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Advisory Committee (STAC) to the Protocol
Concerning Specially Protected Areas and Wildlife
(SPAW) in the Wider Caribbean Region

# PROPOSAL FOR THE UPLISTING OF the smooth hammerhead shark *Sphyrna zygaena* FROM ANNEX III TO ANNEX II OF THE SPAW PROTOCOL

**Proposal for the uplisting of the smooth hammerhead shark *Sphyrna zygaena* from Annex III to Annex II of the Protocol concerning Specially Protected Areas and Wildlife (SPAW Protocol)**



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From IUCN redlist website https://www.iucnredlist.org/species/39388/2921825

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# Authors

**Twan Stoffers,** Independent expert (sharks), Fish Ecologist, Wageningen University and Research

†**Paul Hoetjes,** Nature Conservation Policy Advisor at Dutch Ministry of Agriculture, Nature and Food Quality, Netherlands

**Andrea Pauly,** Associate Programme Management Officer, Coordinator Sharks MOU

**Heins Bent-Hooker** Directorate of Marine, Coastal and Aquatic Resources Affairs, Ministry of Environment, Colombia

**Anne-Marie Svoboda,** Senior Policy Officer bij Ministry of Agriculture, Nature and Food Quality, Netherlands

**Irene Kingma,** Strategy and Policy Lead, Dutch Elasmobranch Society

**Jean Vermot** SPAW Focal Point and European and International Coordinator Marine Environment, Ministry for an Ecological Transition, France

**Elisabeth Fries**, Project officer SPAW-RAC
**Sandrine Pivard**, Executive Director, SPAW-RAC, chair

with the contribution of
**Angela Somma,** Division Chief, National Marine Fisheries Service, National Oceanic and Atmospheric Administration (NOAA)

**Kristen Koyama,** National Recovery Coordinator, Endangered Species Division, NMFS Office of Protected Resources, NOAA, USA

**Océane Beaufort,** French West Indies sharks network coordinator / Environmental consultant

# I. Nomination Requirements

Requirements regarding species nomination are set forth in Specially Protected Areas and Wildlife (SPAW) Protocol Articles 11, 19, and guidelines and criteria adopted by the Parties pursuant to Article 21. The procedures to amend the annexes, contained in Article 11(4), state that "any Party may nominate an endangered or threatened species of flora or fauna for inclusion in or deletion from these annexes," and that, after review and evaluation by the Scientific and Technical Advisory Committee, the Parties shall review the nominations, supporting documentation and the reports of the Scientific and Technical Advisory Committee and shall consider the species for listing. Such a nomination is to be made in accordance with guidelines and criteria adopted by the Parties pursuant to Article 21. As such, this nomination addresses the 2014 "Revised criteria for the listing of species in the

Annexes of the Protocol Concerning SPAW and Procedure for the submission and approval of nominations of species for inclusion in, or deletion from Annexes I, II and III." Finally, Article 19(3) lists the type of information that should be included, to the extent possible, in reports relevant to protected species.

Article 1 of the SPAW Protocol defines Annex II as "the annex to the Protocol containing the agreed list of species of marine and coastal fauna that fall within the category defined in Article 1 and that require the protection measures indicated in Article 11(1)(b). The annex may include terrestrial species as provided for in Article 1(c)(ii)." Further, Article 11 of the Protocol specifies that "each Party shall, in cooperation with other Parties, formulate, adopt and implement plans for the management and use of such species…"

Listing of species can be justified based on a variety of criteria set out in the Revised criteria for the listing of species in the Annexes of the SPAW Protocol, in particular:

> *Criterion #1. For the purpose of the species proposed for all three annexes, the scientific evaluation of the threatened or endangered status of the proposed species is to be based on the following factors: size of populations, evidence of decline, restrictions on its range of distribution, degree of population fragmentation, biology and behaviour of the species, as well as other aspects of population dynamics, other conditions clearly increasing the vulnerability of the species, and the importance of the species to the maintenance of fragile or vulnerable ecosystems and habitats.*

> *Criterion #2. When evaluation of the factors enumerated above clearly indicates that a species is threatened or endangered, the lack of full scientific certainty about the exact status of the species is not to prevent the listing of the species on the appropriate annex.*

> *Criterion #4. When compiling a case for adding a species to the Annexes, application of the IUCN criteria in a regional (Caribbean) context will be helpful if sufficient data are available. The evaluation should, in any case, use best available information, and expertise, including traditional ecological knowledge.*

> *Criterion #5. The evaluation of a species is also to be based on whether it is, or is likely to be, the subject of local or international trade, and whether the international trade of the species under consideration is regulated under CITES or other instruments.*

*Criterion #6. The evaluation of the desirability of listing a species in one of the annexes should be based on the importance and usefulness of regional cooperative efforts on the protection and recovery of the species.*

*Criterion #8. The listing of a taxonomic unit covers all the lower taxa within that unit. The lists should be prepared at the level of species; [...] higher taxa can be utilized in listing when there are reasonable indications that the lower taxa are similarly justified in being listed, or to address problems of misidentification caused by species of similar appearance.*

# II. Substantiated Nomination Requirements to Support Inclusion in Annex II

## A. Article 19(3) – Information to be included in reports relevant to protected species, to the extent possible

### a. Article 19(3)(a) – Scientific and Common Names of the Species

a.1. Scientific and common name of the species

Class: Chondrichthyes, subclass Elasmobranchii

Order: Carcharhiniformes

Family: Sphyrnidae

Genus/species: *Sphyrna zygaena* (Linnaeus 1758)

Common name: English: Smooth hammerhead shark

Spanish: Tiburón martillo liso

French: Requin-marteau commun, requin-marteau lisse

a.2 Biological data

*Sphyrna zygaena* is a large species of hammerhead shark, growing to a maximum reported size of 420 cm. However, the average size for this species is 2.5 to 3.0 m total length (Miller, 2016). New information using updated growth models suggested a (k) of 0.09 for both males and females, with maximum sizes of 285 cm and 293 cm, respectively (Rosa *et al*. 2017). These values appear to be slightly lower than their relatives the great and scalloped hammerheads (Harry *et al*. 2011), suggesting the smooth hammerhead is the slowest-growing species of large hammerhead complex. Like many other shark species, this species reaches sexual maturity relatively late, at a total length between 210 and 260 cm for males and 250 and 290 cm for females (Castro and Mejuto, 1995; Miller, 2016). In the Gulf of California, both sexes of *S. zygaena* appear to mature earlier, at a total length of 194 cm for males and 200 cm for females (Nava Nava and Marquez-Farias, 2014). Age at maturity is estimated to be 9 years (Cortés *et al*., 2015). Like other hammerhead shark species, *S. zygaena* are viviparous (i.e. live-bearing) (Compagno, 1984; Ebert *et al*., 2013). After a gestation period of 10–11 months, females give birth to 20 to 50 pups (average litter size of 33 pups), with pups 49–64 cm in total length (Compagno, 1984; Castro and Mejuto, 1995; White *et al*., 2006; Miller, 2016). Juveniles of this species have been observed to form large aggregations (Smale, 1991). The reproductive cycle of smooth hammerheads is estimated to be biennial with a 10-11 month gestation, and litter size ranges from 20-50 young ranging in size from 50-65 cm (Ebert and Stehman 2013). Within the first four years, the young sharks grow approximately 25 cm per year, with growth reducing every year after (Coelho *et al*., 2011). Rosa *et al*. (2017) compared growth rates with other species in the genus, and estimated that the growth coefficients for *S. zygaena* were in the low to middle range. Growth curves for this species differ between populations in the Atlantic and Pacific Oceans, with individuals reaching smaller sizes in the Pacific Ocean (Clarke *et al*., 2015; Miller, 2016). Longevity is unknown, but the species has been aged to at least 18 years for males and 21 years for females (Coelho *et al*., 2011). Like many large-bodied shark species, *S. zygaena* is among the top predators (feeding at trophic level 4.2) in the marine food web (Cortés, 1999). The species feeds on a large variety of teleosts (i.e. bony fish), elasmobranchs, crustaceans and cephalopod species (Smale and Cliff, 1998; Cortés, 1999).

a.3 Habitat

*Sphyrna zygaena* has a circumglobal distribution in tropical to warm temperate waters, generally between the 59°N and 55°S latitude (FAO, 2010). Accurate data on the global

range of *S. zygaena* is limited. It is a pelagic species that occurs in both coastal and oceanic waters, thus occurring along the continental shelves (at depths of 20–200 m) and also making excursions into more oceanic habitats (Smale, 1991; Ebert, 2003). According to Clarke *et al*. (2015), this is the most oceanic of all hammerhead sharks. Young individuals occur in coastal habitats in the first years of their life, with their habitat range extending out to oceanic zones as they grow (Smale, 1991; Diemer *et al*., 2011; Clarke *et al*., 2015). The species has the widest temperature tolerance of all hammerhead species, allowing for a broader geographical range compared to other species of hammerhead (Compagno, 1984; Ebert et al., 2013). It is most common in waters of 16–22°C, but has also been reported in cooler waters of 13–19°C off South Africa (Diemer *et al*., 2011).

In the Eastern Atlantic, *S. zygaena* occurs from the south of the British Isles to Angola, including the Mediterranean Sea and Cape Verde Islands (Ebert et al., 2013). Very few specimens have been reported from the southern British Isles, where it is considered a very occasional vagrant (Southall and Sims, 2008). Within the Mediterranean Sea, it is likely more common in the western basin. In the Western Atlantic, *S. zygaena* occurs from Canada (vagrants) to Florida, US, parts of the Caribbean, including the Virgin Islands, and as far south as southern Argentina (Ebert et al., 2013). Recent catches are duly documented between Cuba and northern Brazil (Aguilar C. *et al*., 2014, Bezerra N. *et al*, 2017) suggesting an extension of its range.

## b. Article 19(3)(b) - Estimated Populations of Species and their Geographic Ranges

### b.1. Size of Populations

Misidentifications or the lack of species-specific data for hammerhead sharks result in many studies examining trends for the Sphyrna-complex (*Sphyrna* spp.: a combination of scalloped hammerhead *Sphyrna lewini*, great hammerhead *Sphyrna mokarran* and *S. zygaena*). As Miller (2016) noted, an accurate abundance estimate for this species on a global scale is not feasible at this stage, based on the available data for different regions. This supports the argument that the listing should not be for specific species but the species complex as a whole to prevent identification difficulties.

At-sea observer data from 1996–2018 in the pelagic longline fishery that targets Xiphias gladius L. (Swordfish) and Thunnus sp. (tuna) contained 8 records of Smooth Hammerheads in deep offshore waters, mostly in the southern Gulf of Mexico (unpubl. data). Additionally, a review of data collected by observers from the commercial shark bottom longline fishery since 1994 reported 6 Smooth Hammerhead captures in the Straits of Florida (Hale et al. 2010, 2011; A.N. Mathers, unpubl. data; Morgan and Burgess 2007). In recreational fisheries, while Great Hammerheads and Scalloped Hammerheads are frequently captured, there have been no confirmed records of Smooth Hammerheads caught in the Gulf of Mexico (Graefe and Ditton 1976, Shiffman and Hammerschlag 2014). However, as previously noted, most landings data for hammerhead sharks are not identified to species, which could account for underreporting of occurrence (Bezerra et al. 2017).

b.2.  Evidence of Decline

Fig 1. IUCN global status from https://www.iucnredlist.org/species/39388/2921825
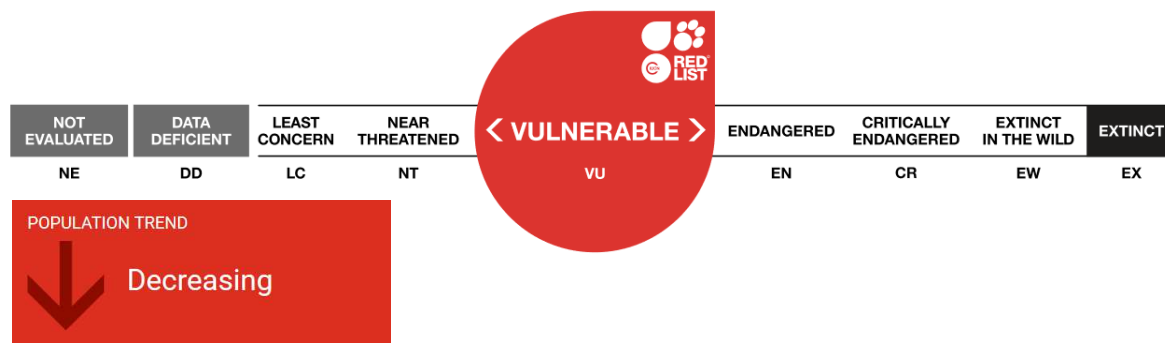


Given the absence of reliable data on *S. zygaena*, there is no stock assessment available on this species that has been accepted by the National Oceanic and Atmospheric Administration (Miller, 2016). An exploratory assessment was undertaken by Hayes (2007; cited by Miller, 2016) that suggested a 91% decline from 1982 to 2005, with this study highlighting a number of uncertainties in the input data. Similar population decreases of over 90% for *S. zygaena* were observed in Southern Brazil. In the national scenario it is inferred that *S. lewini* and *S. zygaena* populations decreased in southern Brazil, with capture declines of over 90% from 2000 to 2012 (Bornatowski *et al.,* 2018). Moreover, NMFS will be doing a stock assessment of all hammerheads in 2021-2022.

In summary, species-specific data on hammerhead sharks are lacking for many regions, as also highlighted by Miller (2016), making trend analyses on a species-levels inaccurate. Based on the results of the cited studies above, it is likely that populations of hammerhead sharks, as a group, have declined. The magnitude of any decline in *S. zygaena*, however, is unknown.

The IUCN defines the Smooth hammerhead's conservation status as 'Vulnerable' and its trend 'decreasing' (Rigby, 2019).

### b.3. Restrictions on its Range of Distribution

Much of the available data on the distribution range of the species is from localized study sites and over small periods of time, and thus is difficult to extrapolate restrictions on its range of distribution to the global population.

### b.4 Degree of Population Fragmentation

## c. Article 19(3)(c) - Status of Legal Protection, with Reference to Relevant National Legislation or Regulation

### c.1. Colombia

Through Resolution 1743 of 2017, among other actions, the exercise of industrial fishing directed at chondrichthyans is prohibited throughout the territory, allowing a percentage of incidental capture of up to 35%. Likewise, the prohibition of the use of steel wires in longlines and not to make modifications of baits or to use other unspecified methods that are aimed for attracting cartilaginous fish to the fishing operation.

The Smooth hammerhead shark is included in the list of threatened species of Colombia (Resolution 1912 of 2017) as a Vulnerable species.

### c.2. Kingdom of the Netherlands

The smooth hammerhead shark is totally protected in the European Union and in the shark sanctuaries in the Caribbean see by the EU Council Regulation 2020/123 of January 27, 2020

which states that it is prohibited to hold, tranship and / or land *S. zygaena* in European Union waters and on European vessels in ICCAT area.

## c.3. Republic of France

The smooth hammerhead shark is totally protected in the European Union and in the shark sanctuaries in the Caribbean sea by the EU Council Regulation 2020/123 of January 27, 2020 which states that it is prohibited to hold, tranship and / or land this species in European Union waters and on European vessels in ICCAT area.

No species of shark or ray is protected under the Environmental Code in Guadeloupe and Saint-Martin. Only management measures for sea fishing exist at the local level, as presented below.

### a- Recreational fishing

It is regulated by decree 971-2019-08-20-003 regulating the exercise of recreational sea fishing in Guadeloupe and Saint-Martin. Fishing for sharks and rays of all species is prohibited at all times and in all places.

### b- Professional fishing

Professional sea fishing is governed by order 2002/1249 / PREF / SGAR / MAP of August 19, 2002 regulating coastal sea fishing in the waters of the Department of Guadeloupe (pj2). This decree also applies to St-Martin, which was still a municipality of Guadeloupe in 2002. However, this text does not provide for any specific measure for Elasmobranchs.

## c.4. United States

The United States manages the commercial and recreational harvest of sharks, including smooth hammerhead sharks. Through its extensive regulations (e.g., permits, minimum sizes, quotas), the United States primarily coordinates the management of highly migratory species (HMS) fisheries in Federal waters (domestic) and the high seas (international), while individual states establish regulations for HMS in state waters. Under the Shark Conservation Act of 2010, the United States requires, with one exception, for all sharks to be landed with

their fins naturally attached (81 FR 42285, June 29, 2016). Additionally, a number of U.S. states prohibit the sale or trade of shark fins (Somma, pers. comm.).

The United States has implemented domestic measures consistent with CITES to regulate trade for smooth hammerhead sharks. Any export from or import into the United States must be accompanied by the appropriate CITES documentation.

In addition, the United States has domestic regulations to implement all of the ICCAT provisions in ICCAT fisheries (50 CFR 635, August 29, 2011).

c.5 International protection status

FAO: In 1998 the International Plan of Action for Conservation and Management of Sharks (IPOA Sharks) was agreed for all species of sharks and rays. The IPOA-Sharks is a voluntary international instrument, developed within the framework of the 1995 FAO Code of Conduct for Responsible Fisheries, which provides guidance for ensuring the conservation and management of sharks and their long-term sustainable use, with emphasis on improving species-specific catch and landings data collection, and the monitoring and management of shark fisheries. The code sets out principles and international standards of behaviour for responsible fishing practices to enable effective conservation and management of living aquatic organisms while considering impacts on the ecosystem and biodiversity. The IPOA-Sharks recommends that FAO member states 'should adopt a National Plan of Action for the conservation and management of shark stocks (NPOA-Sharks), if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in nondirected fisheries'.

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

Finning Bans: One of the main priorities in shark management and conservation in the past two decades has been the prohibition of shark finning. Many countries have already adopted finning bans in their waters and/or in their fisheries, that are in general implemented through an obligation to land all sharks with fins attached to the corresponding carcasses, or through a "fins to carcass ratio". All t-RFMOs have adopted finning bans with these two possible

implementation means. NAFO and NEAFC have adopted the fins naturally attached policy as only possible means for implementing the finning ban in the areas under their purview.

ICCAT: ICCAT members are prohibited from retaining onboard, transhipping, landing, storing, selling, or offering for sale any part or whole carcass of hammerhead sharks from the family Sphyrnidae (except S. tiburo) taken in the Convention area in association with ICCAT fisheries. Further, hammerhead sharks caught in ICCAT fisheries must be promptly released unharmed to the extent practicable. Developing coastal States that catch hammerhead sharks for local consumption, however, are exempt from these requirements provided they submit their catch data to ICCAT. Notwithstanding, ICCAT calls on developing coastal States qualifying for this exemption to not increase their catches of Sphyrnidae (except S. tiburo) and requires them to take the necessary measures to ensure that Sphyrnidae will not enter international trade and to notify ICCAT of such measures. Taking these requirements in total, therefore, there should be no international trade of hammerhead sharks of the family Sphyrnidae, with the possible exception of S tiburo, caught by ICCAT members (or those with cooperating status who are subject to the same requirements) in ICCAT fisheries. To date, however, ICCAT has not been able to conduct a comprehensive review of the implementation of this measure. Despite clear requirements, processes, and procedures to do so, reporting by parties on their domestic implementation of ICCAT's measures for hammerhead sharks has been spotty and little independent information is available to assess compliance. This contributes to the difficulty in determining the level of international trade that may be occurring contrary to ICCAT's requirements. It is, therefore, possible that some ICCAT parties may be exporting or importing these products and have failed to implement and enforce domestic regulations to monitor or prevent such trade. Furthermore, not all potential importing and exporting countries are members of ICCAT or have cooperating party status. These countries may not be aware of ICCAT's hammerhead measures and, as non-members, would not be obligated to comply with them in any case.

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

Appendices, according to the degree of protection they need. *S. lewini*, *S. mokarran*, and *S. zygaena* were added to Appendix II of CITES in March 2013. Appendix-II specimens require: an export permit or re-export certificate issued by the Management Authority of the State of export or re-export is required; and an export permit may be issued only if the specimen was legally obtained and if the export will not be detrimental to the survival of the species.

CMS: The Convention on the Conservation of Migratory Species of Wild Animals is an environmental treaty under the aegis of the United Nations Environment Programme. The CMS provides a global platform for the conservation and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally-coordinated conservation measures throughout the migratory range. *Sphyrna lewini* and *Sphyrna mokarran* were listed on CMS Appendix II in 2014 and *Sphyrna zygaena* in 2020 – this list includes migratory species with an unfavourable conservation status or those that would significantly benefit from international co-operation. Parties that are range states for Appendix II-listed species "shall endeavour to conclude agreements where these should benefit the species and should give priority to those species in an unfavourable conservation status". Also, the Shark MoU and its Annex 1 species list, which is not equivalent to the CMS appendices, includes all three Sphyrna spp.

d. Article 19(3)(d) - Ecological Interactions with Other Species and Specific Habitat Requirements

d.1 Migration

*Sphyrna zygaena* is a large-bodied and highly mobile hammerhead shark with active and strong swimming capacities. Little is known on the migratory behaviour of *S. zygaena*, and how the parts of the population migrate. Bass *et al*. (1975) documented juveniles of this species moving along the coast of South Africa in high numbers, but there was no evidence of migration in groups (Miller, 2016). In contrast, other sources indicate migrations of juvenile aggregations (Diemer *et al*., 2011; Ebert, 2013). Kohler and Turner (2001) reported the largest distance travelled for *S. zygaena* was 919 km in just over two years, averaging a speed of 4.8 km/day. Smale and Cliff (1998) suggested that *S. zygaena* migrates along the

east coast of South Africa, based on distinct species of cephalopods found in the stomach of this species. The oceanic cephalopods reported in the stomach contents indicate that *S. zygaena* range offshore, which suggests they may cross into international waters.

Conventional tagging of smooth hammerheads off Eastern Africa found that of the 20 recaptured sharks from 1980 to 2008, the average distance traveled was 141 km and the maximum distances traveled was 384 km (Diemer *et al*. 2011). These movements were far less wide-ranging than scalloped hammerheads, suggesting the species may not be as migratory as other large pelagic sharks (Gallagher *et al*., 2018).

In summary, although scientific studies on the movements and migrations of this species are limited (and more research is needed), the data available are indicative of *S. zygaena* making inshore-offshore migrations. This is evidenced by the presence of juvenile stages in more coastal areas, and that larger individuals have been found with oceanic squid in their stomach contents. Such migrations would lead to *S. zygaena* moving from national to international waters and across jurisdictional boundaries. There is also evidence of north-south movements, which may be seasonal migrations. The scale of potential movements from tagging programmes (well above 1000 km) would also indicate that *S. zygaena* are capable of moving through different national waters, as was reported from the specimen moving from California to Mexico and back, or across several countries off west Africa.

## e. Article 19(3)(e) - Management and Recovery Plans for Endangered and Threatened Species

### e.3. Colombia

There is the "National Action Plan for the Conservation and Management of Sharks, Rays and Chimeras of Colombia (PAN - Tiburones Colombia)", as the Policy instrument that establishes the guidelines for the conservation and sustainable management of the species of sharks, rays and chimeras in the marine and continental waters of the country and interact with tourist and cultural activities and the different fisheries on an artisanal and industrial scale. Its objectives include the following:

● Identify and evaluate the threats to the populations of sharks, rays and chimaeras in Colombia, associated with the extraction of individuals from their natural environment and the deterioration or modification of critical habitats.

● Determine and develop a regulatory and normative framework that allows the proper management and management of sharks, rays and chimeras in Colombia.

● Structure and guide an efficient program for the surveillance and control of fishing or other activities that impact sharks, rays and chimeras of marine and continental waters, by the competent entities.

e.9. Republic of France

There are several ongoing projects:

- establishment of the list of species present,
- development of identification sheets on state of knowledge on biology,
- state of fishing activity on these species in Guadeloupe
- sensitization of marine stakeholders (via participatory sciences in particular via a network of observers), including the animation of a network of observers, the ReGuaR network
- identification of coastal nursery areas

One of the study projects, based on the use of baited cameras, was part of an international project that resulted in publication in the scientific journal Nature in 2020

The improvement of knowledge on elasmobranchs aims to establish red lists of this group of species, a necessary prerequisite for the implementation of farm management measures at the national or local level. The intentions at the local level being to intervene on fishing regulations when the threat is linked to this activity, otherwise to set up protection under the environmental code when other threats are identified (disturbance of individuals, alteration of habitats…). The CSRPN of Guadeloupe has undertaken an initial analysis of candidate species for protection. The Kap Natirel association has issued recommendations for the management of these species in the Antilles.

The challenges of preserving Elasmobranchs in Guadeloupe have also been taken into account since 2017 in the fishery control plan and the preservation of the marine environment with clearly displayed dedicated objectives, on the proposal of the DEAL.

In 2017, the sea control services received theoretical training in the challenges of preserving Elasmobranchs and their identification, delivered by the Kap Natirel association alongside the DEAL.

### e.14. United States

Data is limited on the population status of smooth hammerhead sharks. In 2016, NMFS completed an Endangered Species Act (ESA) Status Review Report that found that the smooth hammerhead shark is likely to be at a low overall risk of extinction throughout its range (Miller, 2016).  Because smooth hammerhead sharks have not been listed under the ESA, the United States has not developed a recovery plan. The United States is currently working on a stock assessment for all hammerhead sharks, which should be completed in 2022.

## g. Article 19(3)(g) - Threats to the Protected Species, their Habitats and their Associated Ecosystems, Especially Threats which Originate Outside the Jurisdiction of the Party

### g.1. Harvesting threats

It is difficult to make accurate assumptions of the catch level of *S. zygaena*, as few countries and organisations collect species-specific data on hammerhead sharks. The United Nations FAO database allows the separate reporting of smooth hammerhead and scalloped hammerhead, but most catches are still reported as Sphyrnidae spp. Some data may also be reported at higher groupings (e.g. sharks). Whilst some nations do report species-specific landings for *S. lewini* and *S. zygaena*, the accuracy of these data is uncertain. As noted by Miller (2016) and Burgess *et al.* (2005), logbook-data have certain inherent inaccuracies (i.e. misidentification and inadequate sampling) and inferences based on such data should be treated with caution. Catches of hammerhead shark are often amalgamated as Sphyrnidae spp. The global overview by the FAO shows a significant increase in reported landings of

hammerheads in the past decade, although this could be partly attributed to increased species-specific reporting of landings.

Hammerhead sharks are taken as direct catch or incidental catch in domestic and artisanal fisheries, as well as industrial pelagic fisheries on the high seas. While the industrial fishing catches large individuals in longline and gillnets (~60 tonnes of "hammerhead sharks" in 2010), artisanal fishing catches large volumes of neonates and juveniles on the continental shelf (Bornatowski *et al*., 2014; Bornatowski *et al*., 2012; Motta *et al*., 2005). In Parana, a landing of approximately 2.5 tons of hammerhead sharks was recorded in 2010, consisting mainly of neonates and juveniles (Bernardo *et al*., 2020).

In the Eastern Atlantic, specifically off Northwest Africa, hammerhead sharks can make up 42% of the bycatch in pelagic trawl fisheries, with catches of hammerhead sharks peaking in July and August (Zeeberg *et al*., 2006). Within the same region, Dia *et al*. (2012; cited by Miller, 2016) indicated that catches of hammerhead species by the artisanal fleet comprised mostly *S. lewini*. *Sphyrna zygaena* is the more common of the three large-bodied hammerhead shark species recorded in the Mediterranean Sea.

g.2 Destrucción del habitát

Like many other shark species smooth hammerhead sharks rely on inshore areas for pupping and nursery grounds. Coastal developments may have resulted in habitat degradation and destruction of potential nursery areas (Knip et al., 2010), although there is no direct evidence that such habitat degradation has negatively impacted on the abundance or range of this species (Miller, 2016). However, the effects of these changes and their ultimate impact on populations of S. zygaena are currently unknown. Miller (2016) also noted that, given the migratory and opportunistic nature of S. zygaena, it may possibly adapt its range according to its physiological tolerance and ecological needs in response to changing environmental conditions.

Several studies have examined levels of contaminants in sharks, as they are long lived, top predators that can bioaccumulate and biomagnify contaminants in their tissues. Whilst a study from Baja California found elevated levels of mercury in *S. zygaena* tissue, these were below the levels deemed safe for human consumption (Garcia-Hernandez *et al*. 2007).

There are no direct studies on climate change effects on *S. zygaena*. Miller (2016) noted that, as this species has a broad geographic range, large-scale impacts such as global climate change affecting water temperature, currents and potentially food chain dynamics could have a detrimental effect on the species. However, Miller (2016) also noted that the migratory behaviour of the species may provide some resilience against any risks climate change posed.

Although there is a limited market for great and smooth hammerhead meat that is deemed of low quality because of the high level of urea, the fins are among the most valuable in the shark fin trade because of their large size and high fin-ray count, which is the essential element adding the gelatinous quality to shark fin soup (Rose, 1996). Thus, the high value of the fins on the international market is the main driver for hammerhead fisheries (directed and bycatch). Abercrombie (2005) estimated a value of $88/kg for 2003. Fins are commonly identified in Hong Kong markets (Abercrombie *et al*. 2005) and an analysis of the trade through the Hong Kong fin market (the largest international shark fin market), Clarke et al. (2006a) estimated that 4–5% of all fins traded were from *S. zygaena* or *S. lewini* each year. This would account for an estimate of between 49000 and 90000 tons of smooth and scalloped hammerhead sharks (combined) which would amount to between 1.3 and 2.7 million individual animals (Clarke *et al*. 2006b).

Furthermore, smooth hammerhead fins they are the most common hammerhead fished off western South America for export to Asia, including in protected waters such as the Galapagos (Carr *et al*. 2013; Sebastian *et al*. 2008) and off the coast of Brazil (Bernardo *et al*., 2020). About 43.3% of the total samples on the fish markets of Brazil consists of species listed in some IUCN risk category (e.g. *Carcharias taurus*, *Carcharhinus falciformis*, *Sphyrna lewini*, *S. zygaena*, *Squatina guggenheim*). Both species of hammerhead shark that occur in the state (*Sphyrna lewini* – the Scalloped hammerhead: 20.7%, and *Sphyrna zygaena*

- the Smooth hammerhead shark; 7.8%) were commercialized in a very significant way (Bernardo *et al.*, 2020).

# III. Discussion points and recommendations

As developed in section 1 of the document, the listing of species is to be justified based on a variety of criteria set out in the Revised criteria for the listing of species in the Annexes of the SPAW Protocol.

In particular, regarding the evidence of decline (criterion #1 in the guidelines) "*the scientific evaluation of the threatened or endangered status of the proposed species is to be based on the following factors: size of populations, evidence of decline, restrictions on its range of distribution, degree of population fragmentation, biology and behavior of the species, as well as other aspects of population dynamics, other conditions clearly increasing the vulnerability of the species, and the importance of the species to the maintenance of fragile or vulnerable ecosystems and habitats*". Criterion #2 states that: "*When evaluation of the factors enumerated above clearly indicates that a species is threatened or endangered, the lack of full scientific certainty about the exact status of the species is not to prevent the listing of the species on the appropriate annex*". Criterion #4 states the importance of considering the IUCN red list listing for the Caribbean region, criterion #5 the interest of alignment with CITES and other international instruments and criterion #6 the importance and usefulness of regional cooperative efforts on the protection and recovery of the species.

The species has suffered an extreme decline evaluated above 90% according to exploratory assessments. It is also a slow growing species, presumably vulnerable to anthropogenic impact (criterion #1). It is very vulnerable to target of trade for fins (criteria #1 and #5). Second, the IUCN status is vulnerable and the trend decreasing (criterion #4). It has been listed in CITES Appendix II (criterion #5).

Listing on international resource management agreements should help to improve national and regional management and facilitate collaboration between states for this species. It is evident that lack of species-specific data collection is hampering management for this species. There is still a lack of understanding of the basic data needed to understand the life-

history, habitat utilization and migration patterns of this species. As noted in section 3.1 hammerhead sharks have a high bycatch mortality rate (71% at-vessel mortality in longline) in nets, trawls and long lines. Measures aimed at reducing unwanted mortality should incorporate avoidance measures as well as gear adaptations that lead to reduced bycatches of this species. In addition, because it is misidentified with S. mokarran and it is very vulnerable to target of trade for fins, similar to S. mokarran, uplisting is coherent with the Great Hammerhead shark proposal and criterion #8.

Addition to SPAW Annex II will strengthen existing conservation measures of various Caribbean nations and makes also sense to address problems of misidentification of S. mokarran with S. zygaena which creates a conservation loophole (criterion #8). It is an important additional argument to encourage change in local practices (including moving towards selective fishing gear, which will be a big step for the conservation of many marine species) (criterion #6). Thus, according to the precautionary principle, some experts believe the species should be listed in annex II because they consider listing in Annex III is obviously not efficient (criteria #2 and #6).

Six (6) experts consider that Annex II listing is not justified. One considers there is lack of data/evidence supporting a conclusion that the species is in decline globally and within the Caribbean region (criteria #1). There is no information about population size, restrictions on its range of distribution, or population fragmentation (criteria #1). The amount of data/evidence available at this time is insufficient to warrant a precautionary approach (criteria #1 versus criteria #2). Two others suggest that Parties adhere to a stricter protocol to manage under Annex III. Among the two, one precises it makes also sense to keep all hammerheads on the same Annex (see great hammerhead rationale) (criteria #8). Two experts finally evoke that the Caribbean is at the edge of its range so protection under SPAW doesn't have that much effect in helping the species (criterion #1). They modulated this by emphasizing that uplisting would be to 1) align with ICCAT retention van and 2) because it is a look-a-like for great hammerhead (which bring back to criteria met by the species)

# IV. Conclusion

The IUCN has classified the global population of *S. zygaena* as Vulnerable. Smooth hammerhead sharks are threatened by direct catch or incidental catch in fisheries, the destruction and modification of their habitats and the value of the fins on the international market. For these reasons, they have been protected for a few years by several international agreements. However, considering that species specific data on population sizes and decline in the Wider Caribbean Region are lacking, experts have not been able to reach a consensus as regards the listing in Annex II of the SPAW protocol.

Experts have not reached a consensus  and they are divided on what would be the most effective.

According to some experts (8), uplisting is warranted considering key criteria are reached in particular significant decline for all hammerhead shark species, 'vulnerable' status under the IUCN, and intensified pressure due to the commercial trade in shark fins. it is important to increase the level of protection of this species from Annex III to II, especially because we know so little about its current status and distribution in the Wider Caribbean Region. They state that whether this is caused by population declines that has not been observed yet or that it is just a rare species in the Caribbean should not matter. In that respect, the priority should always be reducing threats to marine animals. Listing this species in Annex II would impose stronger conservation measures of various Caribbean nations and could also allow to cope with field misidentifications if the whole taxonomic unit is uplisted.

However, other experts (6) stress that several criteria for listing in Annex II have not been met. Smooth hammerhead sharks are rarely observed in the Greater Caribbean region. Thus, there is not enough reason to propose this species to be listed on Annex II. Worldwide declines of this species are real, but not really an issue in the Caribbean region. Finally, additional measures should be taken to improve data collection in view of scientific monitoring of the species. The existing Annex III listing already makes it a priority for SPAW Parties to reduce threats to these marine animals.

# V. Annexes

## Annex 1. Criteria evaluation for the smooth hammerhead shark

| | | *Concerns Annexes I, II and III* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Criteria evaluation for the: smooth hammerhead shark Sphyrna zygaena listing under the Annex II | | | | |
| SPAW Article | Criterion number | Criterion | Criterion details | Presence of information in the proposal report | Information quotes | Literature | 1 is the criterion relevant for this species R/NR 2 is it possible to obtain the information O/NO) | If relevan Criterion validatio Yes/ No |
| 21 | #1 | The scientific evaluation of the threatened or endangered status of the speces is to be based on these factors : | Size of population | N | An accurate abundance estimate for this species on a global scale is not feasible at this stage, based on the available data for different regions. | Miller 2016 | R, NO | Y/N |
| | | | Evidence of decline | N | Given the absence of reliable data on *S. zygaena*, there is no stock assessment available on this species that has been accepted by the National Oceanic and Atmospheric Administration . | Miller 2016 | R, NO | Y/N |
| | | | Restriction on its range of distribution | N | Much of the available data on distribution range of the species is from localized study sites and over small periods of time, and thus is difficult to extrapolate restrictions on its range of distribution to the global population. | | NR | |
| | | | Degree of population fragmentation | N | | | | |
| | | | Biology and behaviour | Y | The smooth hammerhead is the slowest-growing species of large hammerhead complex | Harry *et al*. 2011 | | |
| | | | Other population dynamics | Y | The data available are indicative of S. zygaena making inshore-offshore migrations. Such | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | migrations would lead to S. zygaena moving from national to international waters and across jurisdictional boundaries. | | | |
| | | | Conditions increasing the vulnerability of the species/ major threats | | see proposal | | R | Y |
| | | | Importance of the species to the maintenance of fragile or vulnerable ecosystems and habitats | N | | | NR | |
| | #2 | Precautionary principle (when criteria 1 gives indication that the species is threatened or endangered, the lack of full scientific certainty about the exact status of the species is not to prevent the listing of the species on the appropriate annex) | | Y | | | R | |
| | #4 | Application of the IUCN criteria in a regional (Caribbean) context will be helpful if sufficient data are available | | | The IUCN defines the Smooth hammerhead's conservation status as 'Vulnerable' and its trend 'decreasing' | Rigby, 2019 | R | Y |
| 21 | #5 | Is the species the subject of local or international trade AND is the international trade regulated under CITES or other instruments? | | Y | *S. zygaena* were added to Appendix II of CITES in March 2013.<br><br>Although there is a limited market for great and smooth hammerhead meat that is deemed of low quality because of the high level of area, the fins are among the most valuable in the shark fin trade because of their large size and high fin-ray count, which is the essential element adding the gelatinous quality to | Abercrombie (2005)<br><br>Clarke et al. 2006a,b<br><br>Rose, 1996. | R | Y |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | shark fin soup | | | |
| 21 | #6 | Importance and usefulness of regional and cooperative efforts on the protection and recovery for species | I | Y | | | R | Y |
| 21 | #7 | Endemism of the species (and importance of regional cooperation for its recovery) | | N | | | NR | |
| 21 | #8 | <mark>Does the species belong to a taxonomic group already listed under the SPAW Protocol ?</mark> | | Y | | | R | Y |
| 21 | #10 | Listing as an "appropriate measure to ensure the protection and recovery" of fragile ecosystems/habitats where they occur | | N | | | NR | |
| 11 (a) | # | Presence of the species in another annex of the SPAW Protocol | | Y | Inclusion in Annex III | | R | Y |
| 11 (4,a) – 19 (3) | # | Information demonstrating the applicability of the appropriate SPAW listing criteria | | N | | | R | Y |
| | # | Does the species benefit from another protection tool ? | | Y | *S. mokarran* was also listed on Annex I, Highly Migratory Species, of the UN Convention on the Law of the Sea<br><br>The Convention on the Conservation of Migratory Species of Wild Animals (CMS) lists the species in Appendix II The species is also included in Annex 1 of the Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU) | | R | Y |

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