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Agenda Item 31.4

PROPOSAL FOR THE INCLUSION OF THE SAND TIGER SHARK (*Carcharias taurus*) ON APPENDIX I AND II OF THE CONVENTION *

Summary:

The governments of Brazil and Panama have jointly submitted the attached proposal for the inclusion of the Sand Tiger Shark (*Carcharias taurus*) on Appendix I and II of CMS.

The governments revised the proposal to address comments from ScC-SC6 and resubmitted it to the Secretariat on 14 November 2023.

*The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CMS Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.

PROPOSAL FOR THE INCLUSION OF THE SAND TIGER SHARK (*Carcharias taurus*) ON APPENDIX I AND II OF THE CONVENTION

A. PROPOSAL

Inclusion of all populations of the Sand Tiger Shark (*Carcharias taurus*) on Appendix I and II.

B. PROPONENTS

The Governments of Brazil and Panama

C. SUPPORTING STATEMENT

1. Taxonomy

- 1.1 Class Chondrichthyes
- 1.2 Order Lamniformes
- 1.3 Family Odontaspidae
- 1.4 Genus species or subspecies, including author and year *Carcharias taurus* (Rafinesque 1810)
- 1.5 Scientific synonyms
 - Odontaspis taurus (Rafinesque, 1810)
 - Eugomphodus griseus (Ayres, 1843)
 - Eugomphodus taurus (Rafinesque, 1810)
 - Odontaspis platensis Lahille, 1928
 - Eugomphodus tricuspidatus (Day, 1878)
 - Carcharias tricuspidatus Day, 1878
 - Carcharias griseus Ayres 1843
 - Carcharias owstoni Garman 1913
 - Squalus americanus Mitchill 1815

1.6 Common name(s), in all applicable languages used by the Convention

English: Sand Tiger Shark, Grey Nurse Shark, Spotted Ragged-tooth Shark or Blue-Nurse

French: Requin Taureau

Spanish: Toro Bacota

Escalandrún (Argentina), Mangona (Brasil), Sarda (Uruguay),

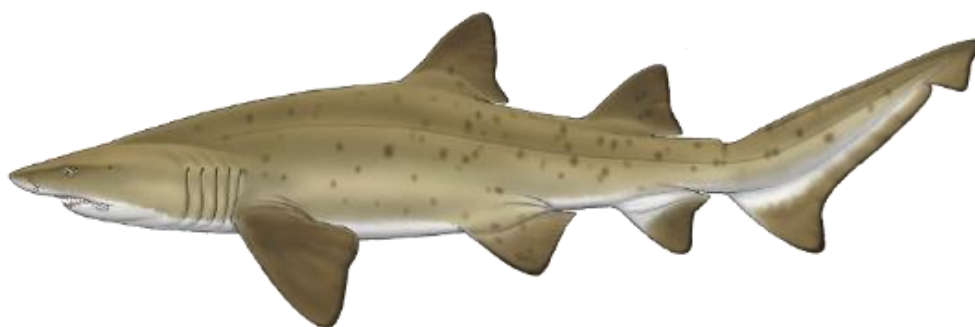


Figure 1. Illustration adapted from Sharks ID Guides (Marc Dando - The Shark Trust)

2. Overview

The Sand Tiger Shark (*Carcharias taurus*) is assessed as Critically Endangered globally on the IUCN Red List of Threatened Species (Rigby et al. 2021). The species is also considered Critically Endangered in Brazil (Kotas et al. 2018).

The Sand Tiger Shark undertakes complex size- and sex-segregated migrations associated with seasonal and reproductive events, habitually returning to the same breeding area (Bass et al. 1975, Gilmore 1993, Musick et al. 1993, Otway and Ellis 2011, Bansemer and Bennett 2011). The species have a regular, cyclical migratory behavior that exposes this Critically Endangered species to a myriad of threats, and that in areas of its range such as the Mediterranean, West Africa and Latin America which have closely spaced international borders, there are strong evidences that the species migrations cross those borders on a regular basis.

The Sand Tiger Shark is estimated and suspected to be declining across its entire range due to exploitation, except for east Australia, with signs of the onset of recovery where management measures have been in place for some time which prohibit retention or reduced fishing mortality, that is, in the Northwest and Southwest Atlantic, South Africa, and east Australia. The east Australian subpopulation is estimated to have undergone a reduction of >80% over the past three generation lengths (74 years), while the Northwest Atlantic and South African subpopulations are inferred to have undergone reductions of 30–49% over the past three generation lengths (74 years). The species is suspected to be Critically Endangered in the Southwest Atlantic, Mediterranean, and Arabian Seas region, that is, reductions of >80% over the past three generation lengths (74 years). Elsewhere, in Southeast Asia and West Africa, fishing pressure is high across the spatial and depth range of this species, and it is suspected similar levels of dramatic decline have occurred. Overall, it is suspected that the Sand Tiger Shark has undergone a population reduction of >80% over the past three generation lengths (74 years) due to levels of exploitation (Rigby et al. 2021).

Species-specific measures are in place in a number of countries and regions. In the United States (US), it was listed as a prohibited species in 1997 under the Fishery Management Plan for Atlantic Sharks (Carlson et al. 2009). In Australia, game fishers voluntarily banned the capture of this species in Australian waters in 1979, and it was protected in 1984 in New South Wales. In 1997 it was listed as threatened under the national Environment Protection Biodiversity Conservation Act, making the take and retention of this species illegal throughout its Australian range. A National Recovery Plan for the species was adopted in 2002 and updated in 2014. From 2001 to 2009, 26 Marine Protected Areas were established in east Australia, at least in part, to manage interactions with the Sand Tiger Shark (Lynch et al. 2013). In Argentina, the landing of this species is prohibited in industrial fisheries from national waters and catch and release is mandatory for recreational fishery in one of the three maritime provinces where the species inhabits. In Brazil, the capture and commercialization of the species have been prohibited since 2014. In the Mediterranean, Parties to the Barcelona Convention agreed that the Sand Tiger Shark is prohibited from being retained and must be released unharmed and alive, to the extent possible. In South Africa, it was protected from commercial fishing through the Marine Living Resources Act of 1998, as a precautionary approach in response to declining population trends elsewhere in the world.

However, outside of those countries, there is limited evidence of protections for this Critically Endangered species, despite a clear need for such action. A CMS Appendix I listing, with collaborative action coordinated by a listing on Appendix II is essential to ensure that protections that allow recovery are extended throughout this species range, both at the national level and through cooperation and collaboration between range States.

3. Migrations

3.1 Kinds of movement, distance, the cyclical and predicable nature of the migration

3.2 Proportion of the population migrating, and why that is a significant proportion

Sand tigers show patterns of fairly large-scale, north-south seasonal migrations along the continental coasts of Australia, South Africa, USA and South America (Teter et al. 2015). The migration pattern for reproduction is dissimilar among all these areas. In the NW Atlantic, populations of mature males and juveniles can be found between Cape Cod, Massachusetts and Cape Hatteras, North Carolina, while pregnant females frequent the southern waters between Cape Hatteras and Florida (Gilmore, 1993). In southern Africa, pregnant females migrate southwards to give birth during winter and early spring and suggests that the migratory movements from this region are opposite those from SE Australia. (Bass et al., 1975, Pollard et al., 1996). Off eastern Australia and South Africa mating occurs at high latitudes. Newly pregnant females migrate towards warmer and lower latitudes and give birth in higher latitudes. Off North and South American waters, gestation and parturition occur in warm, low-latitude waters (Teter et al. 2015).

Migration of *C. taurus* in Australia's eastern population is well documented and associated with reproduction (Bansemer & Bennett 2009, 2011, Dwyer et al. 2023). From 34 tagged individuals and divers' records, migratory movements ranged up to 1500 km along the coastline, connecting temperate waters of Montague Island to the southern Great Barrier Reef (Dwyer et al. 2023).

Regarding migration of Australia's western population, in 2003, three juveniles and one mature female shark were tagged with pop-up archival tags. Juveniles traveled up to 489 km north from Rottnest Island or Ledge Point (south of Lancelin) before returning south, and the female remained near her original location off the Abrolhos Islands (McAuley 2004). Later, during 2009–2016, a shark monitoring project tagged three *C. taurus* with acoustic tags (McAuley et al. 2016). The male shark (2 m fork length) was recorded near its tagging location, south of Augusta in late August 2012, then offshore from Rottnest Island in early September 2012, and again 1038 km further north near Coral Bay in mid-October 2012. This was the first hard evidence of male *C. taurus* migration in WA (Jakobs & Braccini 2019).

In the case of South America and according to Lucifora et al. (2002), mature males and females and some juveniles are found in higher latitudes in Argentinean and Uruguayan waters during late spring, summer and autumn. Whereas mating occurs in Argentinean waters, pregnant females are found in the warmer waters off southern Brazil, where parturition also takes place. Newborns and juveniles have been reported from Argentinean and Uruguayan waters indicating dispersion towards the south (Cervigón and Bastida, 1974; Menni et al., 1986; Lucifora et al. 2002). As males are found in small numbers in Argentina, Uruguay and Brazil in winter, it is presumed that males migrate offshore to continental shelf waters, crossing international boundaries as they enter the high seas (Meneses, 1999; Nion, 1999; Lucifora et al. 2002) or in southern Brazil (Sadowsky, 1970).

Due to the regional variations of migration patterns and movement between countries, SW Atlantic Sand Tiger Sharks are difficult to manage effectively without cooperation between countries, and high localized fishing pressure will affect the whole population. Not only do reproductive stages and life events occur in different jurisdictions but this results in uneven distribution of sexes throughout this species range. This requires a more cohesive, global strategy to manage the population of *C. taurus* more effectively (Lucifora et al., 2002)

Although migratory patterns of sand tigers may be complex, difficult to characterize and may differ between world populations (Teter et al, 2015) there are overall patterns for the species. In this sense, the Sand Tiger Shark undertakes complex size- and sex-segregated migrations

associated with seasonal and reproductive events, habitually returning to the same breeding area (Bass et al. 1975, Gilmore 1993, Musick et al. 1993, Otway and Ellis 2011, Bansemer and Bennett 2011).

4 Biological data (other than migration)

See sections 4 and 5 for details.

4.1 Distribution (current and historical)

Carcharias taurus inhabits warm temperate and warm temperate coastal waters of all oceans, with the exception of the eastern Pacific (Compagno 2001). It is generally found associated with the bottom at depths between 15 and 25 m, although it can reach depths up to 200 m (Compagno 2001).

In the southwestern Atlantic Ocean, Sand Tiger Shark was historically common from Espírito Santo (Brazil) to Chubut Province (Argentina) (Ebert et al. 2013, Cuevas et al. 2020). However, its southern distribution has contracted significantly to the southern coast of Buenos Aires (Argentina) (Juan Martin Cuevas, pers. comm. 2023).

Genetic studies support at least five subpopulations of the Sand Tiger Shark where it has been sampled, that is, Northwest Atlantic, Japan, west Australia, east Australia, and South Africa which is possibly also the same subpopulation as Brazil and the Mediterranean Sea (Stow et al. 2006, Ahonen et al. 2009, Fioravanti et al. 2020). Genetic data imply a low frequency of migration among each of these five regions and that the populations are genetically discrete (Ahonen et al. 2009, Fioravanti et al. 2020) and should be managed regionally (Ahonen et al. 2009). Although, Australian populations are genetically isolated from Japan, USA, Brazil, and South Africa (Ahonen et al. 2009), comparisons with Papua New Guinea and Indonesia have not yet confirmed the complete isolation of Australia's populations.

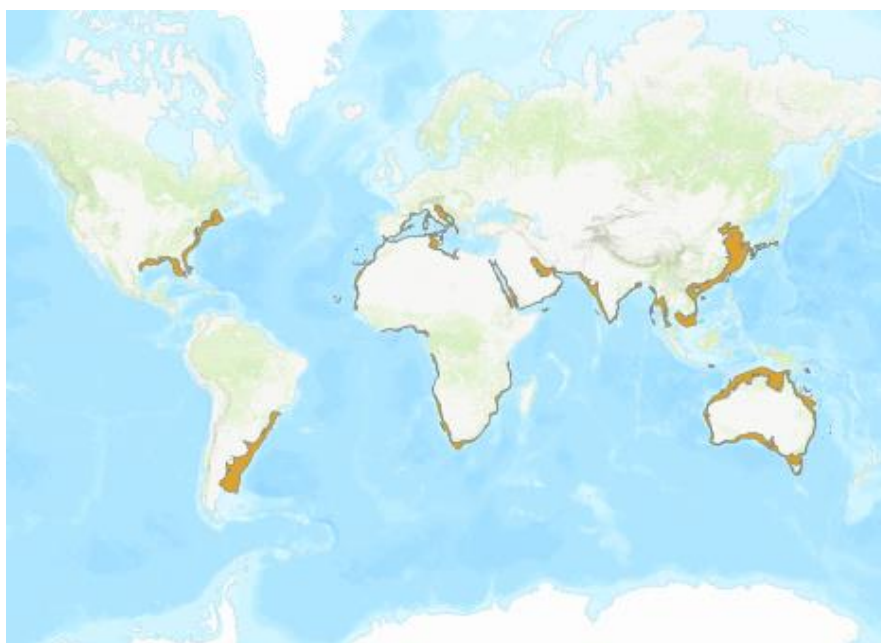


Figure 2. Global range – Rigby, C.L., Carlson, J., Derrick, D., Dicken, M., Pacoureau, N. & Simpfendorfer, C. 2021. *Carcharias taurus*. The IUCN Red List of Threatened Species 2021: e.T3854A2876505. <https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS.T3854A2876505.en>. Accessed on 29 March 2023.

Carcharias taurus from Arabian/Persian Gulf is known to occur from just a few specimens (Jabado et al 2013), which precludes understanding of further biology or ecology aspects of the species.

In Japan, *C. taurus* is distributed in Ogasawara Islands and is an important resource for tourism. Biological data, including information of reproduction and seasonal migration, has not been studied and scientifically recorded (Nakamura et al. 2019). Nakamura et al. 2018, hypothesized that “*C. taurus* in Ogasawara islands settles there and will not migrate so much” (Nakamura et al. 2018) but further data to confirm this statement is clearly needed.

The presence of *C. taurus* was recently confirmed in Papua New Guinea by records of local divers identified by Australian scientists (White et al. 2018). There are no other studies in PNG regarding this species as well as its use or fishery (White et al. 2017).

In Australia, this species has also been recorded as far north as Cairns in the east (Queensland), the North West Shelf in the west (Western Australia) and also in the Arafura Sea¹(Northern Territory). Furthermore, commercial shark bycatch fisheries data indicate that the species occupies sites from North West Shelf to southern coastal waters near Cocklebidy, in the Great Australian Bight (South Australia). Within the Australian Exclusive Economic Zone, an area known as the MoU box (Australia-Indonesia Memorandum of Understanding), is open to Indonesian traditional fishing. The presence of *C. taurus* on remote tropical reefs within the MoU box is described from genetics studies of four specimens collected by Indonesian fishers off Browse Island (Momigliano and Jaiteh 2015). Due to the differences in management measures for *C. taurus* in Indonesia and Australia, authors recommended further exploring the connectivity between the species among these countries (Momigliano and Jaiteh 2015). Recently, Hoschke et al. (2023) used 16 years (2006–2021) of divers’ observations (2,347 sightings) and commercial fisheries bycatch records (574 sharks) to reconstruct the distribution of western population and noted that the occurrence data northern than Barrow Island are limited. Therefore, for these authors it is “conceivable that the population extends further to the north” (Hoschke et al. 2023).

4.2 Population (estimates and trends)

The Sand Tiger Shark is estimated and suspected to be declining across its entire range due to exploitation, except for east Australia, with signs of the onset of recovery where management measures have been in place for some time which prohibit retention or reduced fishing mortality (Bradford et al. 2018), that is, in the Northwest Atlantic, South Africa, and east Australia. The east Australian subpopulation is estimated to have undergone a reduction of >80% over the past three generation lengths (74 years), while the Northwest Atlantic and South African subpopulations are inferred to have undergone reductions of 30–49% over the past three generation lengths (74 years). The species is suspected to be Critically Endangered in the Southwest Atlantic, Mediterranean, and the Arabian Seas region, that is, reductions of >80% over the past three generation lengths (74 years). Elsewhere, in Southeast Asia and West Africa, fishing pressure is high across the spatial and depth range of this species, and it is suspected similar levels of dramatic decline have occurred. Overall, it is suspected that the Sand Tiger Shark has undergone a population reduction of >80% over the past three generation lengths (74 years) due to levels of exploitation.

The number of individuals that inhabit the Southwest Atlantic is not known as well as time series of population abundances. Instead, there are studies that used indirect data, as interviews with fishers, landing information or magazine records, to identify some trends. In Argentina, as mentioned above, catches of *C. taurus* in recreational fishing seem to have

¹ <https://www.dcceew.gov.au/environment/marine/marine-species/sharks/greynurse>

drastically decreased over time (Irigoyen and Trobbiani 2016, Irigoyen 2020, Barbini et al. 2015). The few records of the species in artisanal or commercial fishing, or in research campaigns, do not allow trends to be identified.

In Uruguay, *C. taurus* has been an important target species for the artisanal fishery since the 1950s with a dramatically decline of 96% in catches (kg per day) from 1985 to 2001 (Paesch and Domingo 2003). There is no current information on population trends of the species, but since 2014, the National Agency of Aquatic Resources (Dirección Nacional de Recursos Acuáticos - DINARA) has been developing fisheries monitoring programs of oceanic and recreational marine crafts that contribute biological information and capture data for the species (Silveira et al. 2018, Laporta et al. 2018).

In Brazil, CPUE for this species declined dramatically between 1980 and 1990 by 97% (Soto 2001). Furthermore, it was abundant in the 1980s in Rio Grande de Sul but rare in 2005 with no records from the shore-based fishery (Vooren et al. 2005). Fishery statistics from three Brazilian states (Santa Catarina, Rio Grande do Sul, and São Paulo) indicate a decrease in *C. taurus* of at least 70% in landings (1990-2010) (Montealegre-Quijano 2020). There are estimates indicating an even more drastic 90% reduction in catch per unit of fishing effort between the 1980s and 2010s (Barreto 2020).

4.3 Habitat (short description and trends)

The Sand Tiger Shark is demersal and pelagic in tropical and temperate seas on the continental shelf from the surf zone to a depth of 232 m (Ebert et al. 2013, Weigmann 2016). It occurs mainly in shallow waters of 15–25 m depth and aggregates in or near underwater caves, gullies, and rocky and coral reefs (Otway and Parker 2000, Pollard et al. 1996, Ebert et al. 2013, Momigliano and Jaiteh 2015).

4.4 Biological characteristics

The species is philopatric and undertakes complex size- and sex-segregated migrations associated with seasonal and reproductive events, habitually returning to the same breeding area (Bass et al. 1975, Gilmore 1993, Musick et al. 1993, Otway and Ellis 2011, Bansemer and Bennett 2011). It reaches a maximum size of 325 cm total length (TL), males mature at 190–200 cm TL and females mature at 220–235 cm TL (Gilmore et al. 1993, Lucifora 2003, Ebert et al. 2013, Weigmann 2016).

Female age-at-maturity is estimated as 7.7 years in the Southwest Atlantic and 9–10 years in the Northwest Atlantic and maximum age is validated to at least 40 years in the Northwest Atlantic and Southwest Indian Oceans (Lucifora 2003, Passerotti et al. 2014, Jakobs and Braccini et al. 2019, S. Wintner pers. comm. 13 March 2020). Generation length is thus estimated as 24.8 years.

Carcharias taurus has only 2 young at a time that are born with a total length of 89 to 105 cm. (Gilmore 1993). The reproductive information of *C. taurus* in South America comes from studies carried out in Bahía Anegada, Argentina, during 1999-2001. The reproductive cycle is two years, with one year of egg production and 9 to 12 months of gestation. Females mature between 218 and 235 cm TL while males begin to mature at 193 cm (Lucifora et al. 2002). The age of sexual maturity in females is estimated at 7.7 years and males at 4.5 years (Lucifora 2003). However, age and growth studies are being reviewed and these ages could be higher. Neonates and small juveniles generally live in shallow waters (Vooren et al. 2005; Cardoso et al. 2010) and neonates are present both in Uruguay (Laporta et al. 2018; Silveira et al. 2018; DINARA 2020), as well as Brazil (Montealegre-Quijano 2020) and Argentina (Cervigón and Bastida 1974; Menni et al. 1986).

Additional studies indicate a similar life history strategy throughout the species range (Rigby et al 2021).

4.5 Role of the taxon in its ecosystem

Sand Tiger Shark is a top predator with a trophic level of 4.4 (Cortés 1999). In Argentine waters consumes mainly bony fish (55.4% of the total number of prey) and chondrichthyans (41.8%) (Lucifora et al. 2009), although pinniped remains have occasionally been found in the diet of specimens captured in Uruguay (Praderi 1985). This shark feeds on species most landed by demersal coastal fisheries (rays, small sharks, croaker and whiting), with a significant overlap with fishery activity (Lucifora et al. 2009). Due to its feeding behavior and dentition, sand tigers usually swallow and consume 94% of their prey whole; for this reason, when the food is baited, the hooks end up inserted in their internal organs, at least in 87.4% of the individuals studied (Lucifora et al. 2009).

Modeling studies carried out in the Argentine-Uruguayan Coastal Ecosystem point to *C. taurus* as a member of the top predators of the system. This implies that small modifications in the biomass of this shark can bring serious consequences to the trophic structure of the ecosystem (Milessi 2020).

5. Conservation status and threats

Carcharias taurus is listed as Critically Endangered under criteria A2bd on the IUCN Red List of Threatened Species (Rigby et al., 2021).

In Europe and the Mediterranean it was categorized as Critically Endangered (Possibly Extinct) (Walls et al. 2015, Walls et al. 2016). Australia's East Coast population is Critically Endangered (Pollard et al. 2003a, Rigby et al., 2021). The Australian Western population of *C. taurus* has been protected since 1999, when it was listed as Vulnerable (EPBC Act 1999), and today is Near Threatened (Pollard et al. 2003b, Rigby et al., 2021). In Japan, *C. taurus* has been considered Endangered since 2017 (Ministry of the Environment 2017 in Nakamura et al. 2018). In the United Arab Emirates this species is assessed as Critically Endangered (Ralph et al. 2021).

5.1 IUCN Red List Assessment (if available)

The species is Critically Endangered globally via a recent (2021) IUCN Red List assessment.

5.2 Equivalent information relevant to conservation status assessment

N/A

5.3 Threats to the population (factors, intensity)

The Sand Tiger Shark is subject to fishing pressure across its range. It is captured as target and bycatch in artisanal, recreational, and industrial fisheries with multiple fishing gears including longline, line, gillnet, and trawl. It is mostly retained for its meat and fins, unless regulations prohibit retention (Rigby et al 2021).

5.4 Threats connected especially with migrations

This species' preference for inshore coastal waters means it is threatened by habitat loss and degradation, including pollution and clearing for aquaculture and development, and climate change. Global climate change has already resulted in large-scale coral bleaching events with increasing frequency causing worldwide reef degradation since 1997. Almost all warm-water

coral reefs are projected to suffer significant losses of area and local extinctions, even if global warming is limited to 1.5°C (IPCC 2019). Conversely, climate change is predicted to create additional available habitat for the species in some areas, which may contribute to recovery and resilience of the species (Bradshaw et al. 2008).

5.5 National and international utilization

Along the species distribution it is fished for commercial purposes as meat, consumed fresh, frozen, smoked, dried and salted, as also for its fins (Fields et al. 2018; Rigby et al. 2021). Besides this, it is also used for its skin, liver oil, and for fish meal. It is popular in aquaria and for dive tourism in some countries (Ebert et al. 2013; Rigby et al. 2021; Kotas et al. 2023).

6. Protection status and species management

6.1 National protection status

Species-specific protections are in place In the United States, South Africa and Australia. In Argentina, the landing of this species is prohibited in recreational fisheries. (Rigby et al 2021).

In Japan, sharks are heavily fished and the national plan of action for sharks is intended to ensure that sharks are fished sustainably and have all body parts commercialized (NPOA, 2016).

In Brazil, the species is listed in the Official Brazilian Red List (Portaria MMA n° 148/2022), which gives it, *a priori*, a series of restrictions, in particular the prohibition of commercial use. In addition, it is present in two national action plans of Brazil, the National Action Plan for the Conservation of endangered shark and marine ray species (PAN Tubarões) and the National Action Plan for the Conservation of lake and lagoon systems in southern Brazil (PAN Lagoas do Sul).

However outside of those countries, there is limited evidence of protections for this Critically Endangered species, despite a clear need for such action. A CMS Appendix I listing, with collaborative action co-ordinated by a listing on Appendix II is essential to ensure that protections that allow recovery are extended throughout this species range.

6.2 International protection status

In the Mediterranean, Parties to the Barcelona Convention agreed that the Sand Tiger Shark is prohibited to be retained and must be released unharmed and alive, to the extent possible. There is no evidence of additional national or international protections for the species.

6.3 Management measures

Management measures at species level may be found for almost each population.

In the United States, it was listed as a prohibited species in 1997 under the Fishery Management Plan for Atlantic Sharks (Carlson et al. 2009). In Australia, game fishers voluntarily banned capture of this species in Australian waters in 1979, it was protected in 1984 in New South Wales, and in 1997 it was listed as threatened under the national Environment Protection Biodiversity Conservation Act in 1997, making the take and retention of this species illegal throughout its Australian range. A National Recovery Plan for the species was adopted in 2002 and updated in 2014. From 2001 to 2009, 26 Marine Protected Areas were established in east Australia, at least in part, to manage interactions with the Sand Tiger Shark (Lynch et al. 2013). In the Mediterranean, Parties to the Barcelona Convention agreed that the Sand Tiger Shark is prohibited to be retained and must be released unharmed and

alive, to the extent possible. In South Africa, it was protected from commercial fishing through the Marine Living Resources Act of 1998, as a precautionary approach in response to declining population trends elsewhere in the world. In recent years, fishing effort by the Kwazulu-Natal bather protection program has been reduced in order to reduce captures of all exploited species (Rigby et al., 2021).

In the Arabian/Persian Gulf only 4 individuals have been recorded from three countries (Jabado et al. 2013) maybe due to poor reports of shark landings, mostly aggregated in “family” or identified as “others” (Ralph et al. 2021). In this sense, conservation measures such as the improvement of landing records of sharks should be championed and implemented between the countries of this gulf as part of a coordinated regional plan (Jabado et al. 2013). In the United Arab Emirates this species is not protected in fisheries since it is not listed in CITES or CMS Appendices - Ministerial Decree No. 43 on Regulating the Fishing and Trading of Sharks, 2019 - (Ralph et al. 2021).

The Migratory population of the species in South America is in particular need of the international co-operation a CMS listing can provide, to deliver range wide protection for the species. The current set of management measures is summarized as follows:

In Argentina, *Carcharias taurus* is one of the species of interest for sport fishing, an activity that has been carried out for more than 70 years (Cedrola et al. 2011; Dellacasa 2019). Sport fishing for this species occurs from the coast, by kayaks or by boats in the province of Buenos Aires and used to be in Río Negro and Chubut. The activity may include catch and retain or catch and release, the latter being only mandatory in the province of Buenos Aires since 2007 (Disposición 217/07). Although its implementation is not enforced by local authorities, bottom up efforts are being executed via a Shark Tagging Programme involving local anglers in catch, tag and release activities (Cuevas et al. 2013; Cuevas et al. 2014; Cuevas et al. 2021) with a total of 64 sand tigers been tagged and released (70% females) since 2013 (Juan Martín Cuevas, pers. comm. 2023). Also, the shark angler activity is totally prohibited inside Punta Bermeja MPA, in Río Negro province.

In the Bahía San Blas Nature Reserve (Argentina), annual catches of between 123 and 453 specimens (1998-2001) were estimated in sport fishing from boats (Lucifora 2003). Catches of *C. taurus* in the Argentine sport fishery appear to have decreased over time. For example, 92% of the 29 sport fishers who were interviewed indicated a decrease in the capture of *C. taurus* during their fishing career in the Argentine coasts (Irigoyen and Trobbiani 2016). According to these sport fishers with vast experience, in some historical fishing points the species has disappeared, and on average they reported a decrease of 82% (Irigoyen 2020). Analyzes based on non-probabilistic methods, using indirect records of the species and indirect measures of fishing effort, indicate an annual population decrease of 29%, during 1973 to 2008 (Barbini et al. 2015).

In Brazil, the species has been subjected to commercial exploitation since the second half of the 20th century (Montealegre-Quijano 2020). Artisanal and industrial fishers directed their efforts to this species through gillnets with dimensions of up to 18 km in length, 5-10 m in height and 20-40 cm mesh between nodes (Montealegre-Quijano 2020). In the 1980s the species reached a high commercial value, and nets called “mangoneras” were already used with baits to further increase yields (Montealegre-Quijano 2020). For example, until 1998, the artisanal fishery in Santa Catarina landed an annual average of 128 tons, which is equivalent to approximately 1,700 sharks per year (Montealegre-Quijano 2020). Since 2014, the capture and commercialization of the species has been prohibited, since the species is on the national red list (MMA Ordinance n° 445/2014 and updated by the n° 148/2022), however illegal commercialization is known to exist (Kotas et al. 2018; Patricia Charvet pers. comm. 2021).

In Uruguay, fishing for *C. taurus* peaked in the mid-20th century, associated with the market demand for the production of dried salted fish, with almost total abandonment in the 1990s. The main captures of this species were made with artisanal gillnet fishing, with yields of between 0 and 58.8 tons in the period 1977-2019. The maximum in catches occurred in the mid-1980s, decreasing later towards the end of the 90s, with catches that do not exceed 1.5 tons from 2000 to date (DINARA 2020). The variations in the volumes of Uruguayan catches for the period considered were not only related to possible changes in the abundance of the species, but also to market demand and the partial abandonment of their fishery to target towards other species. Most recent data, collected within the framework of the Monitoring of the Oceanic Artisanal Fisheries, recorded captures of 157 individuals in 605 fishing events (2014-2019) (DINARA 2020). In industrial fishing in Uruguay, catches of *C. taurus* are incidental, with official reports of 0.05 to 5 tons (1977-2020) in industrial coastal trawling, which represents an average of 0.25 tons per year in the last 10 years (DINARA 2020).

Carcharias taurus has also been one of the most coveted species for sport fishing in Uruguay, an activity that is widespread along the entire coast, either from the beach or by boats, and mainly in the department of Rocha (Domingo et al. 2008).

Conservation and Management Measures in South America:

	Argentina	Uruguay	Brazil
Main threat	Recreational fishing with sacrifice, some landed from artisanal fishery by-catch	Artisanal and recreational fishing	Historical intensive commercial (artisanal and industrial) fishing targeting <i>Carcharias taurus</i> .
Management measures	Industrial fishing forbidden in national waters. Provincial jurisdictions with different management measures (recreational and commercial fishing). Closed areas for the artisanal/ capture of large coastal sharks in a specific area south of the province of Buenos Aires (Disposition 55/08 - Ministry of Production and Agriculture Issues of the Province of Buenos Aires). Catch with return is mandatory in recreational fishing in Buenos Aires province (Disposition 217/07 – Regulation of maritime sport fishing). In Río Negro Province recreational fishing of sharks is not allowed in Bermeja Natural Reserve. Killing sharks in rec fishing in Chubut, Santa Cruz and Río Negro is still allowed.	Capture and commercialization of <i>Carcharias taurus</i> allowed in all jurisdictions.	Since 2014, capture and commercialization of the species is prohibited in the whole territory (MMA Ordinance n° 445/2014 and n° 148/2022)
National Plan of Actions	National Plan of Action for the Conservation and Management of Chondrichthyans in the Argentine Republic (2009). Regional action plan for the conservation and sustainable fishing of chondrichthyans in the area of the Río de la Plata Treaty and its Maritime Front (2018).	National Action Plan for the conservation of chondrichthyans in Uruguayan fisheries. (2008). Review of National Action Plans for the Conservation of Seabirds and Chondrichthyans in Uruguayan Fisheries (2015). Regional action plan for the conservation and sustainable fishing of chondrichthyans in the area of the Río de la Plata Treaty and its Maritime Front (2018).	National Action Plan for the Conservation of Sharks and Marine Rays Threatened with Extinction in Brazil (Pan Tubarões - 2014-2019) and the National Action Plan for the Conservation of Lake and Lagoon Systems in Southern Brazil (2018 – 2023 - PAN Lagoas do Sul).

The species is considered the most threatened and vulnerable chondrichthyan in the Uruguayan Buenos Aires coastal ecosystem by the Mixed Technical Commission of the Maritime Front (Comisión Técnica Mixta del Frente Marítimo - CTMFM). In Brazil, the national evaluation that followed the IUCN criteria considers it as Critically Endangered. *Carcharias taurus* is listed as Critically Endangered under criteria A2bd of the Red List (Rigby et al. 2021). Argentina, Brazil and Uruguay created their National Plan of Action for chondrichthyans with some actions that include indirect conservation measures for *C. taurus*, excepting Brazil that has specific objectives for the species. Challenges, objectives and actions for the species at regional and national level were compiled as a result of a multi-stakeholder workshop with participants of Brazil, Uruguay and Argentina in 2020 (Southwest Atlantic Regional Recovery Action Plan for *Carcharias taurus*): <https://tallerctaurus.com.ar/informe/Informe-Final-Aportes-para-la-conservacion-de-C-taurus-en-el-ASO.pdf>

6.4 Habitat conservation

In east Australia 26 Marine Protected Areas were established between 2001 and 2009, at least in part, to manage interactions with the Sand Tiger Shark (Lynch et al. 2013). *C. taurus* crosses the jurisdictional border between Queensland and New South Wales (when moving north or south), protected by the network of MPAs (Dwyer et al. 2023).

6.5 Population monitoring

There are some monitoring programs that include the Sand Tiger Shark, but usually associated with fisheries activities or some punctual research initiatives along its distribution.

7. Effects of the proposed amendment

7.1 Anticipated benefits of the amendment and

7.2 Potential risks of the amendment

The species has already been nationally protected in several range countries, and the Appendix I listing would expand that level of protection for this Critically Endangered species throughout its range.

Additionally, an Appendix II listing would allow for coordinated conservation action in regions where the species is known to form part of a migratory population across international borders, such as the Western Atlantic coast of Latin America.

In some locations there will be a direct impact on fishers as a result of the need to fully protect this species, however national protection for the species as mandated by a CMS Appendix I listing is in keeping with the recommended action for a species that is assessed as Critically Endangered.

7.3 Intention of the proponent concerning development of an Agreement or Concerted Action

The proponent will endeavor to produce a Concerted Action for the species if the listing is successful.

8. Range States

Albania; Algeria; Angola; Argentina; Australia; Bahamas; Bahrain; Benin; Bosnia and Herzegovina; Brazil; Cabo Verde; Cambodia; Cameroon; China; Congo; Congo, Democratic Republic of the; Croatia; Côte d'Ivoire; Egypt; Eritrea; France (Corsica); Gambia; Ghana;

Greece; Guinea-Bissau; India; Indonesia; Iran, Islamic Republic of; Iraq; Israel; Italy; Japan; Korea, Democratic People's Republic of; Korea, Republic of; Kuwait; Libya; Malta; Mauritania; Montenegro; Morocco; Mozambique; Myanmar; Namibia; Nigeria; Oman; Pakistan; Papua New Guinea; Qatar; Saudi Arabia; Senegal; Slovenia; South Africa; Spain (Canary Islands); Sudan; Tanzania, United Republic of; Thailand; Togo; Tunisia; United Arab Emirates; United States of America; Uruguay; Viet Nam; Yemen

9. Consultations

10. Additional remarks

ERRATA: The Sharks MOU Advisory Committee noted (paragraph 3 of the 'overview' and in paragraph 1 of the section 4.2 'population') that the text 'The Sand Tiger Shark is estimated and suspected to be declining across its entire range due to exploitation, except for west Australia,...' should be corrected to 'The Sand Tiger Shark is estimated and suspected to be declining across its entire range due to exploitation, except for east Australia,...'

11. References

- Ahonen, H., Harcourt, R.G., Stow, A.J. 2009. Nuclear and Mitochondrial DNA Reveals Isolation of Imperilled Grey Nurse Shark Populations (*Carcharias taurus*). *Mol. Ecol.* 18: 4409-4421
- Barbini, S.A., Lucifora, L.O., Figueroa D.E. 2015. Using opportunistic records from a recreational fishing magazine to assess population trends of sharks. *Can. J. Fish. Aquat. Sci.* 72: 1853-1859.
- Barreto, R. 2020. Estado de Conservación de *Carcharias taurus* en Brasil. Resumen, Taller Regional sobre el tiburón *Carcharias taurus* en el Atlántico Sudoccidental (2020). 17-21 agosto 2020, virtual.
- Bass, A., D'Aubrey, J., and Kistnasamy, N. (1975). Sharks of the east coast of southern Africa IV. The families Odontaspidae, Scapanorhynchidae, Isuridae, Cetorhinidae, Alopiidae, Orectolobidae and Rhinodontidae. Investigative report number 39. Oceanographic Research Institute, Durban, South Africa.
- Bansemmer CS, Bennett MB (2009) Reproductive periodicity, localized movements and behavioural segregation of pregnant *Carcharias taurus* at Wolf Rock, southeast Queensland, Australia. *Mar Ecol Prog Ser* 374:215-227. <https://doi.org/10.3354/meps07741>
- Bansemmer, C., and Bennett, M. (2011). Sex- and maturity-based differences in movement and migration patterns of grey nurse shark, *Carcharias taurus*, along the eastern coast of Australia. *Marine and Freshwater Research* 62, 596–606. doi:10.1071/MF10152
- Bradford, R.W., Thomson, R., Bravington, M., Foote, D., Gunasekera, R., Bruce, B.D., Harasti, D., Otway, N. and Feutry, P. (2018). A close-kin mark-recapture estimate the population size and trend of east coast grey nurse shark. Report to the National Environmental Science Program, Marine Biodiversity Hub. CSIRO Oceans & Atmosphere, Hobart, Tasmania
- Bradshaw CJA, Peddemors V, McCauley R, Harcourt R (2008) Population Viability of Eastern Australian Grey Nurse Sharks Under Fishing Mitigation and Climate Change. Department of Environment, Water, Heritage and the Arts, Canberra, ACT, 36 pp.
- Cardoso, L.G., Vooren, C.M., Haimovici, M. 2010. Survival due to vitelline reserve of a finned neonate of *Carcharias taurus* in southern of Brazil. *Bol. Inst. Pesca* 36: 333-338.
- Carlson, J., McCandless, C., Corte's, E., Grubbs, R., Andrews, K., Macneil, M., and Musick, J. (2009). An update on the status of the sand tiger shark, *Carcharias taurus*, in the Northwest Atlantic Ocean. NOAA Technical Memorandum NMFS-SEFSC-585.
- Cedrola, P., Bovcon, N., Bruno, C., Bustamante, C., Caille, G., Calvo, S., Chiaramonte, G., García Liotta, R., González, R., Laura, D., Massola, V., Mendia, L., Moronta, M., Perier, R., Remes Lenicov, M., Tombesi, M.L. 2011. La pesca deportiva de condriactios en el Mar Argentino. En: Wöhler, O.C., Cedrola, P., Cousseau, M.B. (Eds.), Contribuciones sobre biología, pesca y comercialización de tiburones en Argentina. Aportes para la elaboración del Plan de Acción Nacional, Consejo Federal Pesquero, Buenos Aires, 2011.

- Cervigón, F., Bastida, R. 1974. Contribución al conocimiento de la fauna ictiológica de la Provincia de Buenos Aires (Argentina). An. Soc. Cient. Argent. 197: 3-20.
- Compagno, L.J.V. 2001. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Volume 2. Bullhead, Mackerel and Carpet Sharks (Heterodontiformes, Lamniformes and Orectolobiformes). FAO, Rome.
- Cortés, E. 1999. Standardized diet compositions and trophic levels of sharks, ICES Journal of Marine Science, 56, 707–717.
- Cuevas, J. M., Cedrola, P., & Chiaramonte, G. E. (2013). Manual de Marcado de Tiburones de Argentina (shark tagging manual of Argentina) (1st ed.). Ciudad Autónoma de Buenos Aires, Argentina: Proyecto Conservar Tiburones en Argentina Advance online publication. <https://www.researchgate.net/publication/258565077>.
- Cuevas, J.M., G. Chiaramonte, P.V. Cedrola, M. Suárez, R. Dellacasa, M.L. Colecchia Corso, N. Dercole, A. Oberti. 2014. Anglers as key stakeholders in a shark conservation programme, in: Proceedings of the Program Book, 7th World Recreational Fishing Conference, Campinas, 1–4 September, pp. 71–72.
- Cuevas, J.M., García, V.B., Montealegre-Quijano, S., Paesch, L., Estalles, M., Falabella, V., Santos, R., Bovcon, N., Chiaramonte, G., Coller, M., Figueroa, D., García, M., Acuña, E., Bustamante, C. Pomper, J., Campagna, C. 2020. Informe del Taller Regional de Evaluación del Estado de Conservación de Especies para el Mar Patagónico según criterios de la Lista Roja de UICN: Condrictios. Foro para la Conservación del Mar Patagónico y áreas de influencia. 302 pp.
- Cuevas, J. M., Palacio, C., Cordero Schmidt, E., Lopes Rocha, F., Arruda Sêga L., Charvet, P., Chiaramonte, G., Colonello, J., Forselledo, R., Gadig, O. B. F., García, M. L., Laporta, M., Mas F., Montealegre-Quijano, S., Paesch, L., Pereyra, I., Riverón, S., Santos, R. A., Silveira, S., Vögler, R. & García, V. B. (Eds.). 2021. Aportes para la planificación estratégica de la conservación del tiburón *Carcharias taurus* en el Atlántico Sudoccidental. 53 pp. https://tallerctaurus.com.ar/informe/Informe-Final_Aportes-para-la-conservacion-de-C-taurus-en-el-ASO.pdf
- Dellacasa, R.F. 2019. Buenas Prácticas en la Pesca Recreacional Marina. Producto 6. Fortalecimiento de la Gestión y Protección de la Biodiversidad Costero Marina en Áreas Ecológicas clave y la Aplicación del Enfoque Ecosistémico de la Pesca (EEP). GCP/ARG/025/GFF.
- Dicken M.L., Smale M.J., Booth A.J., 2006. Spatial and seasonal distribution patterns of the raggedtooth shark *Carcharias taurus* along the coast of South Africa. Afr. J. Mar. Sci. 28: 603-616.
- DINARA 2020. Registros de *Carcharias taurus* en campañas de investigación, pesca industrial y artesanal en Uruguay. Resumen, Taller Regional sobre el tiburón *Carcharias taurus* en el Atlántico Sudoccidental (2020). 17-21 agosto 2020, virtual.
- Domingo, A., Forselledo, R., Miller, P., Passadore, C. 2008. Plan de Acción Nacional para la conservación de los condrictios en las pesquerías uruguayas. (PAN-Condrictios Uruguay). Montevideo, DINARA. 88 pp.
- Dwyer RG, Rathbone M, Foote DL, Bennett M, Butcher PA, Otway NM, Loudon BM, Jaine FRA, Franklin CE, Kilpatrick C (2023) Marine reserve use by a migratory coastal shark, *Carcharias taurus*. Biological Conservation, 283, 110099 <https://doi.org/10.1016/j.biocon.2023.110099>
- Ebert, D. A., Fowler, S., Compagno, L. 2013. Sharks of the world: a fully illustrated guide. Wild Nature Press. 528 pp.
- Fields, A.T., Fischer, G.A., Shea, S.K., Zhang, H., Abercrombie, D.L., Feldheim, K.A., Babcock, E.A. and Chapman, D.D. 2018. Species composition of the international shark fin trade assessed through a retail-market survey in Hong Kong. Conservation Biology 32(2): 376–389.
- Fioravanti, T. & Bargnesi, F. & Splendiani, A. & Giovannotti, M. & Renzi, F. & Caputo Barucchi, V. (2020) Historical DNA as a tool to genetically characterize the Mediterranean sand tiger shark (*Carcharias taurus*, Lamniformes: Odontaspidae): a species probably disappeared from this basin. Aquatic Conservation, Marine and Freshwater Ecosystems, 30(5), 892–902 DOI: 10.1002/aqc.3294
- Gilmore, R. (1993). Reproductive biology of lamnoid sharks. Environmental Biology of Fishes 38, 95–114. doi:10.1007/BF00842907

- Hoschke A, Whisson G, Danielle H (2023). Population distribution, aggregation sites and seasonal occurrence of Australia's western population of the grey nurse shark *Carcharias taurus*. *Endangered Species Research*. 50. 10.3354/esr01225.
- Irigoyen, A., Trobbiani, G. 2016. Depletion of trophy large-sized sharks populations of the Argentinean coast, south-western Atlantic: insights from fishers' knowledge. *Neotrop. Ichthyol.* 14: e150081.
- Irigoyen, A. 2020. Pesca recreativa del tiburón *Carcharias taurus* en Argentina: descripción y percepción de pescadores expertos. Resumen, Taller Regional sobre el tiburón *Carcharias taurus* en el Atlántico Sudoccidental. 17-21 agosto 2020, virtual. Jabado R, Al Ghais SM, Hamza W, Henderson AC, Almusallami MA (2013). First record of the sand tiger shark, *Carcharias taurus*, from United Arab Emirates waters. *Marine Biodiversity Records*. 6. 10.1017/S1755267213000043.
- Jakobs, S., Braccini, M. 2019. Acoustic and conventional tagging support the growth patterns of grey nurse sharks and reveal their large-scale displacements in the west coast of Australia. *Marine Biology*.
- Kotas, J. E., Soto, J. M. R.; Montealegre-Quijano, S.; Moro, G.; Charvet, P. & Santos, R. A. 2018. *Carcharias taurus* Müller & Henle, 1841. In: Instituto Chico Mendes de Conservação da Biodiversidade (Org.). Livro Vermelho da Fauna Brasileira Ameaçada de Extinção: Volume VI - Peixes. Brasília: ICMBio. p. 1016-1019.
- Kotas, J. E., Vizuete, E. P., Santos, R. A., Baggio, M. R., Salge, P. G., Barreto, R. 2023. PAN Tubarões: Primeiro Ciclo do Plano de Ação Nacional para a Conservação dos Tubarões e Raias Marinhos Ameaçados de Extinção, Brasília (DF): ICMBio/CEPSUL, 376 p.
- Laporta, M., Scarabino, F., Fabiano, G., Silveira, S., Pereyra, I., Santana, O. 2018. Peces e invertebrados capturados en las pesquerías artesanales oceánicas de enmalle y palangre de fondo de Uruguay. *Frente Marítimo*, 25: 325-348.
- Lucifora, L.O., Menni, R., Escalante, A.H. 2002. Reproductive ecology and abundance of the sand tiger shark, *Carcharias taurus*, from the Southwestern Atlantic. *ICES J. Mar. Sci.* 59: 553-561.
- Lucifora, L.O. 2003. Ecología y conservación de los grandes tiburones costeros de Bahía Anegada, Provincia de Buenos Aires, Argentina. Tesis Doctoral, Universidad Nacional de Mar del Plata Mar del Plata, Argentina. 406 pp.
- Lucifora, L.O., García, V.B., Menni, R.C., Escalante, A.H., Hozbor, N.M. 2009. How can the feeding habits of the sand tiger shark, *Carcharias taurus*, influence the success of conservation programs? *Anim. Conser.* 12: 291-301.
- Lynch, T.P., Harcourt, R., Edgar, G. et al. Conservation of the Critically Endangered Eastern Australian Population of the Grey Nurse Shark (*Carcharias taurus*) Through Cross-Jurisdictional Management of a Network of Marine-Protected Areas. *Environmental Management* 52, 1341–1354 (2013). <https://doi.org/10.1007/s00267-013-0174-x> McAuley R. (2004) Western Australian grey nurse shark pop up archival tag project. Final Report to Department of Environment and Heritage.
- McAuley R, Bruce B, Keay I, Mountford S, Pinnell T (2016) Evaluation of passive acoustic telemetry approaches for monitoring and mitigating shark hazards off the coast of Western Australia. Fisheries Research Report No. 273, Department of Fisheries, Perth.
- Meneses, P. D. 1999. Distribución espacio-temporal y abundancia de los elasmobranchios en el Río de la Plata exterior y la zona costera atlántica uruguaya. In *Estudios Realizados sobre los Elasmobranchios dentro del Río de la Plata y la Zona Común de Pesca Argentino-Uruguay en el Marco del Plan de Investigación Pesquera*, pp. 38–73. Ed. by G. Arena, and M. Rey. INAPE-UNDP, Montevideo. 80 pp.
- Menni, R. C. 1986b. Shark biology in Argentina: a review. In *Indo-Pacific Fish Biology: Proceedings of the Second International Conference on Indo-Pacific Fishes*, pp. 425–436. Ed. by T. Uyeno, R. Arai, T. Taniuchi, and K. Matsuura. Ichthyological Society of Japan, Tokyo. 986 pp.
- Milessi, A.C. 2020. Evaluación del rol ecológico de *Carcharias taurus* en el Ecosistema Costero Argentino-Uruguayo mediante modelos ecotróficos. Resumen, Taller Regional sobre el tiburón *Carcharias taurus* en el Atlántico Sudoccidental (2020). 17-21 agosto 2020, virtual.
- Momigliano, P., & Jaiteh, V. (2015). First records of the grey nurse shark *Carcharias taurus* (Lamniformes: Odontaspidae) from oceanic coral reefs in the Timor Sea. *Marine Biodiversity Records*, 8, E56. doi:10.1017/S1755267215000354

- Montealegre-Quijano, S. 2020. Análisis de la estadística pesquera del tiburón “Mangona” (*Carcharias taurus*), en Brasil. . Resumen, Taller Regional sobre el tiburón *Carcharias taurus* en el Atlántico Sudoccidental (2020). 17-21 agosto 2020, virtual.
- Musick JA, Branstetter S, Colvocoresses JA (1993) Trends in shark abundance from 1974 to 1991 for the Chesapeake Bight region of the U.S. mid-Atlantic coast. NOAA technical report NMFS 115.
- Nakamura M, Kondo K, Nagasawa T. 2018. Reproductive Management Committee for Sand Tiger Sharks. <https://www.aquamarine.or.jp/wp-content/uploads/2019/03/Full-Papers/11-FullPaper-IAC2018.pdf>
- National Plan of Action of Uruguay. 2008.
https://www.fao.org/fishery/docs/DOCUMENT/IPOAS/national/uruguay/PAN_sharks.pdf
- National Plan of Action of Argentina. 2009.
https://www.magyp.gob.ar/sitio/areas/pesca_maritima/plan/PAN-TIBURONES/PAN_Tiburones.pdf
- National Plans of Action of Brazil. 2014, 2018.
<https://www.gov.br/icmbio/pt-br/assuntos/biodiversidade/pan/pan-tubaroes>
<https://www.gov.br/icmbio/pt-br/assuntos/biodiversidade/pan/pan-lagoas-do-sul>
- Regional Plan of Action Argentina and Uruguay. 2018.
<https://ctmfm.org/upload/biblioteca/201807/par-condrictios-153071123790.pdf>
- National Plan of Action for Conservation and Management of Sharks in Japan. 2016. Fisheries Agency. Government of Japan. https://www.iucnssg.org/uploads/5/4/1/2/54120303/2016_-_npoa-sharks_-_japan_-_national_plan_of_action_for_the_conservation_and_management_of_sharks.pdf
- Nion, H. 1999. La pesquería de tiburones en Uruguay con especial referencia al cazo'n (*Galeorhinus galeus* Linnaeus 1758). In Case Studies of the Management of Elasmobranch. Fisheries, Part 1, pp. 218–267. Ed. by R. Shotton. FAO Fisheries Technical Paper, 378.
- Otway, N., and Ellis, M. (2011). Pop-up archival satellite tagging of *Carcharias taurus*: movements and depth/temperature-related use of south-eastern Australian waters. Marine and Freshwater Research 62, 607–620. doi:10.1071/MF10139
- Otway NM, Parker PC (2000) The Biology, Ecology, Distribution and Abundance, and Identification of Marine Protected Areas for the Conservation of Threatened Grey Nurse Sharks in South East Australian Waters. Fisheries Final Report Series No. 19. NSW Fisheries Office of Conservation, Sydney, NSW, 132 pp.
- Paesch, L.; Domingo, A. 2003. La pesca de condrictios en el Uruguay. Frente Marit. v. 19, n. 1, p. 207-216.
- Passerotti, M. S., Andrews, A. H., Carlson, J. K., Wintner, S. P., Goldman, K. J. and Natanson, L. J. 2014. Maximum age and missing time in the vertebrae of sand tiger shark (*Carcharias taurus*): validated lifespan from bomb radiocarbon dating in the western North Atlantic and southwestern Indian Oceans. Marine and Freshwater Research 65(8): 674–687.
- Praderi, R. 1985. Relaciones entre Pontoporia blainvillei (Mammalia: Cetacea) y tiburones (Selachii) de aguas uruguayas. Comunicaciones Zoológicas del Museo de Historia Natural de Montevideo, 11: 1- 19.
- Pollard, D.A., Lincoln Smith, M.P. and Smith, A.K. 1996. The biology and conservation states of the grey nurse shark (*Carcharias taurus* Rafinesque 1810) in New South Wales, Australia. Aquatic Conservation. Marine and Freshwater Ecosystems 6: 1–20.
- Pollard, D., Gordon, I., Williams, S., Flaherty, A. and McAuley, R. 2003a. *Carcharias taurus* (East coast of Australia subpopulation). The IUCN Red List of Threatened Species 2003: e.T44070A10854830. Available at:
<https://dx.doi.org/10.2305/IUCN.UK.2003.RLTS.T44070A10854830.en>.
- Pollard, D., Gordon, I., Williams, S., Flaherty, A. and McAuley, R. 2003b. *Carcharias taurus* (Western Australia subpopulation). The IUCN Red List of Threatened Species. Version 2014.
- Ralph GM, Stump E, Linardich C, Bullock RW, Carpenter KE, Allen DJ, Hilton-Taylor C, Al Mheiri R, Alshamsi O (2021) UAE National Red List of Marine Species: Reef-building corals, cartilaginous

- fishes and select bony fishes. 2021. Ministry of Climate Change and Environment, Dubai, United Arab Emirates.
- Rigby, C.L., Carlson, J., Derrick, D., Dicken, M., Pacoureau, N. & Simpfendorfer, C. 2021. *Carcharias taurus*. The IUCN Red List of Threatened Species 2021: e.T3854A2876505. <https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS.T3854A2876505.en>. Accessed on 13 April 2023.
- Sadowsky, V. 1970. On the dentition of the sand shark, *Odontaspis taurus*, from the vicinity of Cananeia, Brazil. Boletim do Instituto Oceanografico, Sao Paulo. 18: 37–44.
- Silveira, S., Laporta, M., Pereyra, I., Mas, F., Doño, F., Santana, O., Fabiano, G. 2018. Análisis de la captura de condriktios en la pesca artesanal oceánica de Uruguay, Atlántico Sudoccidental. Frente Marítimo, 25: 301-324.
- Soto, J.M.R. 2001. Annotated systematic checklist and bibliography of the coastal and oceanic fauna of Brazil. I. Sharks. Mare Magnum 1(1):51-120.
- Stow A., Zenger K., Briscoe D., Gillings M., Peddemors V., Otway N. and Harcourt R. 2006. Isolation and genetic diversity of endangered grey nurse shark (*Carcharias taurus*) populations. Biology Letters 2: 308–311.
- Teter, S. M., Wetherbee, B. M., Fox, D. A., Lam, C. H., Kiefer, D. A., & Shivji, M. (2015). Migratory patterns and habitat use of the sand tiger shark (*Carcharias taurus*) in the western North Atlantic. Marine and Freshwater Research, 66, 158–169. <https://doi.org/10.1071/MF14129>
- Vooren, C.M., Klippel, S. and Galina, A.B. 2005. Os elasmobrânquios das águas costeiras da Plataforma Sul. In: C.M. Vooren and S. Klippel (eds). Ações para a conservação de tubarões e raias no sul do Brasil, pp. 113-120. Porto Alegre: Igaré.
- Walls, R., Soldo, A., Fordham, S. & Buscher, E. 2015. *Carcharias taurus* (Europe assessment). The IUCN Red List of Threatened Species 2015: e.T3854A48947509. Accessed on 12 October 2023.
- Walls, R.H.L. & Soldo, A. 2016. *Carcharias taurus* (Mediterranean assessment). The IUCN Red List of Threatened Species 2016: e.T3854A16527817. Accessed on 12 October 2023.
- Weigmann, S. 2016. Annotated checklist of the living sharks, batoids and chimaeras (Chondrichthyes) of the world, with a focus on biogeographical diversity. Journal of Fish Biology 88(3): 837-1037.
- White W.T., Baje, L., Sabub, B., Appleyard, S.A., Pogonoski, J.J. and Mana, R.R. 2017. Sharks and Rays of Papua New Guinea. ACIAR Monograph No. 189. Australian Centre for International Agricultural Research, Canberra.