the latter study has recently been criticized because temporal changes in fishing gear and practices over the time period were not taken fully into account and the study may, therefore, have exaggerated or underestimated the magnitude of the declines (Burgess *et al*. 2005, Baum *et al*. 2005). (Baum et al., 2009) Depending on the area and study, oceanic whitetip shark populations have

	experienced declines of 60-70% in the northwest and central Atlantic Ocean and up to a 10-fold decline in abundance from baseline in the central Pacific Ocean (United States and Palau, 2010). There is insufficient data for Australia.
24. *Does the species occur in a* ***number of smaller populations****? How many? For each population give the locality, numbers and trends in numbers and tenure of land (include extinct populations). Can these be considered to be subpopulations and why?* **Subpopulations** are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange.	The lack of data for the species makes it difficult to determine numbers in smaller populations.

25. *Provide details on ages of the following:*	
a. *sexual maturity;*	Males mature at about 170 to 96 cm and females at 170 to 190 cm TL (Seki *et al*. 1998). Last and Stevens note that age at maturity is about 5-7 years in both sexes (2009, p.266). In the north Pacific, females become mature at about 168-196 cm TL and males at 175-189 cm TL corresponding to an age of 4-5 years, respectively (Seki et al. 1998). Lessa et al. (1999) found both sexes mature at 180-190 cm TL (age 6-7 years) in the western equatorial Atlantic Ocean. Tropical Pacific records of pregnant females and newborns are concentrated between 20°N and the equator, from 170°E to 140°W. (United States and Palau, 2010, p.3)
b. *life expectancy;*	The lack of data for the species makes it difficult to determine life expectancy.
c. *natural mortality.*	The lack of data for the species makes it difficult to determine natural mortality.
26. Reproduction	
For plants*: When does the species flower and set fruit? What conditions are needed for this? What is the pollinating mechanism? If the species is capable of vegetative reproduction, a description of how this occurs, the conditions needed and when. Does the species require a disturbance regime (e.g. fire, cleared ground) in order to reproduce?*	***Not applicable***
For animals*: provide overview of breeding system and of breeding success, including: when does it breed; what conditions are needed for breeding; are there any breeding behaviours that may make it vulnerable to a threatening process?*	Few reproductive studies are available for oceanic whitetip sharks. Seki et al. (1998) suggested a 2-year reproductive cycle with a 9-12 month gestation period. Litter sizes ranged from one to 14 with a mean of 5-6 embryos depending on geographic location. Litter size was found to increase with maternal size in the northwest Atlantic Ocean but this was based on a small sample size (Backus et al. 1956). Pups are born at a size between 55 and 75 cm TL. In the north Pacific, females become mature at about 168-196 cm TL and males at 175-189 cm TL corresponding to an age of 4-5 years,

	respectively (Seki et al. 1998). Lessa et al. (1995) found both sexes mature at 180-190 cm TL (age 6-7 years) in the western equatorial Atlantic Ocean. (United States and Palau, 2010, p.4) Development is viviparous and embryos have a yolk sac placenta that attaches to the uterine wall of the mother (Bigelow and Schroeder 1948). Born at about 60 to 65 cm TL after a gestation period of about 10 to 12 months (Compagno in prep.), males mature at about 170 to 96 cm and females at 170 to 190 cm TL (Seki *et al*. 1998). Oceanic whitetip sharks grow to a large size, with some individual reaching almost 4 m. However, most known specimens are <3 m in length. Litter sizes vary from about 1 to 14 (Bass *et al*. 1973, Stevens 1984, Seki *et al*. 1998), although 15 foetuses were recorded from a female of 245 cm TL from the Red Sea (Gohar and Mazure 1964) and larger females appear to carry more young, although there may be regional variation (Bass *et al*. 1973). Birth is thought to occur in early summer in the northwest Atlantic and south west Indian Oceans (Bass *et al*. 1973), and January to March off New South Wales (Stevens 1984), whereas Seki *et al*. (1998) found that parturition was February to July in the North Pacific. Pregnant females of this species are less frequently found in the Indian Ocean than other sharks of this genus (Gubanov 1978). In the Central Pacific, females with small embryos have been found throughout the year, suggesting a less tight seasonality of birth (and presumably mating) than the Western Atlantic (Compagno in prep). Also, non-breeding adult females have been found to outnumber gravid females in the equatorial Central Pacific (Compagno in prep). The location of nurseries has not been reported, but very young oceanic whitetip sharks have been found well offshore along the southeastern US, suggesting offshore nurseries over the continental shelves (Compagno in prep). (Baum et al., 2009) Seki *et al*. (1998) studied the age, growth and reproduction of the oceanic whitetip in the north Pacific. They found similar growth rates in both males and females with a Von Bertalanffy equation of: $L_t = 299.58 * \{1 - e^{-0.103} \times (t + 2.698)\}$ where L_t is expressed as precaudal length in cm at age t. They used Bass *et al*.s (1973) transformation of TL = 1.397 x PL for conversions to total length. Using vertebral analysis they showed that annular formation occurred in spring. Both male and female oceanic whitetips matured at 4 to 5 years of age. Smith *et al*. (1998) investigated the intrinsic rebound potential of Pacific sharks and found that oceanic whitetips to be among a moderate rebound potential, because of their relatively fast growth and early maturation. (Baum et al., 2009)
27. *What is the* ***population trend*** *for the entire species?*	
a. What data are there to indicate ***past decline*** *in size (if available, include data on rate of decline over past 10 years or 3 generations whichever is longer)?*	Where data are available, they show the species is severely depleted. An analysis of the U.S. pelagic longline logbook data, which covers the Northwest and Western Central Atlantic regions, led to decline estimates of 60-70% between 1992 and 2000. An analysis of the Gulf of Mexico, using data from U.S. pelagic longline surveys in the mid-1950s and U.S. pelagic longline observer data in the late-1990s, estimated a decline of 99% over this forty-year period. Where trend data are not available, but where unregulated fisheries exist and are a source of supply for the international trade, stocks are likely to be declining rapidly. For this reason, IUCN classifies the Northwest Atlantic and Western Central Atlantic populations (for which data exist) as Critically Endangered, while the global population (for which data are scarce) as Vulnerable. In IUCN's estimation, if data from areas outside the Northwest and Western Central Atlantic were available**, the global population would probably be shown to have experienced declines similar to those of the Northwest and Western Central Atlantic, since fisheries for the species are similar in both areas. In other words, it is likely that the**

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	species meets the definition of Critically Endangered throughout most of its range. (SSN, 2010) Eastern Tuna and Billfish Fishery (ETBF) reports show increase of 202 to 247 catches (including discards) between 1998 and 1999. For the Western/Southern Tuna and Billfish Fishery (WSTBF) records showed an increase from 25 to 331 for the same years. (Bensley et al., 2009) Using trade records and molecular genetics, researchers estimated total species-specific catch, based on the Hong Kong fin trade, which itself controls 50-85% of the world trade in shark fins: 17% came from the pelagic blue shark, which dominated the market, 2% from the oceanic whitetip. This represented an extrapolated figure of 250,000 – 1,200,000 oceanic whitetip sharks killed per annum. Results provide the first 'fishery-independent' estimate of the true scale of shark catches. Up to 4 times that reported by the FAO 2000 global catch data-base. Latter is based on reported catch/bycatch by all commercial fisheries. It doesn't include illegal or under-reported or unregulated catch. There is mounting evidence of the oceanic whitetip's increasing vulnerability in Indian and Pacific oceans to commercial exploitation (large numbers and widely caught) with potential to follow the pattern of stock collapses seen in the northern hemisphere. There are no stock assessments for the oceanic whitetip because of the lack of historical catch and abundance indices (Bonfil *et al* Camhi et al., 2009, p136) Refer to responses for questions 11b and 18 for more data.
b. *What data are there to indicate **future changes** in size (if available, include data which will indicate the percentage of decline over 10 years or 3 generations whichever in longer (up to a maximum of 100 years in the future) where the time period is a continuous period that may include a component of the past)?*	If there is no reduction in fishing exploitation of the Oceanic whitetip shark (targeted catch, bycatch, legal and illegal), no improvement in management processes and/or mitigation measures implemented, declines of *C. longimanus* can only be expected to continue until the species is eliminated. **The IUCN Red List states that the species population trend is decreasing**. (Baum et al., 2009)
28. *Does the species undergo **extreme natural fluctuations** in population numbers, extent of occurrence or area of occupancy? To what extent and why?* **Extreme fluctuations** can be said to occur in a number of taxa when population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude (i.e. a tenfold increase or decrease).	The lack of data for the species makes it difficult to determine extreme natural fluctuations.
29. *What is the **generation length** and how it is calculated?* **Generation length** is the average age of parents of the current cohort (i.e. newborn individuals in the population). Generation length therefore reflects the turnover rate of breeding individuals in a population. Generation length is greater than the age at first breeding and less than the age of the oldest breeding individual, except in taxa that breed only once. Where generation length varies under threat, the more natural, i.e. pre-disturbance, generation length should be used.	Generation length calculations necessarily incorporate age at maturity and life expectancy values; neither has been definitively determined in *C. longimanus* as yet.

30. *Identify **important populations** necessary for the species' long-term survival and*	From a conservation/preservation strategy perspective, each subpopulation is potentially as important as the next, since strong population structure built by a high degree of reproductive isolation

recovery? This may include: key breeding populations, those near the edge of the species' range or those needed to maintain genetic diversity.	suggests that regional populations, if depleted, will not replenish themselves rapidly through immigration, but rather slowly through reproduction (Duncan et al 2006). Therefore, practical management for sharks like *C. longimanus* should include not only population-specific protection in the adult phase, but also access to regional nurseries (Bowen and Roman 2005). Critical habitats and threats to these habitats are unknown. Pacific records of pregnant females and newborn oceanic whitetip sharks are concentrated between 20°North and the equator, from 170°East to 140°West. Young oceanic whitetip sharks have been found well offshore along the southeastern coast of the United States, suggesting that there may be an offshore nursery over this continental shelf (Fourmanoir 1961, Compagno 1984, Last and Stevens 1994, Bonfil et al. 2008). The effects of climatic changes on world ocean temperatures, pH, and related biomass production could potentially impact oceanic whitetip populations, but the possible extent of such impacts is unknown.
31. *Describe any **cross-breeding** with other species in the wild, indicating how frequently and where this occurs.*	There is no evidence of any cross-breeding with other species in the wild in the available literature.
32. *Departmental Use only:*	

Populations In Reserve

33. *Which **populations** are **in reserve systems**? Which of these are actively managed for this species? Give details.*	No species specific mechanisms are currently in place to manage particular populations of *C. longimanus*. Nonetheless, enforcement is difficult and high levels of fishing intensity continue illegally. In Australian waters, all reserve systems in the species range may have *C. longimanus* either permanently or occasionally. The map in Figure 7 shows Commonwealth marine protected areas of 2009. **Refer to Figure 7 for map showing Commonwealth marine protected areas.**

Habitat

34. *Describe the **species' habitat** (e.g. aspect, topography, substrate, climate, forest type, associated species, sympatric species). If the species uses different habitats for different activities (e.g. breeding, feeding, roosting, dispersing, basking), then describe each habitat.*	The oceanic whitetip is oceanic and pelagic ranging from the surface to at least 150m deep. Occupying a similar habitat to the blue shark, it prefers water temperatures above 20°C and is mostly found in the open ocean, but may also occur close inshore where the continental shelf is narrow. (Last, P.R. and Stevens, J.D., 2009) Data shows that pregnant females occur mainly in a wide area of the North Pacific between 140W and 150E, with higher concentrations in the central part of this distribution just about 10N. Newborn sharks occur between the equator and 20N, but mainly in a narrow strip just about 10N in the central Pacific, coincident with higher concentrations of pregnant females. This suggests that the area between 150W and 180W and just about 10N might be a pupping ground for oceanic whitetip sharks. (Camhi et al, 2009, pp.129-130)
35. *Does the species use **refuge habitat**, e.g. in times of fire, drought or flood? Describe this habitat.*	No known refuge habitats have been identified for *C.longimanus*.
36. *Is the **extent or quality** of the species' habitat **in decline**? If the species uses different habitats, specify which of these are in*	Anthropogenic influences threaten coastal and estuarine habitat utilized by *C. longimanus* and other coastal species through development, fisheries activities, chemical and nutrient pollution, freshwater diversion from incoming rivers, and dumping of plastic and other manmade substances,

decline.	endangering marine life (Camhi 1998). Marine pollution from agriculture and industry effluents cause algal growths which smother plant life, and leach atmospheric contaminants and heavy metal deposits such as mercury, organochlorines and PCBs which can act as endocrine disruptors, cause neurological complications or interrupt other basic biological functions in sharks (Camhi 1998; WildAid 2007). Moreover, climate change and its many associated effects (i.e. ocean acidification, water temperature rise, altered current flows, limited nutrient availability, coral bleaching etc – refer item 45) might potentially result in any number of implications for sharks; however it is inappropriate to speculate about such implications at present, as management of such potential outcomes is far beyond the scope of this document. Nevertheless, habitat is likely to face threats resulting from climate change.
37. *Is the species part of, or does it rely on, a* ***listed threatened ecological community****? Is it associated with any other* ***listed threatened species****?*	The lack of data for the species makes it difficult to determine relationships with listed threatened ecological communities or species.

Feeding

38. *Summarize the species'* ***food*** *items or sources and timing/seasonality.*	Oceanic whitetip sharks are high trophic level predators in open ocean ecosystems feeding mainly on teleosts and cephalopods (Backus 1956), but studies have also reported that they prey on sea birds, marine mammals and other sharks and rays (Compagno 1984). As one of the four most dangerous species to humans it is thought responsible for many open-ocean attacks after air or sea disasters (Last and Stephens, 2009). This pelagic species feeds mainly on bony fishes (including tunas, barracuda, white marlin, dolphinfish, lancetfish, oarfish, threadfish, swordfish) and cephalopods and to a lesser extent, seabirds, marine mammals, stingrays, and flotsam, including garbage. (Baum et al., 2009) Cortes (1999) determined the trophic level based on diet for oceanic whitetip shark was 4.2 (maximum=5.0).
39. *Briefly describe the species'* ***feeding behaviours****, including those that may make the species vulnerable to a threatening process.*	This shark is often accompanied by remoras, dolphin fishes and pilot fishes, and reportedly demonstrates an unusual association with the shortfin pilot whale (*Globicephala macrorhynchus*) in Hawaiian waters. Although the exact reason for this shark swimming along with pods of pilot whales is unknown, it is suspected that oceanic whitetip sharks are following them to sources of squid, which the pilot whales are extremely efficient at locating (Florida Museum of Natural History, 2006). (Arkive, n.d.) Furthermore, sharks tend to target the sick and the weak members of prey populations, removing weaker genes from the pool, thereby maintaining the overall genetic fitness of prey populations. Apex predators have also been documented to influence the spatial distribution of potential prey as fear of predation causes some species to alter their behaviours regarding habitat use and activity level, leading to shifts in abundance in lower trophic levels, ultimately maintaining or enhancing biodiversity. They exert additional influence by providing essential food sources for scavengers (Frid et al, 2007; Griffin et al, 2008).

Movement Patterns (fauna species only)

40. *Describe any relevant* ***daily and seasonal pattern of movement*** *for the species, or other irregular patterns of movement, including relevant arrival/departure dates if migratory.*

The full extent of *C. longimanus* movements in Australian waters is not understood.

41. *Give details of the species'* ***home ranges/territories****.*

Refer to Figures 2, 3 and 5 for national and international ranges, respectively.

As a pelagic shark throughout Australian waters, *C. longimanus* are generally restricted to warmer waters from Sydney north to central Western Australia. They are absent from Gulf of Carpentaria. (DAFF, n.d.) The 2009 Shark Assessment Report shows that *C. longimanus* is a prominent species in the Eastern Tuna Billfish Fisheries (ETBF) (Bensley et al., 2009). Further, the oceanic whitetip occurs within line fisheries within their Australian extent of distribution (QLD DPIF, 2009).

Cosmopolitan in tropical and warm temperate seas; mainly northern Australian waters but recorded south to about Cape Leeuwin (western Australia) and Sydney (New South Wales). The distributional limit off southern Australia is uncertain, but a single specimen was recorded south-west of Port Lincoln (South Australia). Not yet recorded from the Torres Strait, Gulf of Carpentaria and Arafura Sea. Coeanic and pelagic from the surface to at least 150m deep; may occur close inshore where the continental shelf is narrow. (Last, P.R. and Stevens, J.D., 2009, p.266)

Survey Guidelines

42. *Give details of the* ***distinctiveness and detectability*** *of the species.*

Distinctive features include body fusiform with low interdorsal ridge present; labial furrows short, confined to mouth corners; upper teeth serrated, broadly triangular and erect, with lowers more slender, erect and serrated; first dorsal-fin origin just anterior to pectoral-fin free rear tips; pectoral-fin anterior margin 20-30% of total length, maximum width 1.9-2.3 in anterior margin; first dorsal-fin height 9-17% of total length; and tooth count 30-31/27-29.

To add, oceanic whitetip mottled white fins mimin schools of baitfish and attract such prey as scombrids (tunas and mackerels).

(Last, P.R. and Stevens, J.D., 2009, p.265)

43. *Describe* ***methods for detecting species*** *including when to conduct surveys (e.g. season, time of day, weather conditions); length, intensity and pattern of search effort; and limitations and expert acceptance; recommended methods; survey-effort guide.*

Methods for data collection included:

- Preliminary data from Japanese research and training tuna longliners in the Pacific Ocean. (Camhi et al., 2009, p.129)
- Strasburg (1958) and Bonfil (1994) estimated oceanic whitetip numbers using an estimate of hooks deployed in the Pacific by longline fleets and hooking rates of 0.07 oceanic whitetips per 1000 hooks. Strasburg (1958) also used a hooking rate for the eastern equatorial Pacific of 5.46 whitetips per 1000 hooks and an estimate of total hooks fished by longliners in the area. (Camhi et al., 2009, p.134)
- Catch data from fisheries. However, quantification of catch numbers or biomass is hindered by the lack of complete and accurate logbook data. (Camhi et al., 2009, p.134)
- Range data provided in Figure 3 was collected using KGS and ACON mappers. Information on these mappers can be found at www.iobis.org.au

There are no stock assessments for the oceanic whitetip because of the

	lack of historical catch and abundance indices (Bonfil *et al* Camhi et al., 2008, p136)

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Australian Government

Department of the Environment

Section 2 - Threats and Threat Abatement

Threats

44. *Identify* ***past, current and future threats****, to the species indicating whether they are actual or potential. For* <u>*each*</u> *threat, describe:*	
a. ***how and where*** *it impacts on this species;*	The Oceanic Whitetip Shark *Carcharhinus longimanus* is widely distributed and its life history characteristics make it highly vulnerable to over-exploitation. Oceanic Whitetip Sharks form part of the catch of many fisheries and are heavily exploited throughout their range, where removal and retention of fins is encouraged by the high value of their fins in international trade. The species is inherently vulnerable to over-exploitation and there is evidence demonstrating declines in most cases where exploited populations are monitored. (TRAFFIC, 2010) The species is unmanaged throughout its range, and falls into the FAO's lowest productivity category of the most vulnerable commercially exploited aquatic species. (SSN, 2010) **1) Overfishing** – Targeted and Bycatch Ecological Risk and Productivity Assessments determined that oceanic whitetip sharks ranked 4th in their susceptibility to pelagic fisheries among 12 other Atlantic Ocean species (Cortés et al. 2008). Oceanic whitetip are harvested commercially as target catch and bycatch in Australian waters. Internationally, there is little to no management of oceanic whitetip. (United States and Palau, 2010) Overfishing is the most direct, immediate and serious threat to *C. longimanus'* survival. Of the 166 species of sharks that occur in Australian waters, fewer than 12 are commonly caught by pelagic longliners. A recent estimate of the average catch rate of all shark species on Australia's east coast was 5.5 per 1000 hooks (Gilman et al, 2007), including the oceanic whitetip. Oceanic whitetip sharks are a common tropical pelagic species taken as bycatch in tuna and swordfish fisheries, where they are retained for their high value fins (Last and Stephens, 2009). They are primarily utilized for fins, but meat is consumed in local markets. The hide and liver are also utilized (Last and Stephens, 2009). Of the 166 species of sharks that occur in Australian waters, fewer than 12 are commonly caught by pelagic longliners. A recent estimate of the average catch rate of all shark species on Australia's east coast was 5.5 per 1000 hooks. Blue sharks are caught in greatest numbers, with oceanic whitetips, shortfin mako, bronze whaler and thresher spp. also frequently caught. Less frequently caught are hammerhead, tiger, crocodile, silky, porbeagle sharks and longfin mako sharks. There is a large amount of uncertainty in the species composition of shark catch due to identification issues that can arise due to similarities between certain species. The sharks that are captured in the ETBF in greatest numbers and discarded include: blue sharks (95%), tiger sharks (82%), **oceanic whitetip sharks (77%)** and bronze whalers (71%). The sharks that are captured in the WTBF in greatest numbers and discarded include: crocodile sharks (100%), dusky sharks (100%), blue sharks (90%) and shortfin makos (80%). (AFMA, 2010) Shark catch data from the Eastern Tuna and Billfish Fishery (ETBF) and

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the Western Tuna and Billfish Fishery (WTBF) has historically been dominated by the blue shark (*Prionace glauca*) and oceanic whitetip (*Carcharhinus longimanus*) (Bensley et al., 2010, p.8)

Eastern Tuna and Billfish Fishery (ETBF) reports show increase of 202 to 247 catches (including discards) between 1998 and 1999. For the Western/Southern Tuna and Billfish Fishery (WSTBF) records showed an increase from 25 to 331 for the same years. (Bensley et al., 2009)

According to Inter-American Tropical Tuna Commission, oceanic whitetip shark are most commonly taken as bycatch by the purse-seine fishery in the eastern Pacific Ocean. Information on bycatch of sharks collected by observers between 1993 and 2004 indicates oceanic whitetip shark make up 20.8% of the total shark bycatch. Total observed numbers over the 11-year period indicated up to 32,000 sharks were caught in combined dolphin, unassociated, and floating object purse-seine sets. Sampling coverage of the Eastern Pacific Ocean purse-seine fishery by IATTC observers for non-mammal bycatch varied by set type, but was generally greater than 60% of the sets of large vessels since 1994 (IATTC 2002, IATTC 2004). The lowest sampling coverage for non-mammal bycatch occurred in 1993, with coverage of 41% for dolphin sets, 46% for floating-object sets, and 52% for unassociated sets. Between 1993 and 2004, IATTC observers recorded shark bycatch in 23% of all sets. Therefore, due to the incomplete sampling coverage of the purse-seine fisheries by IATTC observers and the fact that of those fisheries sampled, data from only a portion of the sets were reported, bycatch for oceanic whitetip shark in purse-seine fisheries is much larger than what observers recorded. (United States and Palau, 2010, p.7)

For longline fisheries, Bonfil (1994) estimated annual catches of oceanic whitetip sharks in the Pacific Ocean using the hooking rates obtained in the 1950s (from Strasburg 1958) applied to the current fishing effort. This produced estimates of 7,253 oceanic whitetip sharks (about 145 mt) taken annually as bycatch in the North Pacific, and 539,946 sharks (1,799 mt) in the central and South Pacific.

2) Product Harvesting
Numerous products are derived from oceanic whitetip sharks: meat and skin for human consumption, hides for leather production, and vitamin A derived from liver oil. Fins from this species are one of the most distinctive and common products in the Asian shark fin trade and compose at least 2% by weight of shark fins auctioned in Hong Kong. Because of economic and operational differences, the utilization of this species varies from fleet to fleet. (Camhi et al., 2009, pp. 135-136)

A large proportion of the oceanic whitetip sharks taken as bycatch on pelagic longlines are alive when brought to the vessel. Thus, most would likely survive if released unharmed, in accordance with several Regional Fisheries Management Organisations (RFMO) shark resolutions (Camhi et al. 2009). However, the high value of their large fins and the low value of the meat encourages finning (removal and retention of fins and discard of carcasses) rather than the release of this bycatch.

Fins from this species are one of the most distinctive and common products in the Asian shark fin trade. Fins are easily identifiable without genetic analysis and Hong Kong traders seldom mix them with other species (Clarke et al. 2006a). Clarke et al. (2004; 2006a) estimated that oceanic whitetip shark fins comprise about 2.0% by weight of the total fin trade. Molecular genetic testing of 23 fin samples that were imported from three oceans and collected from nine randomly sampled fin traders demonstrated 100% concordance between the fin trade name “Liu Qui” and oceanic whitetip shark (Clarke et al. 2006). Wholesale prices for oceanic whitetip fin sets originating from the south Pacific ranged from US$45 to US$85 per kg (Clarke et al. 2004a). Clarke et al. (2006b)

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	estimated that in 2000 0.6 million oceanic whitetip sharks (or 22,000 metric tons), were utilised annually for the fin trade. **3) Legal trade** Oceanic whitetip sharks are caught as bycatch in high seas pelagic fisheries. As the meat is of generally low value it is often discarded and the fins are retained because of their high value (US$45 to US$85 per kg) in international trade. International shark trade information is not documented to the species level for sharks in the Harmonized Tariff Schedule. Therefore, species-specific information about quantity or value of imports or exports is not available through the tariff schedule. In addition, most parties do not report catches to species level to FAO or Regional Fisheries Management Organisations. However, information on the trade of oceanic whitetip shark fins can be obtained by examination of the Hong Kong Fin Market whose global trade in fins represented 65-80% from 1980 to 1990 (Clarke 2008) and 44-59% of the market from 1996 to 2000 (Fong and Anderson 2000; Clarke 2004). Prior to 1998, imports of fins to Hong Kong were reported as either dried or frozen ("salted") without distinguishing between processed and unprocessed fins. To avoid double counting fins returning to Hong Kong from processing in mainland China, only unprocessed dried and frozen fins were included in total imports to Hong Kong. Hong Kong shark fin traders use 30–45 market categories for fins (Yeung et al. 2000), but the Chinese names of these categories do not correspond to the Chinese taxonomic names of shark species (Huang 1994). Instead, Chinese market categories for shark fins appear to be organized primarily by the quality of fin rays produced and secondarily by distinguishing features of dried fins. Using commercial data on traded weights and sizes of fins, the Chinese category for oceanic whitetip shark, coupled with DNA and Bayesian statistical analysis to account for missing records, Clarke et al. (2006a, 2006b) estimated between 220,000 and 1,210,000 oceanic whitetip sharks were traded globally in 2000. (United States and Palau, 2010, p.8)
b. *what its **effect** has been **so far** (indicate whether it is known or suspected; present supporting information/research; does it only affect certain populations);*	1) Overfishing Despite being described as having moderate rebound potential with relatively fast growth and early maturation for Pacific sharks Smith *et al* (1998), Castro *et al*, (1999) classified this species as vulnerable to overfishing on the basis of slow growth, limited reproduction and high rate of by-catch in pelagic fisheries. Precipitate population collapses in the Gulf of Mexico and NW Atlantic require explanation. More work is needed to understand growth characteristics, geographic extent and size of local populations. Using trade records and molecular genetics, researchers estimated total species-specific catch, based on the Hong Kong fin trade, which itself controls 50-85% of the world trade in shark fins: 17% came from the pelagic blue shark, which dominated the market, 2% from the oceanic whitetip. This represented an extrapolated figure of 250,000 – 1,200,000 oceanic whitetip sharks killed per annum. Results provide the first 'fishery-independent' estimate of the true scale of shark catches. Up to 4 times that reported by the FAO 2000 global catch data-base. Latter is based on reported catch/bycatch by all commercial fisheries. It doesn't include illegal or under-reported or unregulated catch. There is mounting evidence of the oceanic whitetip's increasing vulnerability in Indian and Pacific oceans to commercial exploitation (large numbers and widely caught) with potential to follow the pattern of stock collapses seen in the northern hemisphere. There are no stock assessments for the oceanic whitetip because of the lack of historical catch and abundance indices (Bonfil *et al* in Camhi et al., 2009, p136) The oceanic whitetip shark is one of the most common bycatch species in

	tuna fisheries in offshore tropical waters. Frequently caught in small-scale multispecies shark fisheries. Despite their abundance, quantification of catch numbers or biomass for the species is hindered by the lack of complete and accurate logbook data. Applying Strasburg's (1958) hooking rate for the eastern equatorial Pacific of 5.46 oceanic whitetips per 1000 hooks, and an estimate of total hooks fished by Japanese, South Korean, Taiwanese and Australian longlines in that area in 1989, Bonfil (1994) estimated that another 539,946 individuals (10,799 t) were taken annually in the central and South Pacific. (Camhi et al., 2009, p. 134) On the basis of longline catch-rate data, Bonfil (1994) estimated that over 7,200 oceanic whitetips (145t) were taken annually in the North Pacific and another 540,000 (10,800t) in the Central and South Pacific in the late 1980s. These sharks were caught incidentally in the longline fisheries of Japan, South Korea, Taiwan and Australia. There are data to suggest that the Central Pacific (150°W to 180°W) just north of the equator (10°N) serves as a pupping ground for oceanic whitetip sharks (Bonfil et al.2008). Stevens (2000) estimated that between 52,000t and 240,000t of oceanic whitetip sharks were taken on longlines and in purse seines throughout the Pacific in 1994. By comparison, FAO landings for this species are clearly underreported: In 2007, only 14t, all from Brazil, were recorded. Reported landings of oceanic whitetips first appeared in the FAO database in 2000 (638t) and have been declining ever since, with annual average landings of 238t (FAO 2009). (Camhi et al., 2009, p.26) Oceanic whitetip populations will suffer if this level of exploitation continues.
c. *what is its **expected effect in** the **future** (is there supporting research/information; is the threat only suspected; does it only affect certain populations);*	Declining catch rates in some regions, however, are cause for concern, particularly because oceanic whitetips were found to suffer a moderately high level of risk of overexploitation (Simpfendorfer et al. 2008 in Camhi et al., 2009, p. 27) There is a considerable amount of data that suggests that most shark species that are impacted by fisheries will continue to be negatively impacted due to their low capacity for population rebound after consistent population decline (Camhi et al, 2007). This impact will likely spread over a wide area, impacting more populations of sharks, as demand for fisheries increases over time. One significant relationship to emerge is that a **higher threat classification is often associated with data–rich regions and lower threat /data deficient classification with data-poor regions**, where "fisheries impacts are suspected but are unquantifiable" (Dulvey et al., 2008 , **p470**). Sharks and rays suffer from a lack of management and low conservation priority. Undervalued previously, they have had a low priority in fishery management schemes. Australia is no exception. There has been a **lack of species-specific data collected**, which could **mask declines** and **local extinctions** (Dulvey *et al*, 2000). There is also **individual species variation** in demographic rates with response to exploitation. This is a **critical point for those species insufficiently understood like the white-tip.** We know too they are important in the fin trade and may merit upgrading to a higher threat category when more data becomes available from our region. (Dulvey et al., 2008)
d. *what is the **relative importance or magnitude** of the threat to the species.*	Due to a lack of protection and little capacity of regulatory enforcement in global and local shark fisheries, fishing pressure is likely to be of very high importance. There is little indication that restrictions on shark fisheries have been effective given a rapid increase in demand for shark products. There is a considerable amount of data that suggests that most shark species that are impacted by fisheries will continue to be negatively impacted due to their low capacity for population rebound after consistent

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	population decline (Camhi et al, 2007). This impact will likely spread over a wide area, impacting more populations of sharks, as demand for fisheries increases over time. There is also **individual species variation** in demographic rates with consequences for response to exploitation. This is a **critical point for those species insufficiently understood like the white-tip.** (Dulvey et al., 2008) Under the International Union for Conservation of Nature (IUCN) Red List, *C. longimanus* is already listed globally as *vulnerable*, and *critically endangered* for populations in the Northwest and Western Central Atlantic (Baum et al., 2009).
45. *If not included above, identify* ***catastrophic threats****, i.e. threats with a low predictability that are likely to severely affect the species. Identify the threat, explain its likely impact and indicate the likelihood of it occurring (e.g. a drought/cyclone in the area every 100 years).*	While it is recognised that climate change and global warming are likely to have serious implications for the vast majority of shark species and ecosystems (Walker 2007), in light of the lack of biological and behavioural data documented for *C. longimanus*, and the uncertain magnitude of the effects of climate change, it is beyond the scope of this document to attempt to speculate at length about possible changes to the species' habitat and ecology. However it is reasonable to assume that a broad range of components will come into play, including increased water temperature, altered rainfall patterns, salinity and turbidity, rising sea level, increased storm length and frequency, coastal erosion, changed ocean currents and upwelling, increased ultraviolet light from reduced ozone, and reduced pH (Walker 2007; Harley et al 2006). Moreover, *C. longimanus'* dependence on estuarine nursery areas and shallow bays makes these sharks vulnerable to smaller scale ecological shifts; and impacts from shipping, mining, chemical contamination, electromagnetic fields, the disturbance of biotic communities and substrates, and other anthropogenic activities can disrupt the sensory systems of sharks (Walker 2007).
46. *Identify and explain any* ***additional biological characteristics*** *particular to the species that are threatening to its survival (e.g. low genetic diversity)?*	*C. longimanus* has been ranked as one of the five species with the highest degree of risk in an ecological risk assessment (IOTC, 2011). It is particularly vulnerable to current threats and pressures and has resulted in significant impacts to populations. Also, a significant proportion of the species catch is composed of juveniles, which require a more precautionary approach in fishing management (IOTC, 2011).
47. *Identify and explain any* ***quantitative measures or models*** *that address the probability of the species' extinction in the wild over a particular timeframe.*	Unable to identify any quatitative measures or models which address this question.
48. *Is there* ***other information*** *that relates to the survival of this species that you would like to address?*	Using a demographic method that incorporates density dependence, Smith et al. (1998) determined that oceanic whitetip sharks have a moderate intrinsic recovery potential when compared to 26 other species of sharks. Cortés (2008), using a density independent demographic approach, calculated population growth rates (λ) of 1.069 yr -1 (1.029, 1.119; lower and upper 95% confidence limits, respectively) and generation times (T) of 11.1 yrs (9.4, 13.0). In this study, population growth rates were low to moderate when compared with eight other pelagic species. Estimates of the intrinsic rate of increase for this species (r=0.09-0.07 yr-1) indicated that oceanic whitetip populations are vulnerable to depletion and will be slow to recover from over-exploitation based on FAO's low productivity category (<0.14 yr-1) (FAO 2001) and Musick et al. (2000). Ecological Risk and Productivity Assessments determined that oceanic whitetip sharks ranked 4th in their susceptibility to pelagic fisheries among 12 other Atlantic Ocean species (Cortés et al. 2008). (United States and Palau, 2010, p.4)

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Threat Abatement and Recovery

49. *Give an overview of how broad-scale* ***threats*** *are* ***being abated****/could be abated and* ***other recovery actions*** *underway/ proposed. Identify who is undertaking these activities and how successful the activities have been to date.*	There has already been considerable bureaucratic and some practical efforts (*Bycatch Mitigation Workshop Report,* BRS 2008) to improve recording and identification of shark by-catch and overcome problems with Bycatch Action (BAP) and Observer programs. It also seems a low cost policy since with the exception of the long line fisheries few of these sharks are caught in Australian waters and are not targeted in our own shark fisheries. Resolution Conf. 9.24 (Rev. CoP14) states that a species meets the criteria for listing on CITES Appendix II when "It is known, or can be inferred or projected, that the regulation of trade in the species is necessary to avoid it becoming eligible for inclusion in Appendix I in the near future" (Annex 2a, Paragraph A). Because the population declines for oceanic whitetip are in large part the result of trade, they clearly qualify the species for listing in Appendix II of CITES. In addition, the FAO Ad Hoc Expert Panel assessing the shark proposals concluded that, on balance, that the available evidence supports the proposal to include C. longimanus in CITES Appendix II. (Baum et al., 2010) One suggestion relevant to the particular case of the white-tip is the '…**implementation of pelagic shark catch limits, ensuring these are precautionary where sustainable catches are scientifically uncertain' (Dulvey et al., 2008)** Demand from international shark fin markets is the driving economic force behind the retention and mortality of oceanic whitetip sharks caught as bycatch. Proposal for the regulation of the fin trade through a CITES Appendix-II listing of this species was presented in 2010 as a necessary measure to ensure that the trade is sustainable. However, the proposal was rejected. Oceanic whitetip sharks are listed in Annex I, Highly Migratory Species, of the UN Convention on the Law of the Sea. ICCAT, IATTC, WCPFC and IOTC and other RFMOs have adopted finning bans, which require full utilization of captured sharks and encourage the live release of incidentally caught sharks. No focused species-specific international or domestic management measures are in place. (United States and Palau, 2010, p.9) Using a demographic method that incorporates density dependence, Smith et al. (1998) determined that oceanic whitetip sharks have a moderate intrinsic recovery potential when compared to 26 other species of sharks. Cortés (2008), using a density independent demographic approach, calculated population growth rates (λ) of 1.069 yr-1 (1.029, 1.119; lower and upper 95% confidence limits, respectively) and generation times (T) of 11.1 yrs (9.4, 13.0). In this study, population growth rates were low to moderate when compared with eight other pelagic species. Estimates of the intrinsic rate of increase for this species (r=0.09-0.07 yr-1) indicated that oceanic whitetip populations are vulnerable to depletion and will be slow to recover from over-exploitation based on FAO's low productivity category (<0.14 yr-1) (FAO 2001). Ecological Risk and Productivity Assessments determined that oceanic whitetip sharks ranked 4th in their susceptibility to pelagic fisheries among 12 other Atlantic Ocean species (Cortés et al. 2008).
50. *For species nominated as extinct in the wild, provide details of the locations in which the* ***species*** *occurs* ***in captivity*** *and the level of human intervention required to sustain the species.*	

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Mitigation Approach

51. *Describe any* ***mitigation measures or approaches*** *that have been developed specifically for the species at identified locations. Identify who is undertaking these activities and how successful the activities have been to date.*	In 2010, the International Commission for the Conservation of Atlantic Tunas (ICCAT) adopted measures to prohibit the retention of Oceanic Whitetip sharks and hammerhead sharks caught in International Commission for the Conservation of Atlantic Tunas (ICCAT) fisheries. Although this marked an important step for shark conservation, additional management measures are required to ensure the future sustainability of these vulnerable species. (PEW, n.d.) The European Union recently submitted a proposal to the Indian Ocean Tuna commission (IOTC) to prohibit the removal of any of a shark's fins at sea; prohibit retention, transshipment, and sale of oceanic whitetip and hammerhead sharks, and improve requirements and incentives to collect and report shark catch data. As described in their proposal, oceanic whitetip sharks are caught as by-catch in the IOTC area of competence; has been ranked as one of the five species with the highest degree of risk in an ecological risk assessment; has high at-vessel survival and constitutes a small portion of the shark catch; is one of the easiest shark species to identify; and has a significant proportion of the species catch consisting of juveniles. (IOTC, 2011) Although various management plans have been launched for shark fisheries in Australia, in which fisheries are required to develop management tools such as quotas, licensing, equipment restriction and bycatch monitoring, these plans are applied as a general strategy for shark fisheries which target multiple species, as opposed to a species-specific approach (Camhi et al, 2007). Consequently there is little data to specifically reflect the success of such activities in regards to *C. longimanus* in particular, with no stock assessments for bull sharks in particular or for large sharks in general. Where trend data are not available, but where unregulated fisheries exist and are a source of supply for the international trade, stocks are likely to be declining rapidly. For this reason, IUCN classifies the Northwest Atlantic and Western Central Atlantic populations (for which data exist) as Critically Endangered, while the global population (for which data are scarce) as Vulnerable. In IUCN's estimation, if data from areas outside the Northwest and Western Central Atlantic were available, the global population would probably be shown to have experienced declines similar to those of the Northwest and Western Central Atlantic, since fisheries for the species are similar in both areas. In other words, it is likely that the species meets the definition of Critically Endangered throughout most of its range. (SSN, 2010)

52. *Departmental use only:*	

Major Studies

53. *Identify major studies on the species that might relate to its taxonomy or management.*	Camhi, M. D., Pikitch, E. K., Babcock, E A., 2009 *Sharks of the Open Ocean: Biology, Fisheries & Conservation*, Chapter 11. The Biology and Ecology of the Oceanic Whitetip Shark, Carcharhinus longimanus, Wiley-Blackwell.

Management Documentation

54. *Identify* ***key management documentation*** *available for the species, e.g. recovery plans, conservation plans, threat*	There is little evidence to suggest that *C. longimanus* is the specific focus of recovery plans. However, documentation that examines management of sharks stocks in general are likely to be relevant.

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abatement plans.	
55. *Departmental use only:*	

Section 3 — Indigenous Cultural Significance

56. *Is the species known to have Indigenous cultural significance to groups within the Australian jurisdiction and, if so, to which Indigenous groups? Are you able to provide information on the nature of this significance?*	No information is available in the literature which has investigated this or which indicates that the oceanic whitetip shark has indigenous cultural significance. It is therefore recommended that the relevant groups be contacted directly on this point

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Section 4 – References and Reviewers

Notes:

- The opinion of appropriate scientific experts may be cited (with their approval) in support of a nomination. If this is done the names of the experts, their qualifications and full contact details must also be provided in the reference list below.
- Please provide copies of key documentation/references used in the nomination

57. *Reference list*

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Department of the Environment

A native species in the list of threatened species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

Oceanic Whitetip Shark (*Carcharhinus longimanus)*
2011 assessment period

Figures and Tables

<u>**Figures**</u>

<u>**Tables**</u>

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