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MEMORANDUM OF UNDERSTANDING ON THE CONSERVATION OF MIGRATORY SHARKS

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Agenda Item 9.1.1

PROPOSAL FOR THE INCLUSION OF THE OCEANIC WHITETIP SHARK (*Carcharhinus longimanus*) IN ANNEX 1 OF THE CMS MEMORANDUM OF UNDERSTANDING ON THE CONSERVATION OF MIGRATORY SHARKS

(Presented by Brazil)

Summary:

The present proposal for the inclusion of the entire population of the Oceanic Whitetip Shark (*Carcharhinus longimanus)* in Annex 1 to the Sharks MOU has been submitted by the Government of Brazil.

At its 2nd meeting (Sharks AC2) which took place in Bonaire in November 2017 the Advisory Committee of the Sharks MOU, recommended the inclusion of the species in Annex 1. Please refer to document CMS/Sharks/AC2/Rec.2.1 for further details.

This revised version contains editorial changes made by the Secretariat.

PROPOSAL FOR THE INCLUSION OF THE
OCEANIC WHITETIP SHARK (*Carcharhinus longimanus*)
IN ANNEX 1 OF THE CMS MEMORANDUM OF UNDERSTANDING
ON THE CONSERVATION OF MIGRATORY SHARKS

A. Proposal

Species to be included: Common name: Oceanic Whitetip Shark
Taxonomic name: *Carcharhinus longimanus*

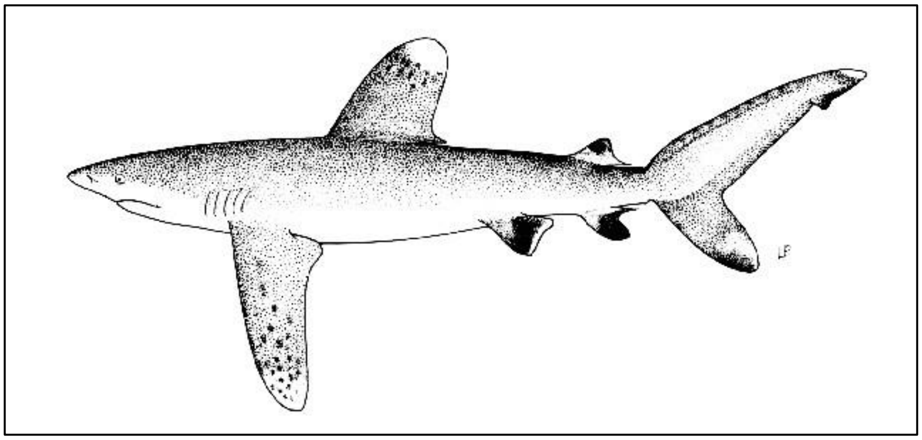

Figure 1. Oceanic whitetip shark (*Carcharhinus longimanus*). Source: FAO

Inclusion of the entire species or only one or more populations? Entire X

B. Proponent

Official name of the Signatory submitting the proposal: Brazil

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C. Supporting Statement

1. Taxon:

1.1. Class: Chondrichthyes, subclass: Elasmobranchii
1.2. Order: Carcharhiniformes
1.3. Family: Carcharhinidae
1.4. Genus/Species/Subspecies, including author and year: *Carcharhinus longimanus* (Poey 1861)

1.5 Common name(s), when applicable: English: Oceanic whitetip shark
French: Requin océanique
Spanish: Tiburón oceánico
German: Weißspitzen-Hochseehai
Italian: Squalo alalunga
Portuguese: Tubarão galha-branco-oceânico

2. Ecological data:

2.1. Distribution (current and historical) – see also 5

Carcharhinus longimanus is a circumtropical species and the only true oceanic species within the *Carcharhinus*-genus, occurring in waters between the 30ºN and 35ºS latitudes (CITES, 2013) (Figure 2). It is considered to be one of the most widespread shark species, ranging across all tropical and subtropical waters (Baum *et al.*, 2015). Within the eastern Atlantic Ocean, *C. longimanus* occurs from northern Portugal to Angola (including possibly the Mediterranean Sea). In the western Atlantic the species ranges from the United States to Argentina, including the entire Gulf of Mexico and Caribbean Sea. In the Indian Ocean, *C. longimanus* occurs from South Africa to Western Australia, including the entire Red Sea. In the Pacific the species is distributed from China to East Australia. Within the central Pacific the species occurs off all islands (Hawaii, Samoa, Tahiti). Within the eastern Pacific, *C. longimanus* occurs from southern California to Peru (CITES, 2013; Ebert *et al.*, 2013).

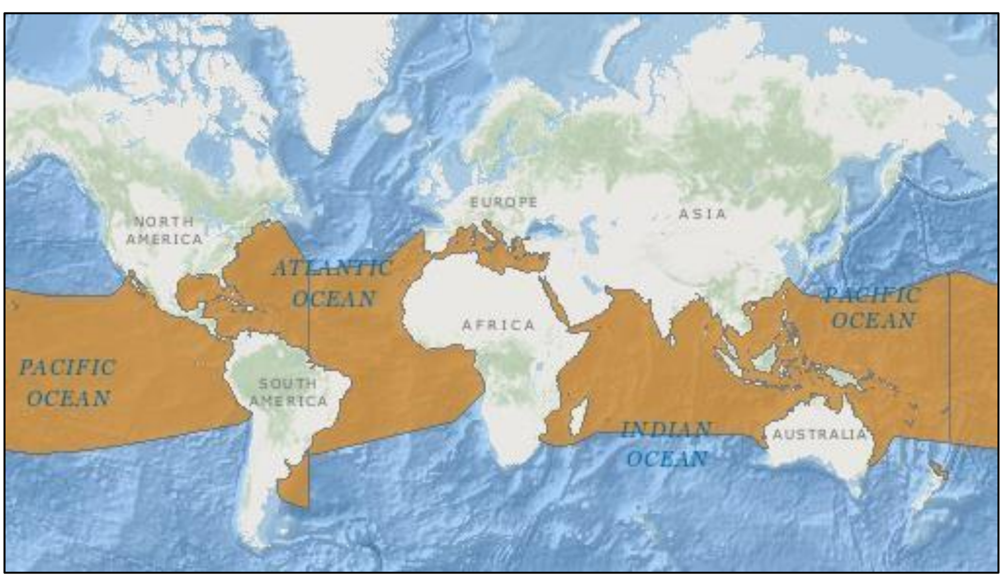

Figure 2. Distribution of *Carcharhinus longimanus*. Source: IUCN

2.2. Population (estimates and trends)

Sharks and rays are vulnerable to overexploitation due to overfishing and the K-selected life history characteristics of the species (Dulvy *et al.*, 2014). *C. longimanus*, once among the most abundant oceanic sharks, has experienced serious declines as high as 70% within the western North Atlantic between 1992 and 2000. This species is assessed to be critically endangered in the Northwest and Western Central Atlantic (Baum *et al.*, 2015). Anecdotal data exists for this species, originating from fisheries (Bonfil *et al.*, 2008).

Overall, global quantitative abundance estimates and trends are lacking for the oceanic whitetip. However, there are several studies on the abundance trends for a few regions and/or populations of oceanic whitetip sharks. There is also a recent stock assessment for the oceanic whitetip shark in the Western and Central Pacific (Rice and Harley 2012). Thus, the following section provides some insight into the abundance trends of the species. It should be noted that catch records of sharks, especially non-target shark species, are often inaccurate and incomplete. The oceanic whitetip shark is predominantly caught as bycatch and the reporting requirements for bycatch species have changed over time and differ by organization, and have therefore affected the reported catch

<u>Atlantic Ocean</u>
Data on *C. longimanus* from the Atlantic Ocean comes from studies varying on gear or data source. According to Baum *et al.* (2003), based on logbook data of the U.S. pelagic longline fleet, *C. longimanus* has experienced a 70% population decline between 1992 and 2000 within the Northwestern Atlantic Ocean and Gulf of Mexico. Based on the same dataset, Cortés *et al.* (2008) estimated a decline of 57% for this species from 1992 to 2005 (as cited by CITES, 2013).

The results of interferences based on logbook data has been subject of debate (Burgess *et al.*, 2005; Baum *et al.*, 2005), as a change of fishing methods and practices could cause a bias in this data.

During a survey from 1992 to 1997 in the southwestern equatorial Atlantic Ocean (Brazilian exclusive economic zone), 29% of the total elasmobranch catches were *C. longimanus*. After the blue shark (*Prionace glauca*), *C. longimanus* was the most common species among the elasmobranch catches (Lessa *et al.*, 1999). Elasmobranchs constituted for 95% of the bycatch in the Spanish swordfish fishery in the Atlantic and Mediterranean Sea in 1999 (Mejuto *et al.*, 2002).

C. longimanus only made up 0.2% of the total elasmobranch catches (by rounded weight) within this fishery. The species was present in 4.7% of the purse seine sets in the eastern Atlantic Ocean (Santana *et al.*, 1997; Bonfil *et al.*, 2008). Per 1000 hooks set, Domingo (2004) reports a catch rate of this species of 0.006 sharks in the southern Atlantic and 0.09 sharks off western Africa (as cited in Bonfil *et al.*, 2008). Data from the Japanese longline fleet operating in the Atlantic Ocean indicates that *C. longimanus* makes up 0.12% of the bycatch of elasmobranch species (Senba and Nakano, 2005).
Although several studies indicate that large pelagic sharks (including *C. longimanus*) declined over the past decades, the magnitude of these declines is unclear, due to sampling differences and origin of the data.

Young *et al,* (2016) list several tagging studies of Atlantic Oceanic Whitetip sharks from the Gulf of Mexico, Bahamas and Brazilian longline fleet in the Central Atlantic. Even though these studies only followed a limited number of animals some observations can be made. The sharks preferred to remain at relatively shallow depth in warm waters with temperatures between 24 and 30ºC. And several seemed to show a strong site fidelity returning to the place they were tagged after traveling thousands of kilometers (Tolotti *et al*. 2015a).

Pacific Ocean

Catches of *C. longimanus* within the Pacific Ocean have been included in a number of fishery dependent studies. Based on catches of the Japanese longline fishing fleet, a significant difference in catch-per-unit-effort (CPUE) of *C. longimanus* between the period of 1967 – 1970 and the period of 1992 – 1995 was reported. Within the east of the study area (east of the 180º latitude), an increase of 40 to 80% was determined just above the equator (10ºN), whereas slightly further north (10º - 20ºN) a decrease of 30 to 50% was reported for the species (Matsunaga and Nakano, 1999; Bonfil *et al.*, 2008). However, just like the studies conducted in the Atlantic, the authors reported that multiple variables could cause a bias in these trends. Another study based on Japanese research longline surveys indicates that *C. longimanus* comprised of 22.5% of the total shark catches in the western Pacific and 21.3% in the eastern Pacific (Taniuchi, 1990, as cited in CITES, 2013).

Within the tropical western and central Pacific Ocean, *C. longimanus* is among the four most caught species in the tuna longline fishery and is the second most caught species (after silky sharks, *Carcharhinus falciformis*) in the tuna purse sein fishery (Williams, 1999). For this same region, Lawson (2011) analyzed the results of the observer program of the longline (1991 - 2011) and purse seine (1994 - 2011) tuna fishery. For the longline fishery, *C. longimanus* were observed on 43% of the fishing trips, with a decreasing trend in sharks per 100 hooks over the study period (Figure 3). A similar trend was determined based on observer data from the purse seine fishery, as the number of sharks per day declined over the study period (Figure 4). Similar, but slightly different trends were published for this region by Clarke *et al.* (2013). This study concluded that catch rate of *C. longimanus* within the longline fishery declined with 17% per year.

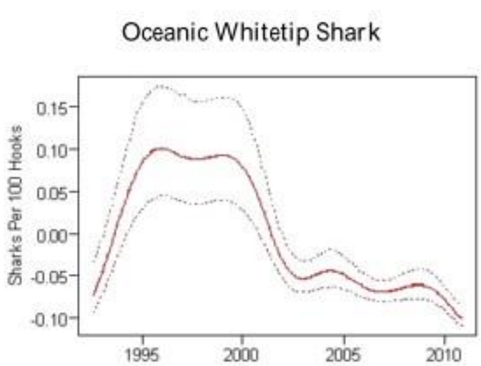

Figure 3. Number of *Carcharhinus longimanus* per 100 hooks in the western and central Pacific tuna longline Source: Lawson (2011)

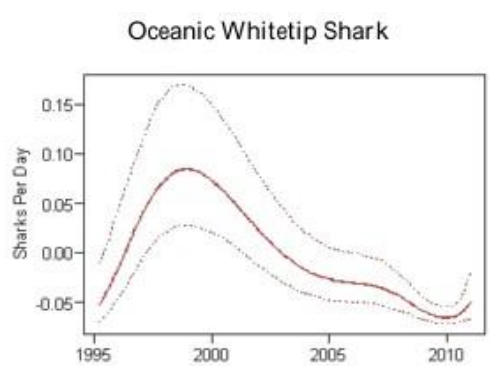

Figure 4. Number of *Carcharhinus longimanus* per day in the western and central Pacific tuna purse seine fishery Source: Lawson (2011)

Two studies describe the catches of *C. longimanus* in the pelagic longline fishery based in Hawaii (Walsh *et al*., 2009). The first study, describes how CPUE (defined as the number of sharks per 1,000 hooks) decreased in deep and shallow longline sets. The CPUE for the shallow set lines decreased from 0.351 for the period of 1995 to 2000, to 0.161 sharks per 1,000 hooks from 2004 to 2006. The CPUE of longline sets deployed in deep water decreased from 0.272 to 0.060 sharks per 1,000 hooks for the same periods respectively (Walsh *et al.*, 2009). A later study indicated that over the period from 1995 to 2010, the CPUE of this species decreased with 90% from 0.428 to 0.036 sharks per 1,000 hooks (Walsh and Clarke, 2011).

<u>Indian Ocean</u>
According to Santana *et al.* (1997; as cited by Bonfil *et al.*, 2008), *C longimanus* was present in 16% of the purse seine nets deployed by the Spanish and French fishing fleets operating in the western Indian Ocean. Catches of *C. longimanus* in the shark longline fishery operating off northern Maldives decreased from 19.9% in 1987 – 1988 to 3.5% in 2002 – 2004 (Anderson *et al.*, 2011; CITES, 2013).

For many elasmobranch species, including *C. longimanus*, inferences based on historical (logbook) data tend to be biased by multiple variables. Changes in fishing techniques, species targeting and unreported catches can cause biases in trends. However, as many cited studies show, populations of *C. longimanus* although the magnitude of decline remains unclear, this species is likely threatened by overfishing on a global scale (Baum *et al.*, 2015).

In 2016, Young *et al.* conducted an extensive review of available literature on the state of the global Oceanic Whitetip Shark population as part of a Status Review to assess the species for the Endangered Species list in the US. They summarized that: Overall, evidence (both quantitative and qualitative) suggests that while the oceanic whitetip shark was once considered to be one of the most abundant and commonly encountered pelagic shark species wherever it occurred, this oceanic species has likely undergone population abundance declines of varying magnitudes throughout its global range. Where more robust information is available, declines in oceanic whitetip shark abundance range from 86% to greater than 90% in some areas of the Pacific Ocean (with declines observed across the entire basin), and between 57%-88% in the Atlantic and Gulf of Mexico. Although information from the Indian Ocean is highly uncertain and much less reliable, the best available information points to varying magnitudes of decline, with the species becoming rare across the basin over the last 20 years. The only population that currently shows a stable trend, based on standardized CPUE observer data, is the Northwest Atlantic. The trend of oceanic whitetip catches in the Hawaii-based pelagic longline fishery may have also potentially stabilized at a post-decline depressed state in recent years. In addition to CPUE trends, which can often be misleading and unreliable due to uncertainties in standardization, stock structure and other factors, other abundance indices such as trends in occurrence and composition of the species in catch data, as well as biological indicators (e.g., mean length or weight, etc.) also indicate significant and continuing declines of oceanic whitetip in a large portion of its range.

2.3. Critical habitat(s) (short description and trends)

Young *et al.* (2016) report *C. longimanus* as a truly oceanic species usually found far offshore in the open sea in waters over 200m deep. The species occurs in both coastal and pelagic zones, utilizing shallow habitats from surface waters to a depth of 20 meters.

The oceanic whitetip has been reported from waters between 15ºC and 28ºC, however the species exhibits a strong preference for the surface mixed layer in water with temperatures above 20°C.It can tolerate colder waters down to 7.75°C for short periods in deep dives into the mesopelagic zone below the thermocline (>200 m), presumably for foraging (Howey-Jordan et al. 2013; Howey *et al.* 2016).

The low tolerance to lower water temperatures appear to create a barrier between the western Atlantic and Indo-Pacific population. Ruck (2016) found genetic differentiation between the populations on both sides of the tip of South Africa.

2.4. Migration pattern (e.g. migration routes, distance, time, drivers for migration)

C. longimanus is a large oceanic shark species, with active and strong swimming capabilities. Only a handful of studies provide detailed information on the movements of this species. As part of the Cooperative Shark Tagging Program of the National Marine Fishery Service, 542 *C. longimanus* were tagged from 1962 to 1993. During this period, only 6 individuals were recaptured, moving from the Gulf of Mexico to the Atlantic coast of Florida, from the Lesser Antilles to the central Caribbean Sea and along the equatorial Atlantic Ocean. The longest tracked distance for this species was 1,226 km, and the maximum speed was 17.5 NM/day (32.4 km/day) (Kohler et al., 1998). Howey-Jordan et al. (2013) tracked 11 C. longimanus tagged in the vicinity of Cat Island, Bahamas. During the tracking period of 30 to 245 days, each individual moved 290 to 1,940 km away from the initial tagging site. Four of these individuals moved in a southeastern direction towards the Lesser Antilles, three remained mostly within the exclusive economic zone of the Bahamas, and one individual moved in northeastern direction for approximately 1,500 km. The majority of these individuals spend the first ± 30 days within the waters of the Bahamas and returned to these waters after ± 150 days. Maximum displacement from initial tagging location occurred from the end of June through September. Backus et al. (1956) indicates that *C. longimanus* possibly leaves the Gulf of Mexico in winter months and will move south as the temperature drops below 21ºC. Relatively little is known of population dynamics of this population, and if only a proportion of the population is migratory. Howey-Jordan et al. (2013) report that only part of the tagged animals undertake long-distance movements, whereas the other part of the 11 tagged animals remained within or within the vicinity of the Bahamas.

3. Threat data:

3.1. Direct threat(s) to the population (factor, intensity)

Carcharhinus longimanus is a large-bodied shark species from the family Carcharhinidae (requiem sharks). This species can reach a maximum size of 325 - 346 cm, with most specimens measuring between 150 and 205 cm (Lessa *et al.*, 1999; CITES, 2013; D'Alberto *et al.*, 2016; Joung *et al.*, 2016). The size at birth for *C. longimanus* is 55 to 75 cm, with some regional variation (Seki *et al.*, 1998). Like many elasmobranch species, *C. longimanus* reaches maturity relatively late (CITES, 2013). With an estimated growth coefficient (*k* in von Bertalanffy growth function) of 0.085 $year^{-1}$, *C. longimanus* is estimated to reach maturity (50% maturity) at an age of 8.9 years for males and 8.8 years for females in the western North Pacific. Associated length at 50% maturity for both sexes in this region are 194 cm for males and 193 cm for females (Joung *et al.*, 2016). D'Alberto *et al*. (2016), estimated a growth coefficient of 0.059 $year^{-1}$ for males and 0.057 $year^{-1}$ for females of *C. longimanus* in the western Central Pacific. Here, females and males reached 50% maturity at a total length of 224 cm (15.8 years) and 193 cm (10.0 years) respectively. Within the southwestern Atlantic Ocean, *C. longimanus* was estimated to have a grow coefficient of 0.075 $year^{-1}$ for both sexes, and to reach maturity at an age of 6 to 7 years or total length of 180 to 190 cm (Lessa *et al.*, 1999). Longevity was estimated to be 25 years.

Like other carcharhinid-species, female *C. longimanus* reproduces viviparous. Mating in the northern Pacific occurs in June and July, and parturition occurs between February and July (Seki *et al.*, 1998). After a gestation period of 12 months, the female produces a litter of 1 to 14 pups (mean: 6). Both Seki *et al.* (1998) and Lessa *et al.* (1999) report a positive correlation between female size and litter size.

C. longimanus can easily be distinguished from other shark species by its large, rounded fins. Especially the pectoral fins are long, and paddle-shaped. On the tip of the first dorsal fin, pectoral fins and caudal fins, adults have white mottled markings (Figure 1).

Like other large shark species, *C. longimanus* feeds close to the top of the marine food web (trophic level 4.2), occupying a top predator position along with other large pelagic teleost species (Cortés, 1999; Madigan *et al.*, 2015). The species exhibits higher site fidelity in areas where large pelagic teleosts are abundant, for feeding purposes (Madigan *et al.,* 2015). Although specific studies indicating the consequences of *C. longimanus* removal have not been published, the loss of predatory sharks can have cascading effects throughout marine ecosystems (Meyers *et al.*, 2007).

In 2012 Cortes *et al*. conducted an ecological risk assessment (ERA) for pelagic shark species in the Atlantic they concluded that of the 11 species studied Oceanic Whitetip was the 5th most vulnerable species. Although the life history parameters of this species are consistent with intermediate among shark species their specific biology indicate that it is a species with a low resilience to fishing and a low productivity with a high catchability due to its preference for surface water and presence in tropical latitudes where tuna fisheries are most active (FAO, 2012).

Fisheries

Oceanic Whitetip Sharks have been caught in both target fisheries and as bycatch in virtually all part of their range. Due to their foraging strategy they are particularly vulnerable to capture in pelagic longline, purse seine and driftnet fisheries. This species was initially described as the most common pelagic shark beyond the continental shelf in the Gulf of Mexico (Wathne, 1959; Bullis, 1961), and throughout the warm-temperate and tropical waters of the Atlantic and Pacific (1954, Strasburg 1957). In the Gulf of Mexico, for example, between 2 and 25 of these sharks were usually observed following the vessel during longline retrieval on the exploratory surveys in the 1950s and their abundance was considered as a serious problem because of the high proportion of tuna they damaged (CITES, 2013).

The Food and Agricultural Organization (FAO) of the United Nations (UN) Global Capture Production dataset gives species specific catch data for *Carcharhinus longimanus*. The database shows a large increase in catches in late 1990s and a decline after that. However, it should be noted here that even though species specific data is requested by

FAO only very few countries provide this data whilst many countries just give a general category (sharks nei) for all shark catches. Furthermore, many nations only report the landings data and disregard the level of discards at sea, so no overview of actual catches level can be given (Rose 1996). This knowledge led researchers to suggest that annual global catch data compiled by the FAO are significantly underestimated for all sharks (Clarke *et al*. 2006b).

Atlantic Ocean

As in other areas historical records indicate that the oceanic whitetip shark was widespread, abundant, and most likely the most common pelagic shark in the warm parts of the North Atlantic (Strasburg 1958) but the stock has been greatly depleted due to over exploitation.

Young *et al.* (2016) made an extensive overview of all available fisheries data for the Atlantic which led him to conclude that all available data indicate a decline for the stock in the Atlantic. For the North West Atlantic data are available from observer programs in the US pelagic longline fleet and from logbook data.

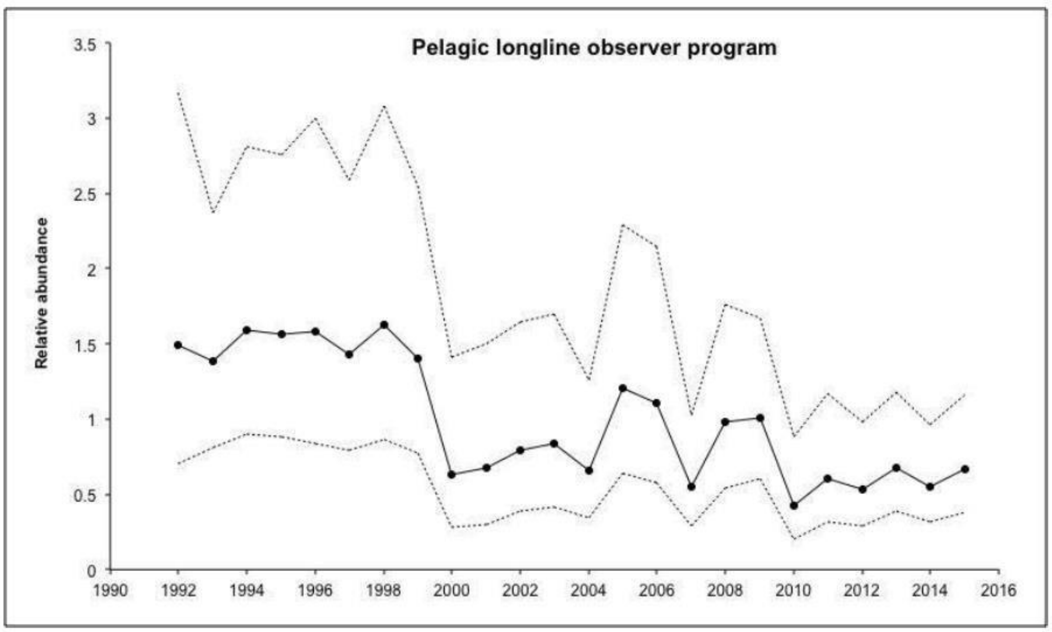

Figure 5. Estimated change in relative abundance (standardized catch per 1000 hooks) between 1992 and 2015 based on the Northwest Atlantic Pelagic Longline observer data for oceanic whitetip sharks. Source: Young et al. 2016

Although *C. longimanus* has been historically recorded from the Mediterranean and the southern edge of the Iberian Peninsula these waters are at the edge of the range of this species as water temperatures tend to be below the preferred range of the species.

Brazil has the highest recorded catches of Oceanic Whitetip shark in the Southern Atlantic, from Young et al: “Historically, the oceanic whitetip was considered one of the most abundant species of pelagic shark in this region. For example, it was the third most commonly caught shark species out of a total 33 shark species caught year-round in the prominent Brazilian Santos longline fishery, and one of 7 species that comprise d >5% of total shark catches from 1971-1995” (Amorim 1998). In Itajaí, southern Brazil, oceanic whitetip sharks were considered “abundant” and “frequent” in the surface longline and gillnet fleets, respectively, from 1994-1999 (Mazzoleni and Schwingel 1999). Abundant means the oceanic whitetip was observed in most of the landings (i.e., surface longline), whereas frequent means the species occurred in at least half of the landings recorded in one of the seasons of the year (i.e., surface gillnet). In northern Brazil, the oceanic whitetip was considered one of the most abundant shark species landed from 2000-2002, comprising 3% of the total catch weight (including tunas, billfishes and other sharks; Asano-Filho et al. (2004)). In equatorial waters, the oceanic whitetip shark was historically reported as the second most abundant elasmobranch species, outnumbered only by the blue shark (P. glauca) in research surveys conducted within the EEZ of Brazil during the 1990s, and comprised 29% of the total elasmobranch catch (Lessa et al. 1999). García-Cortés and Mejuto (2002) found that the oceanic whitetip comprised 17% of the total shark catch in the Spanish longline fishery targeting swordfish from 1990-2000.”

Santana et al. (2004) looked at the population in North-Eastern Brazil and found a rate of decline of 7,2% since the 1990’s due to high natural mortality in the first year of life combined with unsustainable fishing pressure. This resulted in a 50% drop in population over a 10-year time.

In 2014 the Government of Brazil listed the species as Vulnerable on its List of Species of Brazilian Fauna Threatened with Extinction (MMA Ordinances No. 445/2014) estimated that the oceanic whitetip population has potentially declined by up to 79% (ICMBio 2014).

ICCAT

The International Commission for the Conservation of Atlantic Tunas collects species specific catch information on all hammerhead species caught by the fisheries operating in its area. Records should also be kept of the status of sharks upon release (alive or dead). Hammerhead sharks are recorded as part of the ‘other’ sharks (separate from the main commercial species) which includes all shark bycatches. Only Brazil, Mexico, Spain, St. Lucia and the United States have reported catches to ICCAT and, as indicated above by Clarke (2006b), these data are likely inaccurate and therefore may under-represent the magnitude of catches in the Atlantic Ocean.

ICCAT	**YEAR**																
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
OCS (*Carcharhinus longimanus*)	642	543	205	179	189	82	78	36	246	54	132	6	4	11	12	2	2
other sharks total	**12630**	**21930**	**16581**	**16013**	**27601**	**33463**	**15619**	**25495**	**23073**	**18870**	**19059**	**18241**	**12258**	**20356**	**5468**	**4033**	**3783**

Table 1: Oceanic White tip shark catches in ICCAT area [source ICCAT]

In 2010 ICCAT adopted measures that prohibit fishing of *C. Longimanus* in ICCAT fisheries and that those captured are released quickly and unharmed.

ICCAT undertook a productivity-susceptibility analysis (PSA) of the sharks (by)-caught in the tuna fishery in the pelagic longline fishery in the management area for 15 species of elasmobranchs. The analysis compares the productivity (based on age at maturity, lifespan, age specific-natural mortality and fecundity) to susceptibility to the fishery which calculated as a proponent of: availability of the species to the fleet, encounterability of the gear with the given species, vertical distribution, gear selectivity and post capture mortality. In this Ecological Risk Assessment scalloped hammerhead (*Sphyrna lewini*) and Smooth hammerhead (*Sphyrna zygaena*) as well as the South Atlantic pelagic stingray (*Pteroplatytrygon violacea*) had the lowest vulnerability. (Cortes, *et.al*, 2015). The analysis does highlight the need for better basic biological information for species included in the analysis, for which the life history variables are still poorly understood.

Pacific Ocean

The oceanic whitetip shark was historically considered one of the most abundant pelagic shark species throughout the Pacific Ocean. Record collected by Strasburg (1958) from tuna longline give 28% of the total shark catches as oceanic whitetip sharks constituted 28% in the fisheries south of 10ºN. The ease of identification for *C. longimanus* makes it highly likely that these figures are correct representation.

According to the Inter-American Tropical Tuna Commission (IATTC), oceanic whitetip sharks are most often taken as bycatch by ocean purse-seine fisheries. Information collected by observers between 1993 and 2004 indicates oceanic whitetip sharks made up 20.8% of the total shark bycatch. However, there is some evidence to suggest that the species has undergone significant population declines in this region.

Young et al., 2016 report that the presence of oceanic whitetip sharks on sets with floating objects, which are responsible for 90% of the shark catches in Eastern Pacific purse seine fishery, has declined significantly.

The Western and Central Pacific Fisheries Commission (WCPFC) developed a 'snapshot' status report on *C. longimanus* in 2011 based on fisheries data and information on shark fin trade. All reviewed populations showed a downward trend. Current estimates of the stock depletion indicate that the total biomass has been reduced to 6.6% of the virgin biomass (FAO, 2012).

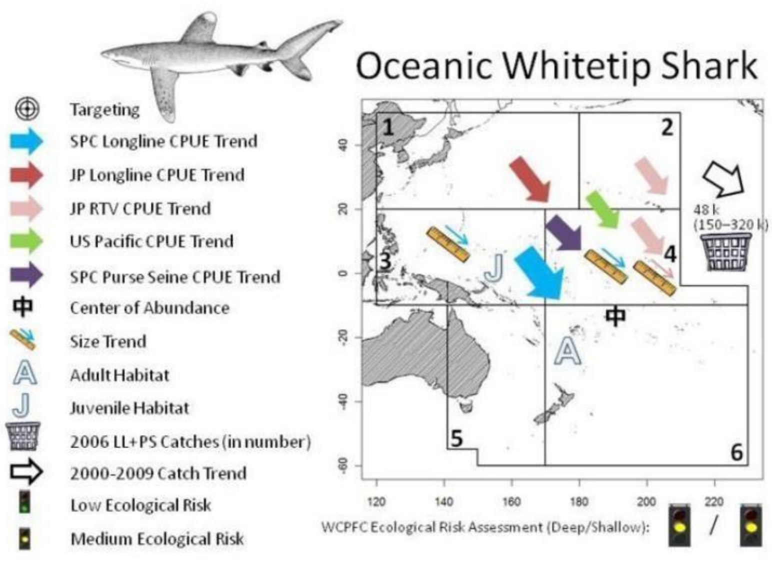

Figure 6: Status snapshot of oceanic whitetip shark in the Western and Central Pacific Fisheries Commission (WCPFC) Statistical Area. JP = Japanese; RTV – Research Training Vessels; SPC = Secretariat of the Pacific Community. *Source: Clarke (2011)*

Indian Ocean

IOTC

The tuna RFMO for this area is the Indian Ocean Tuna Commission (IOTC) and has been collecting species specific information on Oceanic White tip catches since 1986. The majority of catches occurs in long line fisheries, with additional catches reported in purse seine and other line and gill net fisheries.

Traditionally most catches of the species are in FAO area 57 but in recent years an equal amount is reported from both FAO areas under IOTC management.

IOTC	YEAR																
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
OCS (*Carcharhinus longimanus*)	807	462	297	469	253	153	172	84	96	158	519	250	411	192	190	215	502

Table 2: oceanic whitetip shark catches in IOTC area [source IOTC]

In 2013 the IOTC adopted a regulation to prohibit all catches to *C. longimanus* in its area and order that all individuals caught should be promptly released. Artisanal fisheries are exempt from this regulation as long as the shark are utilized for local consumption.

In 2012 a PSA was carried out for the sharks in (by)caught in various longline and purse seine fleets operating in the Indian Ocean based on the methodology developed by Cortes et.al. for ICCAT (Murua et.al. 2012 & Cortes et.al 2010). Similar to the analysis carried out in ICCAT *C. Longimanus* had a relatively high PSA score compared to other shark species (ranking 5th out of 19 species). This is due to its low productivity score coupled with a high overlap in pelagic longline fisheries in the area. Although the authors also note that: due to time constrains and lack of data the analysis presented here should be considered as preliminary and a starting point for future analysis as soon as biological information for Indian Ocean sharks as well as observer data compilation becomes available.

Post release survival

Some studies have been conducted on survival of this species after capture indicating that for long-line fisheries this species have a potential for high survival after release. Gallagher et al. (2014) found an at vessel survival percentage of 77,3% in Atlantic longline fisheries which would put this species in the highest survival category for shark species. It should be notes that no post release mortality study was conducted so the long-term survival rate is unknown and should be presumed to be lower. Survival in purse seine and drift net fisheries is negligible as the sharks cannot keep swimming after capture and pressure in the net will cause internal damage.

Fin trade

Oceanic whitetip sharks are caught as bycatch in high seas pelagic fisheries. Space for retaining meat from this species is often limited and reserved for higher-value species such as tunas and swordfish. As the meat is generally of low value, oceanic whitetip shark fins would not be interesting to retain if the fins were not of a high value (USD 45 to USD

85 per kg). This is a strong driver for shark finning (cutting of the fins and discarding the body at sea). Young et.al (2016) note that *C. longimanus* is a preferred species in the shark fin trade in the Hong Kong fin market. An analysis of traded fins (by weight) and genetic information from species by Clarke et al. (2006a).

Clarke et.al (2006a) found that oceanic whitetip shark represents approximately 2% of the Hong Kong shark fin market and it was estimated that it has been used as an indicator of the global trade for many years. They estimated that in 2000 0.6 million oceanic whitetip sharks (or 22,000 metric tons), had been utilized annually for the fin trade. Oceanic whitetip shark fins have broadly rounded tips and the pectoral fins are very long and wide, with white mottling on the tip of pectoral and dorsal fins and lower lobes of the caudal fin. Given these distinctive oceanic whitetip shark fins relatively easy to identify and it is therefore likely that the estimate is more reliable than for other species. Fins from this species are one of the most distinctive and common products in the Asian shark fin trade. Traders in Hong Kong SAR seldom mix them with other species (Clarke et al., 2006a). Molecular genetic testing of 23 fin samples that were imported from three oceans and collected from nine randomly sampled fin traders in Hong Kong SAR 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 USD 45 to USD 85 per kg (Clarke et al., 2004a).

The high value of the fins combined with prohibitions on catches is thought to be a driver for Illegal, Unreported and Unregulated Fisheries. A study that provided regional estimates of illegal fishing (using FAO fishing areas as regions) found the Western Central Pacific (Area 71) and Eastern Indian Ocean (Area 57) regions have relatively high levels of illegal fishing (compared to the rest of the regions), with illegal and unreported catch constituting 34% and 32% of the region’s catch, respectively (Agnew et al. 2009).

3.2. Destruction of critical habitat(s) (quality of changes, quantity of loss)

The habitat for the oceanic whitetip is defined as the water column or attributes to the water column, where cumulative impacts from HMS and non-HMS fishing gears are anticipated to be minimal. However, a better understanding of the specific habitat types and characteristics that influence the abundance of these sharks within those habitats is needed to determine the effects of fishing activities on habitat suitability for oceanic whitetip sharks.

3.3. Indirect threat(s) (e.g. reduction of reproduction success by climate change, pollutants)

There are no directed studies on climate change effects on oceanic whitetip but Young (2016) noted that as this species has a broad geographic range large-scale impacts such as global climate change, effecting water temperature, currents and potentially food chain dynamics could have a detrimental effect on the species. The migratory behaviour of the species can also be an advantage to mitigate the risks climate change poses to the species as it is less dependent on one discrete geographic area.

Several studies have been done on elevated levels of environmental contaminants in sharks, as they as long lived, top-predators build up contaminants in their tissue. A study from Baja California found elevated levels of mercury in tissue of large shark species but these were below the levels deemed safe for human consumption (Garcia -Hernandez et.al 2007).

3.4. National and international utilization

Although there is a limited market for oceanic whitetip meat in some areas, mainly through artisanal fisheries, as stated earlier the main driver for the fishery (directed and bycatch) is the high value of the fins on the international market. *C. longimanus* fins are large and deemed prime quality in the Hong Kong fin market. This makes them one of the most valuable fins on the Hong Kong market (the largest international fin market), with values ranging between $45–85 per kg (Clarke et.al. 2006b).

4. Protection status and needs:

4.1. National protection status

Shark finning has been banned in Brazil since 2012 after the publication of Interministerial Normative Instruction No. 14, of November 26, 2012. It is allowed only the landing of sharks and rays with all the fins naturally attached to the body of the animal.

In December 2014 Brazil approved its National Action Plan for the Conservation of Elasmobranchs in Brazil. Apart from general requirements for all catches of elasmobranchs to be sustainable, the plan focus on 12 priority species which do not include specific regulations to manage or protect the oceanic whitetip shark. However, the Brazilian Interministerial Normative Insctruction No. 01, of March 12, 2013, prohibits directed fishing, retention on board, transhipment, landing, storage, transportation and marketing of oceanic whitetip shark (*Carcharhinus longimanus*), in Brazilian jurisdictional waters and on national territory.

Also, in the Brazilian list of Endangered Fish and Aquatic Invertebrates in force, Ordinance No.
445 of December 17, 2014, the oceanic whitetip shark is classified as “Vulnerable”.

4.2. International protection status

<u>FAO:</u>
In 1998 the International Plan of Action for Conservation and Management of Sharks (IPOA Sharks) was agreed for all species of sharks and rays.

The IPOA-Sharks is a voluntary international instrument, developed within the framework of the 1995 FAO Code of Conduct for Responsible Fisheries, that guides nations in taking positive action on the conservation and management of sharks and their long-term sustainable use. Its aim is to ensure the conservation and management of sharks and their long-term sustainable use, with emphasis on improving species-specific catch and landings data collection, and the monitoring and management of shark fisheries. The code sets out principles and international standards of behaviour for responsible fishing practices to enable effective conservation and management of living aquatic organisms while considering impacts on the ecosystem and biodiversity. The IPOA-Sharks recommends that FAO member states 'should adopt a national plan of action for the conservation and management of shark stocks (NPOA-Sharks), if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in nondirected fisheries'.

Several range states have developed national action plans: Australia, Brazil, Canada, Egypt, Democratic People's Republic of Korea; Japan; Mexico; New Zeeland; Oman; South Africa; United States, as well as regional action plans: Pacific Island States, the Central American Isthmus (OSPESCA), the EU and the Mediterranean.

RFMO's

All relevant RFMO's have developed management measures banning the retention of oceanic whitetip shark.

RFMO	Area	Year established	Description
ICCAT	Atlantic	2010	Recommendation 10-07: prohibits the retention, transhipping, landing, storing, selling, or offering for sale any part or whole carcass of oceanic whitetip sharks in any fishery
IOTC	Indian Ocean	2013	Resolution 13-06: prohibits the retention, transhipment, landing, or storing of any part or whole carcass of oceanic whitetip sharks. The retention prohibition of oceanic whitetip shark exempts "artisanal fisheries operating exclusively in their respective EEZ for the purpose of local consumption."
IATTC	Eastern Pacific	2011	Resolution C-11-10 for the conservation of oceanic whitetip sharks caught in association with fisheries in the Antigua Convention Area. This Resolution prohibits Members and Cooperating Non-Members (CPCs) from retaining onboard, transhipping, landing, storing, selling, or offering for sale any part or whole carcass of oceanic whitetip sharks in the fisheries covered by the Antigua Convention.
WCPFC	Western-Central Pacific	2011	2011-04 that prohibits retaining onboard, transhipping, storing on a fishing vessel, or landing any oceanic whitetip shark, in whole or in part, in the fisheries covered by the Convention. WCPFC also adopted 2014-05 (effective July 2015) that requires each national fleet to choose either banning wire leaders or banning the use of shark lines.

CITES:

CITES works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention must be authorized through a licensing system. Each Party to the Convention must designate one or more Management Authorities in charge of administering that licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.

The species covered by CITES are listed in three Appendices, according to the degree of protection they need. the oceanic whitetip shark was listed under Appendix II of CITES in 2013.

Appendix-II specimens require:
•An export permit or re-export certificate issued by the Management Authority of the State of export or re-export is required.
•An export permit may be issued only if the specimen was legally obtained and if the export will not be detrimental to the survival of the species.

Barcelona Convention (Mediterranean):
The Oceanic Whitetip shark is listed in Appendix II of the Barcelona Convention, affording it protection from fishing activities taking place in the Mediterranean region. All species listed in Appendix II must be released unharmed and alive to the extent possible, therefore cannot be retained on board, transhipped, landed, transferred, stored, sold, displayed or offered for sale (Recommendation GFCM/36/2012/1). The recommendation continues to stipulate that all vessels encountering these species must record information on fishing activities, catch data, incidental taking, release and/or discarding events in a logbook or similar document, then all logged information must be reported to national authorities. Finally, additional measures should be taken to improve such data gathering in view of scientific monitoring of the species

The Protocol Concerning Specially Protected Areas and Wildlife (SPAW Protocol)
The SPAW protocol of the Cartagena convention is the only cross border legal instrument for species and habitat protection in the wider Caribbean region. Oceanic Whitetip was added to Annex III protocol in March 2017. Species on Annex III may be utilized on a rational and sustainable basis, but parties are obliged to in co-operation with other Parties, formulate, adopt and implement plans for the management and use of such species, this can include:

1. the prohibition of all non-selective means of capture, killing, hunting and fishing and of all actions likely to cause local disappearance of a species or serious disturbance of its tranquillity;
2. the institution of closed hunting and fishing seasons and of other measures for maintaining their population;
3. the regulation of the taking, possession, transport or sale of living or dead species, their eggs, parts or products

4.3. Additional protection needs

Listing on international agreements, such as the CMS Sharks MoU could help to drive improvements in national and regional management and facilitate collaboration between states, for this species. It is evident that lack of specific data collection is hampering management for this species. There is still a lack of understanding of the basic data needed to understand the life history, habitat utilisation and migration patterns of this species.

The comparison in management measures between RFMO's in section 4.2 illustrates that alignment of policy between areas is needed to improve the effective management of this species.

5. Range States (see official names of UN member states)

Angola; Antigua and Barbuda; Argentina (Malvinas); Australia (Christmas Island; Cocos Keeling Islands; Heard Island and McDonald Islands; New South Wales, Northern Territory, Queensland, South Australia, Western Australia); Bahamas; Bangladesh; Barbados; Belize; Benin; Brazil; Brunei Darussalam; Cambodia; Cameroon; Cabo Verde; Chile; China; Colombia; Comoros; The Democratic Republic of the Congo,; Costa Rica; Côte d'Ivoire; Cuba; Denmark (Faroe Islands); Djibouti; Dominica; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eritrea; Fiji; France (French Guiana; French Polynesia; French Southern Territories; Guadeloupe; Martinique; New Caledonia; Réunion; Saint Martin) Gabon; Gambia; Ghana; Grenada; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; India; Indonesia; Israel; Jamaica; Japan; Jordan; Kenya; Liberia; Madagascar; Malaysia; Maldives; Marshall Islands; Mauritania; Mauritius; Mexico (Baja California, Baja California Sur, Campeche, Chiapas, Colima, Guerrero, Jalisco, Michoacán, Nayarit, Oaxaca, Quintana Roo, Sinaloa, Sonora, Tabasco, Tamaulipas, Veracruz, Yucatán); Morocco; Myanmar; Nauru; Netherlands (Aruba, Bonaire, Curaçao; Sint Eustatius and Saba; Sint Maarten); Nicaragua; Niger; New Zealand (Cook Islands; Niue, Tokelau;); Norway (Bouvet Island); Oman; Pakistan; Palau; Panama; Papua New Guinea; Peru; Philippines; Portugal (Azores, Madeira); Puerto Rico;, Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Samoa; Sao Tomé and Principe; Saudi Arabia; Senegal; Seychelles; Sierra Leone; Singapore; Slovenia; Solomon Islands; Somalia; South Africa (KwaZulu-Natal, Northern Cape Province, Western Cape); Spain (Canary Is.); Sri Lanka; Sudan; Suriname; United Republic of Tanzania,; Thailand; Togo; Tonga; Trinidad and Tobago; Tuvalu; UK (Anguilla; Ascension and Tristan da Cunha; Bermuda, Saint Helena; Cayman Islands; Montserrat; Pitcairn; Turks and Caicos Islands; Virgin Islands); USA (Alabama; American Samoa; California, Connecticut, Delaware, District of Columbia, Florida, Georgia, Guam; Hawaiian Is., Johnston I., Louisiana, Maine, Maryland, Massachusetts, Mississippi, New Hampshire, New Jersey, New York, North Carolina, Northern Mariana Islands; Rhode Island, South Carolina, Texas, Virginia; Wake Is); Uruguay; Vanuatu; Bolivarian Republic of Venezuela,; Viet Nam.

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