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PROPOSAL FOR THE INCLUSION OF THE ANGULAR ANGELSHARK *(Squatina guggenheim)* ON APPENDIX II OF THE CONVENTION*

Summary:

The Government of Brazil has submitted the attached proposal for the inclusion of the angular angel shark *(Squatina guggenheim)* on Appendix II, in light of its unfavourable conservation status, recognised by its global classification as Endangered (EN) and regionally (Brazil) as Critically Endangered (CR) and the urgent necessity for transboundary collaboration among the Range States (Brazil, Uruguay, and Argentina) to effectively mitigate key threats, most notably the significant bycatch associated with fisheries operating across the species' distributional range, as well as strategies for joint monitoring and data sharing.

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

PROPOSAL FOR THE INCLUSION OF THE ANGULAR ANGELSHARK *(Squatina guggenheim)* ON APPENDIX II OF THE CONVENTION

A. PROPOSAL

The inclusion of ***Squatina guggenheim*** (angular angel shark) on **Appendix II** of the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

B. PROPONENT

Government of Brazil

C. SUPPORTING STATEMENT

1. Taxonomy

1.1 Class: Chondrichthyes, Subclass: Elasmobranchii

1.2 Order: Squatiniformes

1.3 Family: Squatinidae

1.4 Genus, species: *Squatina guggenheim* Marini, 1936 (Fig. 1)

1.5 Scientific synonyms: *Squatina punctata* Marini, 1936

1.6 Common name(s): English: angular angel shark; spiny angel shark
French: ange de mer
Spanish: pez ángel espinhoso; angelito
Portuguese: cação-anjo-espinhoso

Figure 1. *Squatina guggenheim* (Spiny angel shark)

2. Overview

The angular angel shark (*S. guggenheim*) is a medium-sized, demersal shark endemic to the Southwest Atlantic Ocean. It is globally classified as Endangered (EN) by the IUCN Red List (Oddone et al., 2019) due to severe population declines driven primarily by unsustainable bycatch in trawl and gillnet fisheries throughout its entire range (Brazil, Uruguay, and Argentina). Its slow reproductive output (small litter, long gestation, and a potential three-year reproductive cycle) makes it highly susceptible to overexploitation. Appendix II listing is necessary to foster the international collaboration required to reverse its current decline.

3 Migrations

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

The Southwest Atlantic Ocean is recognized as one of the world's most biologically productive areas, characterized by high species richness and distinct thermal gradients along the coastline (Acha et al., 2004; Lutz et al., 2010; Franco et al., 2020). Despite this high biodiversity, it is notably vulnerable to high fishing efforts (Tyedmers et al., 2005; FAO, 2022). Regarding the class Chondrichthyes (sharks, rays, and chimaeras), this is 50% of endemic species of the Southwest Atlantic Ocean is currently threatened with extinction (Dulvy et al., 2014).

The known range of *Squatina guggenheim* extends continuously along the Southwest Atlantic continental shelf from Southeast Brazil to central Patagonia, Argentina (Vooren & Klippel, 2005; Colonello et al., 2007). Given its broad, contiguous range, effective management of the species by one Range State is crucial, as it directly influences the stock available to the others, a core challenge in migratory species conservation.

The species exhibits predictable seasonal and ontogenetic movements, presenting a historical and complex pattern of genetic exchange between populations, associated in part with long-term shifts in spatial and temporal environmental variables due to current displacements, as well as due to sex-biased behavior (Vooren & da Silva, 1991; Vögler et al. 2008; Garcia et al., 2014; Bunholi et al., 2022). While temperature and depth are key habitat variables affecting the species' distribution in southern Brazil (Vooren & da Silva, 1991), salinity was also observed by Vögler et al. (2008) to influence the movements of the angular angel shark in the Argentine-Uruguayan Common Fishing Zone. Adult females undertake migrations to shallow coastal waters (generally <40m deep) for breeding and parturition in spring. Juveniles (both sexes) are distributed within the outer area of the de la Plata Estuary, while the adults (both sexes) are widespread offshore reaching the bathymetric limit of the species (Garcia et al., 2015). Vögler et al. (2008) found that during the reproductive migration of adult males and females in November and December, the population is exposed to important changes in salinity within the La Plata River mouth and the Maritime Front (Uruguay and Argentina) due to their proximity.

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

The concentration of reproductive adults and neonates in shallow, high-vulnerability areas highlight the importance of this shared marine region for the entire stock's recruitment (Vooren & Klippel, 2005; Vögler et al., 2008). These interconnected life stages demonstrate a single, functional metapopulation structure that relies on habitat connectivity across national boundaries. Genetic studies indicate population structure between the Southeast Brazilian and South-Southwest Atlantic groups (South Brazil, Uruguay and Northern Argentina) (Bunholi et al., 2022).

Although the species was historically targeted due to the commercial value of its meat (often sold as angel shark fillet), the primary threat today stems from bycatch in multi-species fisheries, particularly trawl and gillnet (Oddone et al., 2019). These activities are concentrated in the continental shelf of the south Brazil to central Argentina, that serve as crucial nursery grounds for the species (Vooren & Klippel, 2005; Colonello et al., 2007). High fishing pressure in this region, notably intense during the 1980s and 1990s, led to a severe population decline, and the stock is still far from recovery, even with the fishing moratorium implemented in Brazil since 2004 (Vooren & Klippel, 2005; Oddone et al., 2019).

The presence of long-term shifts in genetic exchange, associated with environmental variables like current displacements, mainly between northern Argentina and southern Brazil (Vögler et al., 2008; Garcia et al., 2014; Bunholi et al., 2022) indicates that the species must be managed as a unified stock, not as separate national populations.

4 Biological data (other than migration)

4.1 Distribution (current and historical)

Squatina guggenheim is endemic to the Southwest Atlantic, ranging from the states of Rio de Janeiro, Brazil (~23°S), south along the coast of Uruguay, to central Patagonia, Argentina (~42°S) (Vooren & da Silva, 1991; Colonello et al., 2007; Vaz & Carvalho, 2013). It is a demersal species and occurs in both marine and estuarine environments, primarily utilizing the sandy and muddy sediments of the continental shelf, with a core depth range of 10 to 80 m (Vooren & Klippel, 2005; Ebert et al. 2013).

4.2 Population (estimates and trends)

Significant population declines have been documented across the range, particularly in Southern Brazil, Uruguay, and Argentina, directly correlating with fishing effort. Population size reduction of at least 70% inferred over three generations (24 years) (Oddone et al., 2019).
In Brazil, the *S. guggenheim* is classified as Critically Endangered (CR), due to population size reduction over 80% with extremely high fishing pressure, mainly bottom trawl and gillnet industrial fisheries, between the 1980s and 2000s (Miranda & Vooren, 2003; Vooren & Klippel, 2005; Santos et al., 2025). The species shows no indication of recovery, mainly because it remains vulnerable to high bycatch levels driven by significant fishing pressure mainly off southern continental shelf (Santos et al., 2025)

Although research surveys in the Argentinean-Uruguayan Common Fishing Zone (AUCFZ) found the *S. guggenheim* to be the dominant species in the catch (Milessi et al., 2001), subsequent Argentinian landings from the AUCFZ declined by 51% between 1996 and 2017 (Oddone et al., 2019). In 2016, the combined Argentina-Uruguay catch from the (AUCFZ) was 2,270.4 t, falling 329.6 t short of the 2,600 t maximum permitted annual catch (MPC). This unused quota may be key evidence of declining availability of angel sharks in the AUCFZ. These annual catch limits have progressively diminished, and they stand fixed at 2,000 t since 2022 (CTMFM, 2022). A portion of these quantities was immediately authorized, with the remainder held as an administrative reserve which would be subject to later release. In 2025, this immediately authorized amount was 1,700 t with a 300 t reserve (CTMFM, 2025).

In Argentina angel shark landings (1998–2003) presented an overall negative trend (Massa et al., 2004). Between 1992 and 1998, the annual Capture per Unit of Effort (CPUE - kg/h) for the Argentinian trawler fleet decreased dramatically by 58%. This decline is estimated to be equivalent to a staggering over 96% reduction across three generation lengths (Massa & Hozbor, 2003).

The maximum permitted annual catch (MPC) in Argentina was halved from 6,000 t (1995–1999) to 3,000 t in 2003. This reduction was likely a direct management response to the decreased availability of the species for the Argentinian trawler fleet (Consejo Federal Pesquero, 2003, Massa & Hozbor, 2003).

Despite the managed reduction, Argentinian annual landings increased from 3,126.7 t, in (2000 to a peak of 5,232.2 t in 2010, before falling sharply to 2,854.1 t in 2013—a drop in just three years and accounted for a small fraction (< 1%) of the total annual marine fish catch in Argentina (Navarro et al. 2014).

4.3 Habitat (short description and trends)

Squatina guggenheim is a medium-sized demersal angel shark and occurs in both marine and estuarine environments, primarily utilizing the sandy and muddy sediments of the continental shelf, with a core depth range of 10 to 80 m (Vooren & Klippel, 2005; Ebert et al. 2013). Adults of the species move to depths between 50 and 100 meters seasonally. Conversely, these individuals shift to the shallower zone, at depths ranging from 10 to 50 meters (Vooren & Klippel, 2005; Colonello et al., 2007; Ebert et al., 2013).

4.4 Biological characteristics

Squatina guggenheim reproduces by lecithotrophic viviparity, also known as ovoviviparity. It exhibits low uterine fecundity, typically ranging from 3 to 9 embryos. The total length (TL) at birth is between 24 and 28 cm. The female reproductive cycle has a duration of three years, comprising a 12-month gestation period, followed by a 24-month resting period during which oocyte maturation for the next gestation occurs. Both sexes reach sexual maturity at approximately 72 cm TL and attain a maximum size of about 95 cm TL (Vooren & Klippel, 2005; Ebert et al., 2013).

Considering the longevity of 13 years and the age at first maturity of approximately 4 years (Vieira, 1996), the generation time is assumed to be around 9 years.

4.5 Role of the taxon in its ecosystem

The angular angel Shark is an ambush predator that spends most of its time buried in the sand or mud of the continental shelf. Its role is crucial in regulating the populations of smaller organisms that live on or near the seafloor. Its diet primarily consists of benthic crustaceans (like shrimp and crabs) and small bony fish (such as small croakers and weakfish) that live near the substrate (Compagno, 1984; Vooren & Klippel, 2005; Ebert et al., 2013).
By preying on these organisms, *S. guggenheim* acts as a mesopredator (middle-level predator), linking the lower trophic levels (invertebrates) to higher trophic levels in the food web.
Due to its specific habitat requirements and high vulnerability to fishing pressure, *S. guggenheim* often serves as a good indicator species for the health of coastal benthic ecosystems.

5. Conservation status and threats

5.1 IUCN Red List Assessment

Endangered (EN A2bd) (Oddone et al., 2019).

5.2 Equivalent information relevant to conservation status assessment

Critically Endangered (CR A2bd) (Santos et al., 2025) in official red list of Brazil.

5.3 Threats to the population

The population decline of the angular angel shark (*Squatina guggenheim*) throughout its Southwest Atlantic distribution (Brazil, Uruguay, and Argentina) is driven by two main factors: intense fishing pressure and significant habitat impacts.

The species is highly susceptible to incidental capture (bycatch), which remains its primary source of mortality. *Squatina guggenheim* is frequently caught in bottom trawling nets and gill nets, predominantly by multi-species coastal fleets targeting more commercially valuable

fishes like croakers and weakfishes. This non-selective fishing method results in extremely high fishing mortality rates, and there are uncertainties regarding the efficacy of discarding mandates, as released individuals are unlikely to survive.

In Brazilian markets, Elasmobranchs are usually sold as "cação", one of their popular trade names (Falcão et al., 2014) and this generalized and nonspecific labeling also complicates efforts to curb consumption of endangered species (Bornatowski et al., 2013; Falcão et al., 2014).

Pollution, dredging, and coastal development lead to habitat degradation and loss. These activities change the quality of bottom water and pollution levels, which reduces the overall habitat suitability and makes the population less resilient to existing exploitation.

5.4 National and international utilization

The utilization of *Squatina guggenheim* is strongly linked to the local consumption of its meat in the Southwest Atlantic countries.

In Brazil, there is a relatively significant consumer market (importation). The meat of *S. guggenheim* is commercially sold as "cação" (shark meat), a generic term covering various shark and ray species. Due to its Endangered status, the fishing, landing, and sale of this species are prohibited, but illegal commercialization under the name "cação" is a persistent problem (Almerón-Souza et al., 2018).

In Argentina, the species' meat is highly sought after and is often sold as "pollo de mar" (sea chicken) or "cazón". Although the species is primarily caught as bycatch in trawl fisheries, it is processed and commercialized both within the domestic market and, historically, for export.

Like its neighbors, Uruguay consumes *Squatina guggenheim*. The species is captured in its territorial waters and commercialized for internal consumption, making it an important market, especially within the Argentinean-Uruguayan Common Fishing Zone.

Beyond its meat, there is a market for the species' by-products, as fins are also commercialized. An illegal market exists for this by-product, with demand often driven by international markets, particularly the Asian market, where shark fins are used in soups and other dishes.

6. Protection status and species management

6.1 National protection status

The species is officially protected in Brazil, under Ordinance MMA n°148/2022 (Red List) listed as Critically Endangered, and due this, landings and commercial use are prohibited.

In Brazil, the National Action Plan for the Conservation of Threatened Sharks and Rays has been under implementation since 2014 and is currently in its second cycle.

The National Plan of Action for the Conservation of Chondrichthyans in Uruguayan Fisheries has been under implementation since 2005, with a revision in 2015

The National Plan of Action (PAN) for the Conservation and Management of Chondrichthyans (Sharks, Rays, and Chimaeras) in Argentina was elaborated in 2009 and revised in 2015.

6.2 International protection status

Squatina guggenheim is officially listed as an Endangered species under the U.S. National Oceanic and Atmospheric Administration's (NOAA) Endangered Species Act (ESA) - 2017, which carries the authority to impose restrictions on its commercial trade within the United States.

In 1998 the International Plan of Action for Conservation and Management of Sharks (IPOA Sharks) was agreed on all species of sharks and rays. The IPOA-Sharks is a voluntary international instrument, developed within the framework of the 1995 FAO Code of Conduct for Responsible Fisheries, that guides nations in taking positive action on the conservation and management of sharks and their long-term sustainable use. The IPOA-Sharks recommend 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'.

6.3 Management measures

The landing and commercialization of the species are prohibited in Brazil (Ordinance MMA n° 148/2022) and if the species is incidentally captured, its release to the sea, regardless of its state (live or dead), is required (Ordinance MPA/MMA n°10/2011).

In the Argentinean-Uruguayan Common Fishing Zone there are established quotes (TAC) since 1990s, that are reviewed periodically.

In Argentina there is the Resolution CFP n° 8/2021 that forbids the target fishing of Chondrichthyes, sets limits on maximum allowable landing percentages of sharks and rays, among other general measures to this group.

In all three countries, protected areas exist within the species' distribution range that can contribute to its conservation, as well as areas of temporal or spatial exclusion for fishing gears that affect *Squatina guggenheim*.

6.4 Habitat conservation

Squatina guggenheim preferentially inhabits shallow coastal waters and estuaries, areas increasingly subject to human pressures. This leads to habitat degradation and loss stemming from pollution, dredging, and coastal development. The disturbance of these areas is critical because they often overlap with essential nursery and feeding grounds for juveniles and pregnant females. Changes in bottom water quality and chronic pollution also reduce the overall habitat suitability and make the population less resilient to existing exploitation.

6.5 Population monitoring

In Brazil, because the species must be discarded, monitoring these incidental catches (bycatch) occurs through isolated, sporadic observer initiatives, from research organizations. Crucially, there is currently no structured and integrated governmental onboard observer program implemented, although a program that existed in Brazil until the 2010s is currently under review.

Structured and integrated programs are in place in Argentina and Uruguay executed by INIDEP and DINARA that generate vital information on the *Squatina guggenheim* fishery, drawing on fleet data and research surveys, including in the Argentinean-Uruguayan Common Fishing Zone coordinated by the Comisión Técnica Mista del Frente Marítimo.

7. Effects of the proposed amendment

7.1 Anticipated benefits of the amendment

Listing on international agreements, such as the CMS, could help to drive improvements in national and regional management and facilitate collaboration between states, for this species, to effectively mitigate key threats, most notably the significant bycatch associated with fisheries operating across the species' distributional range, as well as strategies for joint monitoring and data sharing.

7.2 Potential risks of the amendment

No risk was raised, given that Appendix II encourages international cooperation in conservation without imposing a direct restriction on utilization, provided that such use is sustainable on populations where exploitation is monitored and verified as viable.

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

8. Range States

Brazil, Uruguay and Argentina

9. Consultations

10. Additional remarks

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