Ministério do Meio Ambiente
Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis
Instituto Chico Mendes de Conservação da Biodiversidade

NON-DETRIMENT FINDING OF BRAZIL FOR THE MAKO SHARK *(Isurus oxyrinchus)*

Brasília, 2023

Summary

Executive Summary

Isurus oxyrinchus, also known as the shortfin mako shark or blue pointer (*tubarão-mako* or *anequim* in Brazil), is a top-of-chain pelagic predator, migratory, found around the globe in temperate and tropical seas. In Brazil, it is found along the entire coast. In South America, it is only not found in the extreme south coast of the continent and, in Africa, it is present along the entire occidental coast.

A subpopulation of *Isurus oxyrinchus* is considered to exist in the South Atlantic Ocean, which transits between ZEE's of coastal countries and international waters. Due to the high commercial value of its meat and fins, its fishing is frequent. Coastal country fleets of the region, as well as international fleets of other regions of the globe explore the species stock. Because of this, effective protective measures require both local and regional approaches in the management of population stock.

It should be noted that there is few information available on the populational stock status of *Isurus oxyrinchus* in South Atlantic, due to data, statistics and fish record precariousness of the region. Thus, the present analysis involved the use of precaution, based on robust evidence that the stock in significantly decreasing. The average size decrease of specimens captured, the increasing amount, in tons, of fishing of the species and analogical interpretation of data available for North Atlantic subpopulations are examples.

1. Preliminary considerations

1.1 CITES status and definition of the species stock

The species is part of Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), since it was included by decision of the Treaty parties, which took place in the 18th Convention of the Parties, in August 2019. The special protection status conferred by the species inclusion in Appendix II of the convention came into force on November 28, 2019.

The sample for the present NDF was taken from the stock present in the South Atlantic, where most of the Brazilian coast is located. There is a subpopulation located between 5° N and 50° S latitude and -60° W and 20° E longitude. The stock is shared in international waters and encompasses other EEZs besides the Brazilian one. In southern Brazil, the stock is shared specially with its neighbor country Uruguay. Other coastal South Atlantic countries also share the aforementioned stock, such as Argentina, the Democratic Republic of Congo, Congo, Angola, Namibia and South Africa. In addition, the stock is also shared with international fleets outside the South Atlantic that operate in and out of the South Atlantic EEZs.

The stock is covered by the following relevant regional fisheries bodies (RFB's): ICCAT (*International Commission for the Conservation of Atlantic Tunas*), ZCPAU (*Zona Comum de Pesca Argentina-Uruguai*) e CTMFM (*Comisión Tecnica Mixta del Frente Marítimo*). However, not all countries that share the shortfin shark stock are part of such regional bodies. Argentina, for example, is not a member of the ICCAT. There are also many vessels that carry out illegal, unreported and unregulated (IUU) fishing. ICCAT has identified at least 138 vessels that carry out this type of fishing in its coverage area. Despite ICCATs geographic management, there are gaps related to species management, especially within the EEZ.

It should also be noted that, due to the interaction of multiple fleets and modalities with the species at an industrial and small-scale level, management data are fragmented, outdated, underreported and, therefore, not fully reliable.

1.2. Normativity regarding acquisition and exportation

The shortfin mako is not protected by Brazilian wildlife legislation or any regional biodiversity agreement. It is also not listed in Appendix I of the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

However, according to more recent assessments of ICMBio (*Instituto Chico Mendes de Conservação da Biodiversidade*), the state scientific body responsible for biodiversity conservation in Brazil, and IUCN, the conservation status of the species includes categories of extinction risk (CR – ICMBio and EN – IUCN). Although the new assessment carried out by ICMBio has already been communicated to MMA (*Ministério do Meio Ambiente*/Ministry of Environment), the new status has not yet been updated in the Ministry's official list of threatened species. In case it is updated, the applicable

legislation will imply in retention, landing and commercialization (including exportation) prohibition of the species in national territory.

Ilegal fishing activities of the shortfin mako exist in the South Atlantic, as well as finning activity. Each capture record needs to be evaluated individually, since the species is captured by multiple fishing modalities (target and bycatch). There are no fishing quotas (or TAC) for the region. In Brazil, although the capture of the mako shark is allowed using longline, certain situations, such as the use of a steel sling inside the Environmentally Protected Area of the São Pedro and São Paulo Archipelago or the non-use of a circular hook (only above the Vitória-Trindade chain) or toriline, make the capture irregular.

There are no closed seasons for the mackerel shark in Brazil and it can be captured even in marine protected areas (MPA). There are also no recommendations from regional fisheries bodies (RFBs) for the South Atlantic. In turn, in November 2021, IUCCAT recommended the banishment of shortfin mako fishing in the northern part of the Atlantic during 2022 and 2023 and a retention ban of on board catches. In Brazil, exportation of the species is allowed.

1.3. Information on species management

The species distribution is circumglobal, between 50° and -60° latitude. In the Atlantic, there is a subpopulation (stock) for the northern portion (above 5°N latitude to 50°N latitude and between -60°W and 20°E longitude) and another for the southern portion (which is located between 5° N and 50° S latitude and -60°W and 20° E longitude) (Barreto et al. 2016a; Rigby et al. 2019). However, the hypothesis that genetic exchange of individuals occurs between these populations is not ruled out, mainly because the shotfin mako has the greatest migratory potential and swimming capacity amongst oceanic sharks (Rigby et al. 2019).

The main catch countries in the South Atlantic are Brazil and Uruguay. In international waters, we include Brazil, Uruguay, Japan, Spain and China-Taipei. The main modality types by which the species is captured are longlines, gill nets, oceanic seine and amateur/sport fishing. Its global conservation status is EN (*Endangered*), it is included in CITES Appendix II, CMS Appendix II, and currently has its capture banned in the North Atlantic by ICCAT. Figure 1 represents the operation area of the main fleet involved in the commercial extraction of the species in the Brazilian coast.

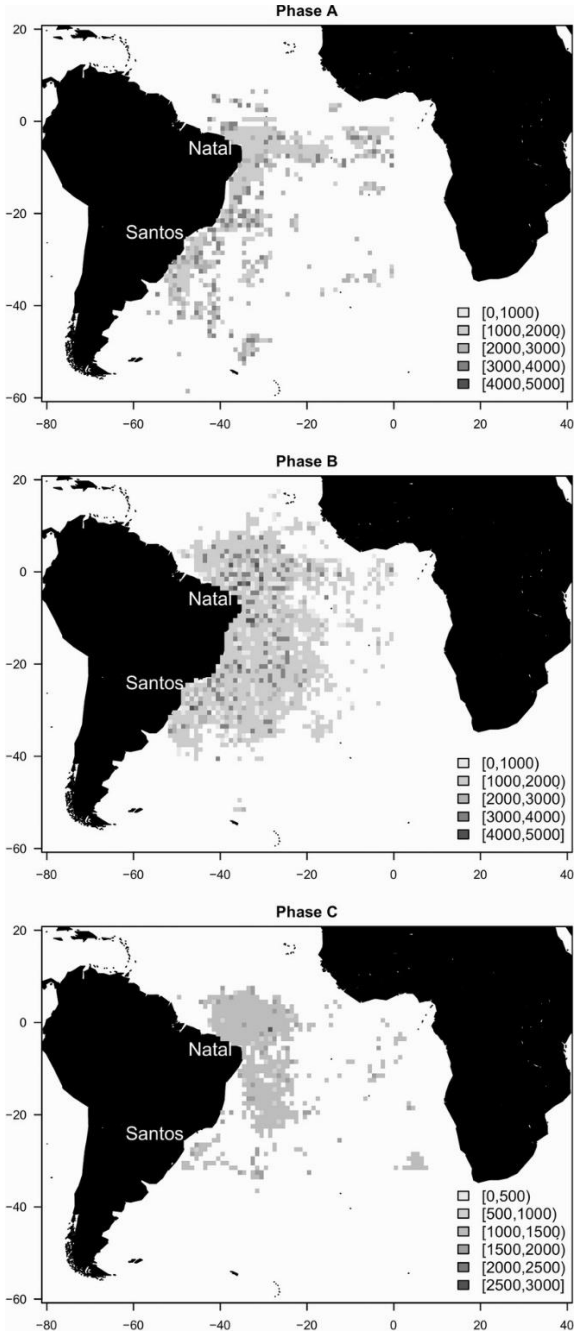

Figure 1. Spatial distribution of the fishing effort of pelagic longline fleet (gray scale, sum of hook numbers in 1×1 pixels) in three exploration phases identified in Barreto et al. 2016a.

Information regarding South Atlantic stock are unreliable (ICCAT, IUCN, Rigby et al. 2019). Information is poor and data on population trends are not conclusive, with many uncertainties in estimates (ICCAT 2017). The South Atlantic population state is highly uncertain, mainly due to lack of data. The trends and estimates of biomass stock in 2015 are unknown (ICCAT SCRS2017). It is quite possible that the South Atlantic shortfin mako stock is in a similar condition to that of the North Atlantic.

The main management body is ICCAT (International Commission for the Conservation of Atlantic Tunas), and the main corporate management agreement is ZCPAU (Zona Común

de Pesca Argentino-Uruguaya). Argentina and some African countries are not members of ICCAT.

The main fishing types used are primary and secondary targets and longline bycatch (industrial and small scale). Primary target and bycatch in sport/amateur fishing, bycatch in gillnet (small scale and industrial) and seine (industrial) fisheries. Areas of high productivity, such as frontal oceanic systems (e.g. subtropical oceanic convergence), tend to concentrate mako sharks and other pelagic species (tuna, swordfish, marlins and other species of sharks), and are target areas of spinel fleets.

Management units in Brazil are the Secretariat of Aquaculture and Fisheries of the Ministry of Agriculture, Livestock and Supply (SAP/MAPA), the Brazilian Institute for Environment and Renewable Natural Resources (IBAMA), the Chico Mendes Institute for Biodiversity Conservation (ICMBio) (in units of conservation), Ministry of Environment

(MMA) and Ministry of Foreign Affairs (MRE). In Uruguai it is the *Dirección Nacional de Recursos Acuáticos* (Dinara). There are, however, deficiencies in management of the species in Brazil, such as incomplete fishing statistics due to underreporting, absence of an integrated onboard national level observer program, poor and occasional inspection, poor satellite tracking of vessels, communication problems between ministries and lack of tracking of the production chain.

In the commerce, commercialized shortfin mako products includes carcasses (in natura, frozen, cooled), steaks (in natura, frozen, cooled), fins (in natura, cooled, frozen, dehydrated), whole (in natura, frozen, cooled), liver, jaws, cartilage and teeth. Meat and fins have high commercial value, reason which the species is usually retained on board.

As for catch data, integrated national statistics have not been produced since 2007 (the last national bulletin available is from 2011, but it was produced through estimates based on years prior to 2007). Even when there was systematic collection of information on national fisheries production, data on sharks were always problematic, with low taxonomic resolution (groupings, categories, etc.). Figure 2 brings a compilation of statistics available for *Isurus oxyrinchus* in the main national databases, which are concentrated in southeastern and southern regions of Brazil (PMAP-Petrobras/PropesqWeb), as well as information made available by Brazil to FAO (through from the FishStatJ application). Santa Catarina and São Paulo are highlighted as major producers according to compiled data, but it is worth mentioning that for the state of Rio Grande do Sul there are still no production statistics and that for Espírito Santo the PMAP has just been implemented. Both states are major oceanic shark producers, according to the literature. There are no other databases available for any other Brazilian state. Thus, official data are most likely underestimated. The state of South Atlantic populations is highly uncertain, mainly due to lack of data.

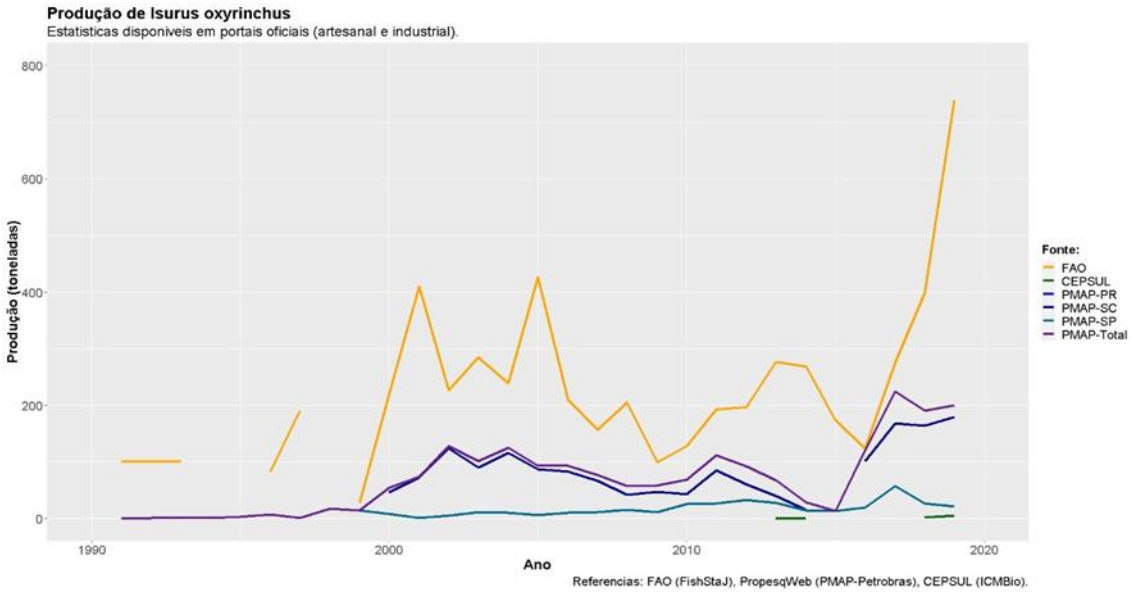

Figura 2. Production of *Isurus oxyrinchus.* Statistics available on official portals (artisanal and industrial).

According to information gathered, species production has increased considerably since 2015 and, considering data reported by Brazil to FAO, it is currently around 700 tons/year. Figure 3 presents the historical series of production of *Isurus oxyrinchus* in tons, in Brazil, in the last 30 years.

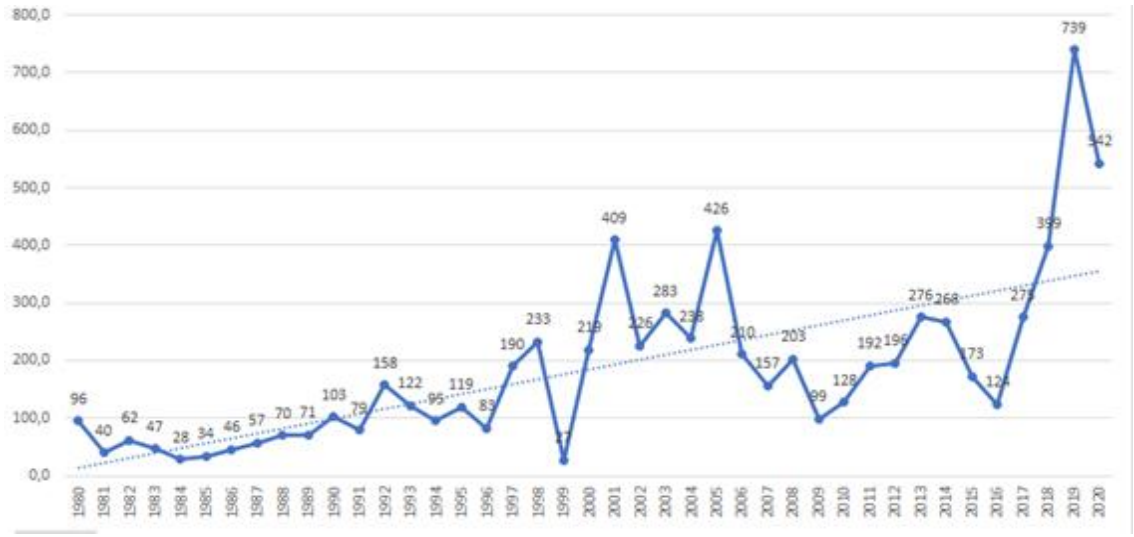

Figure 3. Historical series of *Isurus oxyrinchus* production in tons in Brazil, in the last 30 years. Source: Statistical Database - ICCAT.

Capture and commercialization data are not reported by all countries that capture the species (ICCAT SCRS2017). Figure 4 presents an information survey on the species capture in other South Atlantic countries, where only Uruguay and Venezuela have reported their national production to FAO (Source: FishStatJ). According to information gathered, Uruguay has not reported data to FAO since 2013, and catches have decreased from a peak of 250 tonnes in 2004 to around 80 tonnes in 2012 (a 4-fold decrease). For Venezuela, catches declined from approximately 60 tonnes in 2004 (first year in the series) to less than 10 tonnes in 2017 (6-fold decrease).

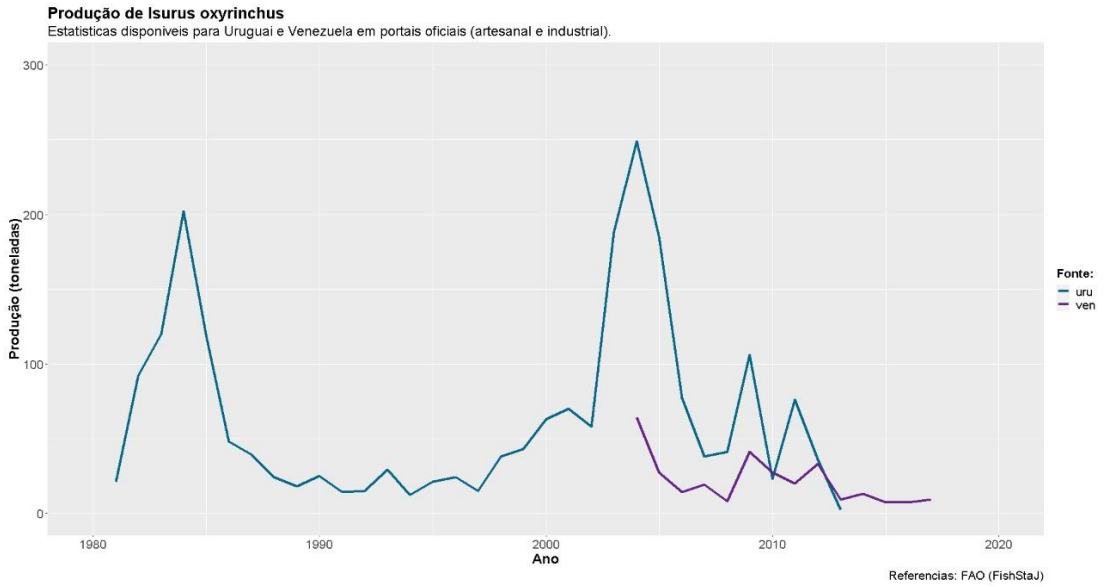

Figura 4. Desembarque de *Isurus oxyrinchus,* em toneladas, no Uruguai e na Venezuela. Fonte: FAO, FishStatJ.

Considering that population size is diminishing and, also, the absence of larger individuals in the latest global and regional extinction risk assessments (Rigby et al. 2019, ICMBio, unpub.), it is likely that catches are or will decrease. As already mentioned, it is quite possible that the South Atlantic shortfin mako stock is in a similar condition to that of the North Atlantic. In the case of South Atlantic, information is precarious and data on population trends are not conclusive, with many uncertainties in the estimates. The Ecological Risk and Productivity assessments detected that the mako shark is the second most vulnerable species to overexploitation among 15 Atlantic Ocean shark species. Its low reproductive capacity and high susceptibility to fishing along its distribution range make populations of *Isurus oxyrinchus* recover very slowly, once decimated (Cortes et al. 2010; Adams et al. 2016). This high vulnerability was confirmed again in a new ecological risk assessment carried out by Cortes et al. (2015).

Finally, it should be noted that, for the elaboration of this NDF, ICCAT results were considered, but other CITES authorities and other regional fisheries bodies were not consulted

2. Intrinsic biological vulnerability and conservation status

2.1 Intrinsic biological vulnerability

For average age at maturity, vulnerability level is considered high. The species average age is 18 years (females) and maturity age of females varies between 18 and 21 years (Bishop et al. 2006, Natanson et al. 2006, Wells et al. 2013, Dono et al. 2014, Barreto et al. 2016b).

For average size at maturity, vulnerability level is considered high. The species average size is 275 cm (females); males mature at 166-204 cm in total length and females at 265-

312 cm (Pratt and Casey 1983, Stevens 1983, Cliff et al. 1990, Francis and Duffy 2005, Varghese et al. 2017).

For maximum age/longevity in unexplored populations, vulnerability level is considered high. The species maximum age ranges from 28 to 32 years (Bishop et al. 2006, Natanson et al. 2006, Wells et al. 2013, Dono et al. 2014, Barreto et al. 2016b).

For maximum size, vulnerability level is considered high. Maximum size of species averages 4 meters, ranging from 2.7 to 5.85 m TL [Compagno (2001), Carpenter (2002), Joung & Hsu (2005), Lyons et al. (2015), Castro (1983), Stevens (1983), Kabasakal & De Maddalena (2011)].

For natural mortality rate, level of vulnerability is considered high. Rate ranges from 0.196-0.270; 0.12 /year (CITES 2019).

For maximum annual production of offspring (per mature female), vulnerability level is considered medium. Litter size is 4 to 25 offsprings (usually 10 to 18) (Garrick 1967, Compagno 2001, Mollet et al., 2000; Joung and Hsu, 2005; Groeneveld et al. 2014).

For intrinsic rate of population increase, vulnerability level is considered high. According to Smith et al. (1998) the shortfin mako shark has an average ability to recover from fishing intensity and its annual population growth rate is 0.046/year. Cortés (2017) using life cycle graphs and Leslie matrix, estimated low productivity values (rmax = 0.066 to 0.123 /year).

For geographic distribution of stock, vulnerability level is considered low, due to circumglobal distribution of the shortfin mako.

For current stock size in relation to historical abundance, vulnerability level is unknown. It is estimated, however, based on the Endangered Species (EN) classification of IUCN for the shortfin mako, that there has been a 50% to 79% reduction in the original population size.

As for behavioral factors, vulnerability level is considered medium. The species is panmictic, highly migratory, associated with species such as tuna, billfish and other sharks (predation), uses nursery areas in coastal regions, has high vulnerability to longlines and nets (caught in all phases of the life cycle since birth), known for being a fighter; is an active swimmer, with the highest speeds in sharks, and due to its thermoregulatory capacity, it can dive 500 m deep (Carey et al., 1985; Goldman, 1997; Bernal et al., 2001; Carpenter, 2002; Dickson & Graham, 2004; Loefer et al., 2005; Block et al., 2011). Due to its high metabolic rate, it can consume its liver energy reserves within few weeks (Graham et al., 1990). It can carry out long seasonal migrations to feeding areas, preying on other fast pelagic species (Stillwell & Kohler, 1982; Compagno, 1984).

Regarding the trophic level, vulnerability level of the species is considered high. The mean trophic level found was 4.5 ± 0.0 se. Rosas-Luis et al. (2016) found trophic level values between 3.68 and 4.44, suggesting that the species is a tertiary predator. Based

on diet studies, it was concluded that the shortfin mako is an opportunistic top predator, feeding on teleosts, elasmobranchs, cephalopods, crustaceans and marine mammals. Large pelagic fish and cephalopods are dominant in stomachs of juveniles and subadults. In adults, preference is for mammals. Adults of *I. oxyrinchus* are at a trophic level below marine mammals and the great white shark (*Carcharodon carcharias*) and above billfish, tuna, crabs and small sharks. Anthropogenic items (plastics, strings) were also found in their stomachs. *Isurus oxyrinchus* occupies high trophic levels, playing an important role in marine ecosystems, including community structuring and control of prey populations. A decrease in high predator populations is expected to alter the dynamics of the marine ecosystem, including the food chain and habitat degradation. However, consequences of overexploitation of the shortfin shark are still unknown.

Considering specific vulnerability levels, overall intrinsic biological vulnerability of *Isurus oxyrinchus* is considered high. Intrinsic vulnerability of *Isurus oxyrinchus* has already been evaluated in different studies for the North Atlantic region (Cortes et al. 2010; Cortes et al. 2015; Byrne et al. 2017). Based in ecological risk analysis (ERAs), these authors considered *I. oxyrinchus* the second least productive shark species and the third most vulnerable among the oceanic species that occur in the Atlantic. More recently, Byrne et al. (2017) demonstrated that mortality rates of the species estimated previously for the northern region were underestimated by up to 10-fold. For the southern portion, Barreto (2015) and Barreto et al. (in press), based in demographic analyses, demonstrated that the species is among the most vulnerable among oceanic sharks that occur in the region, with probable population decline occurring, considering mortality rates estimated with recent capture data.

According to the last extinction risk assessment carried out by IUCN in 2018 (Rigby et al. 2019), while previous assessment of the North Atlantic stock suggested low probability of overfishing and that stocks were healthy (ICCAT 2012), more recent assessment revealed that the stock was overexploited and that overfishing was taking place (ICCAT 2017). Biomass estimates from South Atlantic stock assessment were considered unreliable by ICCAT evaluators, although they inferred that fishing mortality is probably unsustainable in this region (ICCAT 2017). This concern is supported by standardized capture analysis rates in the South Atlantic, where Barreto et al. (2016b) found that the species increased its CPUE from about 0.1 sharks to approximately one shark for every 1000 hooks (increase of 684.3%), between 1979 and 1997, where fishing effort was relatively low and capture was directed mainly to tuna. The authors report that, at that moment, capture rates were influenced by an increase in record frequency of onboard maps (reporting method). Between 1998 and 2007 a decreasing trend of 52.2% was identified, however, the CPUE in the first years of this phase was considerably lower compared to the last year of the previous phase (1979-1997, about 0.1 sharks/1000 fish hooks). This is considered the most intense phase of exploration due to fishing effort, influenced by the policy of leasing foreign vessels (25 countries) that took place in Brazil, by the expansion of the national fleet and the increase in demand for shark by-products. The third exploration phase (2008-2011) is marked by the collapse of the national fisheries statistics program, and also by the implementation of the onboard observer

program. Thus, the authors analyzed catches from only foreign vessels that operated in the equatorial South Atlantic region, identifying an increase in catch rates of approximately 20%. Despite this increase, catch rates were considerably lower than in previous phases (<0.01 shark/1000 hooks between 2008-2011). Analyzing trends between exploration phases, a 99% decline between the first and second phases was identified as well as a 21.93% increase between the second and third phases (Barreto et al., 2016b). Increases, according to these authors, must be associated with a hyperstability of capture rates, since there is evidence that in recent years, local and international fleets have directed their fishing effort (therefore specialized) to capture almost exclusively sharks (species became target, at least in some months of the year).

2.2. Conservation Status

As for conservation or stock assessment status, severity level is considered high. Likewise, regarding the geographic extent and the scope of concern with conservation, severity level is also considered high. Overall, fisheries-dependent studies in Brazil, particularly those where biological samples were analyzed, are characterized by a generalized absence of adult individuals, especially females (Dono 2014; Dono et al. 2015; Barreto 2015; Barreto et al. 2016ab; Sampaio 2018; Sampaio et al. 2020; Barreto et al. in press; Kotas et al. in press). Juveniles and neonates of both sexes are also frequently recorded in sport and amateur fisheries in the southeastern-south region, indicating that the region is possibly a nursery for the species. Worryingly, it is evident that, like hammerhead sharks (*Sphyrna* spp.), which also use coastal and oceanic areas during their life cycle, and unlike the blue shark (*Prionace glauca*), which spends most of its life cycle in strictly oceanic areas, *Isurus oxyrinchus* has all phases of its life cycle exposed to fisheries (sport, amateur, artisanal and coastal industrial during its juvenile phase and oceanic/longline in juvenile and adult phases). In an analysis of the spatial distribution of catches of the species considering phases of its life cycle, Barreto et al. 2016a demonstrate that multiple fleets that operate/disembark (including data from national and international/leased vessels) in the South Atlantic, do not operate only in the southwestern portion of the ocean and that the effort employed by these fleets must be representative of population of the Atlantic South as a whole. In this context, considering the generalized absence of adults in fisheries, it is likely that local population is overexploited, since the disappearance of larger individuals is one of the first evidences of this type of situation (overfishing), according to the literature. Furthermore, with fisheries concentrating catches on individuals that have not yet reproduced, it is likely that the replacement potential of the species population will be affected in short/medium term, as is customary in shark populations (Cortes 2002; Simpfendorfer 2005), in which fewer and fewer individuals will be available in nature over the years.

In 2017, ICMBio reassessed the species conservation status using the best scientific evidence available. Based on declines estimated between 1979 and 2007 by Barreto et al. (2016b) and future projections for available biomass up to the year 2040 using trophic models from ECOPATH/ECOSIM (Bornatowsky et al. 2017), population reduction of at

least 80% was inferred, based on an appropriate abundance index for the taxon and real levels of exploitation. Under these conditions, *I. oxyrinchus* was categorized as Critically Endangered (CR) by the A4bd criteria. It is worth mentioning that, in previous evaluation, carried out between 2010 and 2014, the species was evaluated as NT. Therefore, the conservation state aggravation is associated with the production of new or better information.

In 2018, IUCN also reassessed the species (Rigby et al. 2019). Acute population declines were identified in the North and South Atlantic, with declines also evident, although not as acute, in North Pacific and Indian Oceans. South Pacific population appear to be increasing, but with fluctuating capture rates. Weighted global population trend estimated an average decline of 46.6%, with the highest probability of reduction of 50-79% in three generation periods (72-75 years) and therefore evaluating the species as Endangered. - EN) by the A2bd criteria. In previous assessments, the species had been rated NT in 2000 (Stevens 2000) and VU in 2008 (Cailliet et al. 2009). The assessment (Rigby et al. 2021) contributed to an important study that showed that, since 1970, the global abundance of ocean sharks and rays has declined in 71% due to an 18-fold increase in relative fishing pressure (Pacoureau et al. 2021). In November 2021, ICCAT, which is the regional organization responsible for the management of oceanic fisheries in the Atlantic, met to discuss new information about *Isurus oxyrinchus* in the Atlantic. Considering scientific evidence available in recent years, more than 50 commission members recommended the ban of species retention for the next two years (as of 2022) in the North Atlantic. This means that ICCAT member countries will not be allowed to embark, transport, tranship or disembark *Isurus oxyrinchus* in the northern portion of the ocean, including also the implementation of a recovery plan for the species during the same period.

3. Analysis of fishing pressure on the species stock

3.1. Commercial pressure on the species stock

Considering trade magnitude, severity level of commercial pressure is elevated, given high demand and high valuation, multiple uses/by-products and increasing volume of commercialization for fins and meat, especially in the last few years. The number of specimens in the commerce is high, compared to the abundance of the species. In addition, high prices per unit of the product are practiced.

Unlike most species of this specific group of sharks, which due to their characteristics (mainly sizes) have fins as the main by-product, *Isurus oxyrinchus* is also valued for its meat, which is pinker in appearance compared to other species. McClenachan et al., (2016) state that the species fin currently reaches 1,500 dollars/kg. In Brazil, unlike other sharks (e.g. *Prionace glauca*, which, proportionally, is more voluminous in disembarkations), most of the trunk production of *I. oxyrinchus* associated with industrial fisheries using surface pelagic longline is exported (obs.: fins of virtually all

species caught by this fleet are exported). As in this case there is no robust data on trade or data are non-existent, it is advisable that authorities adopt a precautionary criteria when assessing the seriousness of trade pressure on the stock of the species in question. For example, there may be occasional indications of an accelerated increase in market demand or trade volumes, but there is no supporting quantitative data (e.g. when trade is declared without including specific custom tariffs for the species).

On illegal trade, documentation is insufficient (national and international trade), trade chain is not transparent, there is a concern about substitution by similar species (*Isurus paucus*, *Lamna nasus*) and the quantities legally exported are significantly lower than the quantities declared by importing countries. It should also be noted that the production chain is poorly known and non-transparent, catches are underestimated, there are great concerns about fraud and quantities legally exported are smaller than quantities reported (especially regarding fins).

3.2 Pressure of fishing on the species stock

Considering the species mortality by fishing (retained catch), severity level of fishing pressure is considered high. Today, F > 1x M (ideally, it would be F < 0.5 M). A study carried out in the Western Atlantic determined that the shortfin catch is possibly higher than currently estimated, indicating that fishing mortality in the region was 5 to 18 times higher than the maximum sustainable yield (Byrne et al., 2017). With international pressure for shark meat and fins, populations of *I. oxyrinchus* will continue to decline and threaten the species' survival unless effective measures are implemented that limit capture and trade to sustainable levels (Sims et al. 2018). Ecological Risk and Productivity assessments detected that the mako shark is the second most vulnerable species to overexploitation among 15 shark species in the Atlantic Ocean. Its low reproductive capacity and high susceptibility to fishing in its distribution range make *Isurus oxyrinchus* populations recover slowly once decimated (Cortes et al. 2010; Adams et al. 2016). This high vulnerability was confirmed again in a new ecological risk assessment carried out by Cortes et al. (2015). Major threats include pelagic longline fisheries, which cause unsustainable incidental capture, with the purpose of supplying international markets. The intensive fishing effort, combined with its low reproductive potential, may have contributed to the decrease in populations of *I. oxyrinchus* in the world (Cailliet et al. 2009; Dulvy et al. 2008).

It should be noted that this assessment involved the use of precaution, since population assessments are seriously hampered by underreporting of catches (or more often non-recording). According to Nakano and Clarke (2006) and Byrne et al. (2017) underreporting can reach 33% in on-board maps. For the Atlantic, there are no records of fisheries statistics for the shortfin mako before 1981, even though industrial surface longline fisheries have been active since the 1950s (CITES 2019). In South and North Atlantic, catches are underestimated and landing data does not reflect the number of animals that suffer finning and are discarded at sea (Cailliet et al., 2009a; ICES 2017). *Isurus oxyrinchus* was considered by-catch, common in pelagic longline fisheries (Stevens, 2008). However, valued for its meat and fins, recent studies show a tendency

of fishing activity, especially by international fleets, for this species (Barreto et al., 2016a).

Despite its common capture, the species life history is still not well known, with conflicting information on estimates of growth, longevity and mortality parameters, as well as reproductive studies with few pregnant females captured, leading to knowledge gaps on reproduction cycle and fecundity (Cailliet et al., 1983; Pratt & Casey, 1983; Mollet et al., 2000; Steven, 2008). As with other elasmobranch species frequent in longline fisheries, there exists a concern about population status, with recent literature suggesting significant declines in certain areas (Baum & Myers, 2004; Barreto et al. 2016ab; Bornatowski et al.2017; Barreto et al. in press; Kotas et al. in press). This species has a combination of life history characteristics such as slow growth, low fecundity and late sexual maturation that limit population recovery from even moderate levels of fishing. The species is described as the most vulnerable in pelagic fishing with longline (Barreto, 2015; Barreto et al. (in press); Cortes, 2010; Cortes,2015). Another difficulty in obtaining data is the fact that sharks fished and their by-products are not properly identified and reported, which results in a limitation of capture and commercialization information, making it complex to evaluate the effects of exploitation and definition of conservation measures.

Therefore, it appears that the main threat to the species is overfishing and its real impacts cannot be well dimensioned, due to difficulties in obtaining data from capture records, which becomes an aggravating factor that prevents appropriate management measures. The species is also caught by sport fishing and as a bycatch by other fishing gear. The opening of notices for the lease of foreign surface longline vessels, which occurred until the early 2010s, is an action that should be avoided. This practice promotes an effective increase of fishing effort in relation to target species and consequently to bycatch, which includes *I. oxyrinchus*, especially juveniles (J. E. Kotas, com.pess., 2010).

As for discard mortality, severity level of fishing pressure is unknown. Nevertheless, it is estimated that mortality is low, due to high interest and commercial value of the species.

As for size, age and sex selectivity, severity level of fishing pressure is considered high. Currently, pelagic longline fisheries focus almost exclusively on juveniles (> 99%) (Barreto et al., 2016a; Kotas et al. in press). The species mortality levels are certainly underestimated, due to disorderly and undocumented exploitation and high discard rates, especially of young.

Regarding the magnitude of illegal, unreported and unregulated (IUU) fishing, severity level of fishing pressure is considered high. The production chain is poorly known and non-transparent, catches are underestimated, there are major concerns with fraud and correct identification and the quantities legally exported are smaller than the quantities reported (this is a certainty in terms of fins). In addition, the production chain is difficult to monitor and catches are underreported, which compromises statistics reliability (Dent & Clarke 2015, Campana et al. 2016a).

4. Existing management measures

As for management measures practiced by the Brazilian government, there are no specific measure for the species, all of them being generic.

Among them, it is worth mentioning access limitation of operators, such as Ordinance n° 89, of May 9, 2019 – MAPA, which suspends new issuance of fishing authorization, complementary fishing authorization and foresees a Prior Permit for Tuna Fishing.

There are also equipment restrictions and measures to increase post-capture survival, such as the Joint Ordinance n° 3, of August, 2018, which disciplines fishing activity in the Environmentally Protected Area of the São Pedro and São Paulo Archipelago. It also predicts that longline vessels may not use steel slings or any other material other than monofilament nylon, unless specifically authorized; and that longline fishing vessels must use circular hooks, made of metal, without a ring, with a tip facing the rod, whose size is equal to or greater than 14/0. Interministerial decree n° 74, of November 1, 2017, establishes mitigating measures to reduce incidental capture and mortality of sea turtles by fishing vessels operating in the modality of surface horizontal longline, in the Brazilian territorial sea, in the Exclusive Economic Zone - Brazilian EEZ and international waters. It establishes mandatory use of circular hooks by national vessels and by leased foreign vessels operating in the Brazilian territorial sea, in the EEZ and in international waters in the following modalities: horizontal longline (surface), whose target species are the yellowfin (*Thunnus albacares*, *T. alalunga* and *T. obesus*); horizontal longline (surface), whose target species is the swordfish (*Xiphias gladius*). It should be noted that, although the interministerial decree nº 74 of November 1, 2017, establishes the use of circular hooks in horizontal longline fishing to minimize the mortality of sea turtles, studies that addressed the biology and fishing of *Isurus oxyrinchus* in Brazil point to the absence of adult individuals in this and other types of fisheries and periods. There is, therefore, a need to correctly identify nursery areas and identify and preserve the adult portion of the population. There is also the Ibama Ordinance nº 121, of August 24, 1998, which prohibits, in waters under national jurisdiction, the use and/or transport of surface and bottom gillnets with length greater than 2, 5 km. It also prohibits the discard of shark carcasses from which the fins have been removed and the landing, commercialization, conservation, processing and transport of fins whose weight is disproportionate to the weight of the landed carcasses (the total weight of the fins may not exceed 5% of the total carcasses weight).

There are also measures to protect and permanently prohibit the use of areas, such as Decree nº 9.313, of March 19, 2018, which created the Environmental Protection Area of the São Pedro and São Paulo Archipelago. The Decree nº 9.312, of 19 March, 2018, creates the Environmental Protection Area of Trindade and Martim Vaz Archipelago and the Natural Monument of the Trindade and Martim Vaz Islands and Monte Columbia.

A measure that restricts equipments, the Interministerial Normative Instruction MPA/MMA nº 12, of August 22, 2012, provided criteria and standards for the management of fishing practiced with the use of gillnets in Brazilian jurisdictional waters

in the Southeast and South regions. It established the maximum length of the bottom gillnets according to the AB of the vessel, established the maximum height of the gillnets and the size of the meshes. The maximum length of the midwater and surface gillnets is a maximum of 2500 m. In the same sense, the Interministerial Normative Instruction nº 11, of July 5, 2012, prohibits surface gillnet or oceanic mesh or driftnet in Brazilian jurisdictional waters.

In turn, the Interministerial Normative Instruction MPA/MMA nº 14, of November 26, 2012, consists in a measure that restricts the form of the product, provides rules and procedures for landing, transport, storage and commercialization of sharks and rays, prohibits the practice of finning in Brazil, establishes that sharks and rays must be landed with fins naturally attached to the body and prohibits the transfer of sharks, rays and their derivatives between fishing vessels.

With the intent of helping to validate capture data and/or minimize opportunities for the product captured by IUU fishing to reach markets, the Ibama Normative Instruction nº 16, of September 29, 2015, which defines the necessary procedures for supervision of landing control of sharks captured in Brazilian jurisdictional waters, on the high seas by national or foreign leased vessels, as well as the storage, conservation, processing, transport, commercialization or export of fins. Also relevant is the MMA/SEAP Joint Normative Instruction nº 26, of July 19, 2005, which establishes criteria and procedures for completing and delivering onboard maps of national or foreign leased vessels, duly authorized, operating in waters under Brazilian jurisdiction**,** on the high seas or in waters included in international agreements to which Brazil is signatory. In the same sense, Normative Instruction MPA nº 20, of September 10, 2014, establishes criteria and procedures for filling and delivering onboard maps of vessels registered and authorized within the scope of the General Fishing Activity Registry – RGP. In turn, the MAPA Normative Instruction nº 53, of September 1, 2020, defines the common name and respective scientific names for the main fish species of commercial interest destined for national trade. MAPA Normative Instruction nº 21, of May 31, 2017, defines the identity and quality characteristics that frozen fish must present. Normative Instruction SEAP/MMA/MD nº 02, of September 4, 2006, instituted the National Tracking of Fishing Vessels by Satellite Program, known as PREPS, for monitoring, fishery management and control of fishing fleet operations authorized by the Special Secretariat of Aquaculture and Fisheries of the Presidency of the Republic (*Secretaria Especial de Aquicultura e Pesca* - SEAP/PR). All foreign fishing vessels licensed by SEAP/PR must participate in the PREPS. In addition, all tuna vessels above or equal to 50 AB or 15 m in length are required to use the system. The same serves for bottom and drift gillnets, as well as trawling. In addition to the aforementioned legislation, it is also worth mentioning the Information Storage System on exported products (SisCOMEX - MRE).

It is important to highlight that existing management measures are generic and not very effective for *Isurus oxyrinchus*. There are no fisheries statistics, monitoring is below necessary for the various modalities in which the species can be captured and, although there are control and surveillance measures, implementation is inadequate and

insufficient (insufficient inspectors, onshore samplers, on-board observers, onboard maps are not verified/accessible/delivered; satellite tracking for only part of total vessels/modalities). There are indications that fishing mortality is unsustainable in the region (Rigby et al. 2019). Furthermore, size of IUU is unknown in the Brazilian coast and adjacent international waters.

It should also be noted that monitoring or control is not efficient throughout the production chain, especially in terms of traceability (fishing statistics are deficient, there is low taxonomic resolution along the production chain, considering different by-products, and sharks labeling is totally inadequate. Few control and surveillance measures are implemented for both domestic and foreign markets, with only occasional inspection initiatives taking place, considering the universe of illicit acts that potentially occur.

Regarding regulation involving discard mortality, it must be considered that, in theory, discard does not exist, since all sizes are used, but the use of circular hooks during the release (desirable), as well as guidelines of good practices, would increase post-capture survival. Currently, considering the species conservation status, it would be important to define measures and standardize them for the release of *Isurus oxyrinchus*. As for councils (e.g. CPGs, Scientific Subcommittees, working groups, etc.), currently, although there are plans to reorganize those that already existed, they have not yet been adequately implemented. Monitoring and control of fisheries are below necessary, with only surface longline with some relevant data collected in landings or through onboard maps, however, there is no on-board monitoring to assess information and, especially in this case, to evaluate what is discarded. Other fisheries are not monitored in an integrated manner by the federal government, with initiatives only in some regions due to oil and gas venture constraints, but with low taxonomic resolution.

Finally, regarding regulation related to selectivity by size, sex and age, there are no measures that define sizes or sex in fisheries that capture the species. In surface longline, as well as in amateur capture fishing, mainly the capture of juvenile individuals (Kotas et al., in preparation) is observed. Adult females in reproductive phase (e.g. pregnant) are rarely observed in captures, without a definition of why.

5. Conclusion

The NDF is negative due to the identification of population declines, current levels of capture by South Atlantic fisheries, as well as for current lack of knowledge of stock size. There are also many uncertainties about real catches, identification of species in relation to by-products, lack of adequate monitoring, both of landings and of fishing cruises, of information reliability of on-board maps (which only exists in part of the fisheries that capture *Isurus oxyrinchus*), difficulties in identifying fish origin/traceability, poor inspection, among others. Current management measures are not directed to the species, therefore considered non-existent for an adequate NDF to be issued. On global

and national level, the species was considered threatened with extinction, with robust indications of a drastic decrease in population size.

The precautionary approach recommended by the FAO Code of Conduct for Responsible Fisheries (1995), that the "lack of adequate scientific information should not be used as a reason for postponing or failing to take measures for the conservation of target species, associated or dependent species and non-target species and their environment" supports the negative NDF recommended by the CITES Scientific Authority in Brazil.

Although the negative NDF presents some isolated ambiguous points (Maximum annual production of young per mature female - MEDIUM; Intrinsic rate of population increase - HIGH; Geographic distribution of the stock - LOW), fishing pressure on juveniles causes negative impacts on the population with predictable cause-effect relation. Considering late maturity (I50= 18 years) and equivalence in average maturity size (L50 = 275 cm females, 166-204 cm males), fishing of the species could be sustainable in Brazilian jurisdictional waters provided that the following conditions are met: mandatory on-board map; onboard observers paid by the Brazilian State; protection of juveniles by setting different capture sizes with mandatory releases and/or selective gear; maintenance of revised quotas based on results of permanent stock assessments (with data from scientific prospecting or from fishing sectors), inspection through the Tracking of Fishing Vessels by Satellite Program - PREPS. Since such conditions are not currently in force, the denial of the NDF is a necessary measure.

6. Recommendations

6.1 Monitoring and information improvements

Implementation of a systematic and permanent national program of on-board observers in all fisheries is recommended, as well as efficient and effective on-board map systems with reliable information, constant monitoring of landings in all fisheries, tracking of vessel activities through effective PREPS, monitoring of amateur fishing, and independent fishing data collection with scientific research cruises, since there are many uncertainties about current catches and difficulties in identifying the origin/traceability of the fish, among others.

It is also recommended to encourage research on the species, collaboration with its monitoring, such as migration pattern studies (marking and recapture), mapping of nursery areas and of adults in reproductive phase, determination of reliable abundance indices in captures for populational trend analysis and conservation status of the species. These measures may help to take more appropriate protection and management measures. Additionally, studies on post-capture mortality and good release practices are needed. Selectivity studies of fishing gear are also necessary to minimize the impact on juvenile species.

6.2 Management improvements

Current management measures existent in Brazil are not directed towards the species. The adoption of management actions for its conservation are recommended, which includes management of fisheries that capture it. As done in the North Atlantic, where it is recommended to prohibit retention, trade and transport of the species from ICAAT, similar measures could be adopted for the South Atlantic or, at least, adopted by Brazil. Uncertainties are greater and there is no indication that there is a more favorable situation in this portion of the Atlantic Ocean, since part of the population being fished are very sensitive. One of the main fisheries under the Brazilian flag, the surface longline, act mainly on juvenile and sub-adult population strata, as demonstrated by demographic analyzes (Barreto, 2015). In addition, there is no adequate dimensioning of other more coastal fisheries (amateur, artisanal and industrial), which mainly affect neonates and juveniles.

It is also recommended that management councils/committees be maintained, considering the best set of information available (systematic monitoring, inspection, management, research) to define adaptive fisheries management measures and readjust the regionalized fishing effort, at all fishery levels. Furthermore, considering that the conservation status of the species at a global level (and also in Brazil) indicates that the species is threatened with extinction (drastic decrease in its population size), management measures should be adopted to mitigate capture and reduce post-capture mortality for the species, such as the ban on steel slings use (or any other type that retains sharks), adoption of adequate monitoring measures to identify actual catches, the use of good practices in the release and the use of escape devices in all known fisheries, as already evidenced in national action plans (e.g. PAN Sharks).

The existence of a negative NDF may not be effective if other countries that fish the South Atlantic stock (Spain, Portugal, China, Japan, Belize), and those that supposedly capture it (Argentina, Uruguay and African countries), issue a positive NDF. Management of the South Atlantic stock reinforces the need for creation of Regional Fisheries Management Organisations (RFMOs), as well as other stocks (corvina, bluefish, etc.), in the southwest Atlantic with Uruguay and Argentina. However, a wider action would be the creation of a management committee of South Atlantic fish stocks for our strategic surroundings (South America and Africa, considering that fishing in Antarctica is already under the care of a specific committee) in parallel with the proposal to create a whale sanctuary in the region.

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8. Normatives

Brasil. Decreto nº 9.312, de 19 de março de 2018. Cria a Área de Proteção Ambiental do Arquipélago de Trindade e Martim Vaz e o Monumento Natural das Ilhas de Trindade e Martim Vaz e do Monte Columbia.

> Art. 1º Ficam criadas a Área de Proteção Ambiental do Arquipélago de Trindade e Martim Vaz e o Monumento Natural das Ilhas de Trindade, Martim Vaz e do Monte Columbia, com a finalidade de preservar:
>
> III - recursos naturais e biodiversidade marinhos na parte da cadeia submersa de que trata este Decreto.

> Art. 4º A Área de Proteção Ambiental do Arquipélago de Trindade e Martim Vaz tem os objetivos específicos de:
>
> I - garantir a conservação dos ambientes insulares, da coluna d'água e dos montes submarinos e das suas espécies de fauna, flora e microrganismos, em particular das espécies endêmicas, presentes no Arquipélago de Trindade e Martim Vaz e no seu entorno;
>
> II - contribuir para assegurar os direitos de soberania, para fins de exploração e aproveitamento, conservação e gestão dos recursos naturais, vivos ou não vivos, das águas sobrejacentes ao leito do mar, do leito do mar e do seu subsolo, e de outras atividades com vistas ao uso sustentável da zona econômica exclusiva para fins econômicos;
>
> III - promover a execução constante de pesquisa científica e monitoramento da biodiversidade na região;
>
> IV - contribuir, por meio do mosaico de unidades de conservação e do seu zoneamento, para a recuperação dos estoques pesqueiros;
>
> V - contribuir para o ordenamento da pesca, do turismo e das atividades econômicas compatíveis com a conservação ambiental que se apresentem como estratégicas à região;
>
> Art. 7º Ficam asseguradas, nas áreas das unidades de conservação de que trata este Decreto:
>
> (...) IV - a pesca de subsistência;
>
> V - a pesca econômica na Área de Proteção Ambiental da Ilha de Trindade, quando autorizada, desde que não sejam utilizados métodos predatórios;

Brasil. Decreto nº 9.313, de 19 de março de 2018. Cria a Área de Proteção Ambiental (APA) do Arquipélago de São Pedro e São Paulo e o Monumento Natural do Arquipélago de São Pedro e São Paulo.

> Art. 4º A Área de Proteção Ambiental do Arquipélago São Pedro e São Paulo tem os objetivos específicos de:
>
> I - garantir a conservação dos ambientes marinhos, da coluna d'água e dos montes submarinos e das suas espécies de fauna, flora e microrganismos, em particular das espécies ameaçadas e endêmicas, presentes no Arquipélago de São Pedro e São Paulo;
>
> II - contribuir para assegurar os direitos de soberania, para fins de exploração e aproveitamento, conservação e gestão dos recursos naturais, vivos ou não vivos, das águas sobrejacentes ao leito do mar, do leito do mar e do seu subsolo, e de outras atividades com vistas ao uso sustentável da zona econômica exclusiva para fins econômicos;
>
> III - promover a execução constante de pesquisa científica e monitoramento da biodiversidade na região;
>
> IV - contribuir, por meio do mosaico de unidades de conservação e do seu zoneamento, para a recuperação dos estoques pesqueiros;

Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Ibama). Portaria Ibama nº 121, de 24 de agosto de 1998.

> Art. 1º Proibir, nas águas sob jurisdição nacional, a utilização e/ou o transporte de redes de emalhar, de superfície e de fundo, cujo comprimento seja superior a 2,5 km (dois quilômetros e meio).

> Art. 2° Proibir a rejeição ao mar das carcaças de tubarões dos quais tenham sido removidas as barbatanas.
>
> Parágrafo Único Somente será permitido o transporte a bordo ou o desembarque de barbatanas em proporção equivalente ao peso das carcaças retidas ou desembarcadas.
>
> Art. 3° Proibir o desembarque, a comercialização, a conservação, o beneficiamento e o transporte de barbatanas cujo peso seja desproporcional ao peso das carcaças desembarcadas.
>
> § 1° Para efeito de comprovação da proporcionalidade referida no caput deste artigo, o peso total das barbatanas não poderá exceder a 5% (cinco por cento) do peso total das carcaças.

IBAMA. Instrução Normativa Ibama nº 16, de 29 de setembro de 2015. Regulamenta o art. 4º da Instrução Normativa Interministerial MPA/MMA n° 14, de 26 de novembro de 2012.

MAPA. Instrução Normativa Mapa nº 21, de 31 de maio de 2017.

> Art.2°. Para os fins deste Regulamento, peixe congelado é todo o produto obtido de matéria-prima fresca, resfriada, descongelada ou congelada, de espécies de peixes oriundas da pesca ou da aquicultura, submetido ao congelamento rápido na sua apresentação final.
>
> Parágrafo único. O congelamento rápido de que trata o caput deve observar os limites de temperatura de cristalização máxima e não deve ser considerado concluído até que a temperatura do produto tenha alcançado - 18ºC (dezoito graus Celsius negativos) no centro geométrico do produto.
>
> Art. 3°. O peixe congelado, em conformidade com seus componentes anatômicos, classifica-se de acordo com as seguintes formas de apresentação:
>
> I - abas ou barbatanas: barbatanas das arraias ou tubarões incluindo a placa basal, seus raios cartilaginosos e sua musculatura;
>
> Art. 7°. O peixe congelado deve cumprir com os seguintes parâmetros físico-químicos:
>
> (...) b) elasmobrânquios que devem ser no máximo 40 mg (quarenta miligramas) de nitrogênio/100 g (cem gramas) de tecido muscular;
>
> Art.9°. O peixe congelado deve ser mantido sob temperatura não superior a -18° C (dezoito graus Celsius negativos).

Ministério da Agricultura, Pecuária e Abastecimento (Mapa). Portaria nº 89, de 09 de maio de 2019. Suspensão de novas emissões de autorização de pesca, autorização de pesca complementar e Permissão Prévia de Pesca de Atuns.

MAPA. Instrução Normativa nº 53, de 1º de setembro de 2020. Define nome comum e respectivos nomes científicos para as principais espécies de peixes de interesse comercial destinados ao comercio nacional.

Ministério da Pesca (MPA). Instrução Normativa MPA nº 20, de 10 de setembro de 2014. Estabelece critérios e procedimentos para preenchimento e entrega de Mapas de Bordo

das embarcações registradas e autorizadas no âmbito do Registro Geral da Atividade Pesqueira (RGP).

> Art. 3º A utilização de Mapa de Bordo é obrigatória para as embarcações registradas e autorizadas no âmbito do RGP, conforme Modalidades de Permissionamento relacionadas no Anexo I desta Instrução Normativa.
>
> § 1º É facultativo o preenchimento e entrega de Mapas de Bordo das embarcações de pesca artesanais autorizadas a atuar em frota sem controle de esforço e com arqueação bruta igual ou inferior a 10 (dez).
>
> § 2º A exigência de entrega de Mapas de Bordo para outras embarcações poderá ser estabelecida em ato normativo específico do MPA.

Ministério da Pesca e Aquicultura, Ministério do Meio Ambiente (MPA/MMA). Instrução Normativa Interministerial MPA/MMA nº 11, de 5 de julho de 2012.

> Art. 1º Proibir, nas águas sob jurisdição nacional, o uso e o transporte de redes de emalhe de superfície oceânico de deriva, popularmente conhecido como malhão.

MPA/MMA. Instrução Normativa Interministerial MPA/MMA n° 12, de 22 de agosto de 2012. Dispõe sobre critérios e padrões para o ordenamento da pesca praticada com o emprego de redes de emalhe nas águas jurisdicionais brasileiras das regiões Sudeste e Sul.

MPA/MMA. Instrução Normativa Interministerial MPA/MMA n° 14, de 26 de novembro de 2012. Dispõe sobre normas e procedimentos para o desembarque, o transporte, o armazenamento e a comercialização de tubarões e raias.

> Art. 3º Fica proibida a prática do finning no Brasil.
>
> § 1º. Todos os indivíduos de tubarões e raias de que trata o art. 1º devem ser desembarcados no litoral brasileiro, seja em infraestrutura portuária, terminal pesqueiro nacional, público ou particular, ou em qualquer outro local de desembarque utilizado pela frota nacional e estrangeira arrendada, com todas as suas barbatanas naturalmente aderidas ao corpo do animal.
>
> § 2º. Está autorizado o corte parcial das barbatanas de forma a possibilitar sua dobra contra o corpo do animal a fim de facilitar o armazenamento do pescado a bordo, bem como a evisceração e o descabeçamento dos indivíduos previamente ao desembarque.
>
> § 3º. O descumprimento do estabelecido neste artigo será considerado descaracterização não autorizada do pescado ou do produto originado da pesca.
>
> § 4º. Fica proibida a transferência de tubarões, raias e dos seus derivados entre embarcações de pesca.
>
> § 5º. Fica proibido o transporte, a bordo das embarcações de pesca, de tubarões e raias dos quais tenham sido removidas as barbatanas ou de barbatanas separadas do corpo dos animais.

Ministério do Desenvolvimento, Indústria, Comércio Exterior e Serviços, Ministério do Meio Ambiente (MDIC/MMA). Portaria Interministerial MDIC/MMA nº 74, de 1º de novembro 2017. Estabelece medidas mitigadoras para a redução da captura incidental e da mortalidade de tartarugas marinhas por embarcações pesqueiras que operam na

modalidade espinhel horizontal de superfície, no mar territorial brasileiro, na Zona Econômica Exclusiva (ZEE) brasileira e águas internacionais.

> Art. 2º Torna-se obrigatória a utilização de anzóis circulares pelas embarcações nacionais e pelas embarcações estrangeiras arrendadas que operam no mar territorial brasileiro, na ZEE e em águas internacionais, nas seguintes modalidades, previstas no Anexo I da Instrução Normativa Interministerial MPA/MMA no 10, de 10 de junho de 2011:
>
> I - espinhel horizontal (superfície), cujas espécies-alvo são a Albacora laje (*Thunnus albacares*), Albacora branca (*Thunnus alalunga*) e Albacora bandolim (*Thunnus obesus*);
>
> II - espinhel horizontal (superfície), cuja espécie-alvo é o Espadarte (*Xiphias gladius*).

Ministério do Meio Ambiente, Instituto Chico Mendes de Conservação da Biodiversidade (MMA/ICMBio). Portaria Conjunta nº 03, de 24 de agosto de 2018. Disciplina a atividade de pesca na Área de Proteção Ambiental do Arquipélago de São Pedro e São Paulo.

> Art. 3º Todas as embarcações, para exercerem a atividade de pesca na área de que trata o art. 1° desta Portaria Conjunta, devem observar as legislações específicas sobre cada tema e ficam obrigadas a:
>
> (...) IV - As embarcações nas modalidades de espinhel não poderão utilizar em seu petrecho de pesca estropo de aço ou de qualquer outro material distinto de nylon monofilamento, salvo autorização específica; V - as embarcações de pesca nas modalidades de espinhel deverão utilizar obrigatoriamente anzol circular, constituindo-se naqueles de formato circular, confeccionado em metal, sem argola, com ponteira virada em direção à haste, cujo tamanho seja igual ou superior a 14/0.

Ministério do Meio Ambiente, Secretaria Especial de Aquicultura e Pesca (MMA/SEAP). Instrução Normativa Conjunta MMA/SEAP n° 26, de 19 de julho de 2005. Estabelece critérios e procedimentos para preenchimento e entrega de Mapas de Bordo das embarcações nacionais ou estrangeiras arrendadas, devidamente permissionadas, que operam em águas sob jurisdição brasileira, em alto-mar ou em águas incluídas em acordos internacionais dos quais o Brasil é signatário.

Secretaria Especial de Aquicultura e Pesca, Ministério do Meio Ambiente, Ministério da Defesa (SEAP/MMA/MD). Instrução Normativa SEAP/MMA/MD nº 02, de 04 de setembro de 2006.

> Art. 1º Instituir o Programa Nacional de Rastreamento de Embarcações Pesqueiras por Satélite - PREPS para fins de monitoramento, gestão pesqueira e controle das operações da frota pesqueira permissionada pela Secretaria Especial de Aquicultura e Pesca da Presidência da República - SEAP/PR.
>
> § 1º É obrigatória a participação no PREPS de toda a embarcação de pesca estrangeira permissionada pela SEAP/PR.
>
> § 2º É obrigatória a participação no PREPS de todas as embarcações pertencentes às frotas e modalidades relacionadas no Anexo I desta Instrução Normativa, respeitadas as condições e regiões de operação estabelecidas.
>
> § 3º É obrigatória a participação no PREPS de todas as embarcações pesqueiras construídas e a serem construídas com Arqueação Bruta (AB) igual

ou superior a 50 ou com comprimento total igual ou superior a 15 metros, incluindo as embarcações de pesquisa pesqueira, considerando os prazos e condições estabelecidos nesta Instrução Normativa.

§ 4º A participação no PREPS de embarcações não previstas no Anexo I desta Instrução Normativa poderá ser exigida por ato normativo da SEAP/PR ou do Ministério do Meio Ambiente, ouvidos os integrantes da Gerência-Executiva do PREPS, no âmbito de suas competências.

§ 5º Os responsáveis pelas embarcações pesqueiras participantes do PREPS deverão instalar o equipamento de rastreamento e iniciar a transmissão das informações obrigatórias, previstas nos Anexos I e II desta Instrução Normativa, nos prazos e condições estabelecidos na mesma, ou em ato normativo especifico, contados a partir da data de divulgação da homologação das prestadoras de serviço de rastreamento, de que tratam o inciso XIII, do art. 2º, e o art. 5º desta Instrução Normativa.

§ 6º Para o início do envio das informações obrigatórias à Central de Rastreamento é obrigatório o envio da Comunicação de Adesão ao PREPS (Anexo III) pela prestadora de serviço de rastreamento à Diretoria de Desenvolvimento da Pesca (DIDEP/SUDAP/ SEAPPR), devidamente preenchida e assinada pelo Responsável Legal pela embarcação pesqueira e pelo Representante Legal da prestadora de serviços de rastreamento, acompanhada de:

a) Informações para Cadastro, constantes nos Anexos III-A e III-B desta Instrução Normativa; e

b) Cópia autenticada do Certificado de Registro da embarcação, dentro do prazo de vigência.

§ 7º A concessão, renovação, ou alteração do Certificado de Registro e da Permissão de Pesca das embarcações participantes do PREPS ficarão condicionadas à verificação, in loco, pela SEAP/PR, da instalação do equipamento de rastreamento, e à constatação do recebimento das informações pela Central de Rastreamento, conforme previsto nesta Instrução Normativa.

§ 8º Deverá constar no Certificado de Registro de Embarcação Pesqueira integrante do PREPS, emitido pela SEAP/PR, a obrigatoriedade do uso de Sistema de Rastreamento por Satélite, devendo os responsáveis pela embarcação providenciar a devida retificação do supramencionado documento junto aos Escritórios Estaduais da SEAP/PR, dentro dos prazos máximos para ingresso no PREPS, estabelecidos nesta Instrução Normativa.

§ 9º Para as embarcações previstas no parágrafo 3º deste artigo, já construídas, e não contempladas nas frotas e modalidades especificadas no Anexo I desta Instrução Normativa, o prazo máximo para adesão ao PREPS será de 120 dias contados a partir da data de divulgação da homologação das prestadoras de serviço de rastreamento, de que trata o art. 5° desta Instrução Normativa.

§ 10º Após o esgotamento dos prazos para adesão ao PREPS, estabelecidos no parágrafo 9º deste artigo e no Anexo I desta Instrução Normativa, todas as novas embarcações pesqueiras em construção ou a serem construídas, com comprimento igual ou superior a 15 metros ou AB igual ou superior a 50, somente poderão iniciar cruzeiros de pesca com os equipamentos de rastreamento em perfeito funcionamento.

§ 11º É permitida a participação voluntária no PREPS de qualquer embarcação pesqueira, atendidas as condições estabelecidas nesta Instrução Normativa.

> § 12º Os Responsáveis Legais pelas embarcações de pesca estrangeiras de que trata o parágrafo 1º deste artigo, deverão instalar o equipamento de rastreamento e iniciar a transmissão das informações obrigatórias, previstas nos Anexos I e II, em conformidade com os critérios estabelecidos nesta Instrução Normativa, em até 30 (trinta) dias contados a partir da data de divulgação da homologação das empresas prestadoras de serviço de rastreamento.

Sistema Integrado de Comércio Exterior (Siscomex – da Secretaria de Comércio Exterior do Ministério da Economia), que pode exigir a anuência do Ibama para as exportações brasileiras de produtos de tubarões. Ainda não vigente anuência do Ibama para exportações de tubarões.