E 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 223

[Docket No. 260410-0096; RTID 0648-XR121]

Endangered and Threatened Species; Notice of 12-Month Findings on a Petition to List the Tope Shark as Threatened or Endangered Under the Endangered Species Act and Proposed Listing of Two Distinct Population Segments of Tope Shark as Threatened

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of 12-month petition findings; proposed rule and request for comments.

SUMMARY: We, NMFS, have completed a comprehensive status review of the tope shark (*Galeorhinus galeus*) in response to a petition to list the species as threatened or endangered under the Endangered Species Act (ESA) of 1973. After reviewing the best scientific and commercial data available, we have determined that this species is comprised of six distinct population segments (DPSs) and that two, the Southern (So.) Africa and Southwest (SW) Atlantic DPSs, are likely to become in danger of extinction throughout all or a significant portion of their ranges in the foreseeable future. Therefore, we propose to list the So. Africa and SW Atlantic DPSs as threatened species under the ESA. We have also determined that the remaining four DPSs—the Northeast (NE) Atlantic, NE Pacific, SW Pacific, and Southeast (SE) Pacific DPSs—do not meet the definition of a threatened or endangered species under section 4(a) of the ESA and therefore do not warrant listing under the ESA. We solicit information to inform the final listing determinations.

DATES: Comments on this proposed rule must be received by [*INSERT DATE 60 DAYS AFTER PUBLICATION IN THE* ***FEDERAL REGISTER***]. Public hearing requests must be made by [*INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE* ***FEDERAL REGISTER***].

ADDRESSES: A plain language summary of this proposed rule is available at *https://www.regulations.gov/docket/NOAA-NMFS-2022-0048*. You may submit comments on the proposed rule, identified by NOAA-NMFS-2022-0048 by the following method:

- *Electronic Submissions*: Submit all electronic comments via the Federal e-Rulemaking Portal. Go to *https://www.regulations.gov* and enter NOAA-NMFS-2022-0048 in the Search box. Click on the "Comment" icon, complete the required fields, and enter or attach your comments.
- *Mail:* Submit written comments to Adrienne Lohe, NMFS Office of Protected Resources, 1315 East-West Highway, Silver Spring, MD 20910.

Instructions: Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered by NMFS. All comments received are a part of the public record and will generally be posted for public viewing on *https://www.regulations.gov* without change. All personal identifying information (*e.g.*, name and address), confidential business information, or otherwise sensitive information submitted voluntarily by the sender will be publicly accessible. NMFS will accept anonymous comments (enter "N/A" in the required fields if you wish to remain anonymous).

The petition, Status Review Report, **Federal Register** notices, and the list of references can be accessed electronically online at: *https://www.fisheries.noaa.gov/species/tope-shark/conservation-management.* The peer review report is available online at: *https://www.noaa.gov/organization/information-technology/peer-review-plans*.

FOR FURTHER INFORMATION CONTACT: Adrienne Lohe, NMFS Office of Protected Resources, 301-427-8442, *adrienne.lohe@noaa.gov*, or Lisa Manning, NMFS Office of Protected Resources, 301-427-8466, *lisa.manning@noaa.gov*.

SUPPLEMENTARY INFORMATION:

Background

On February 15, 2022, we received a petition from the Center for Biological Diversity and the Defend Them All Foundation (Petitioners) to list the tope shark, *G. galeus,* as a threatened or endangered species under the ESA and to designate critical habitat concurrent with the listing. The petition asserts that *G. galeus* is threatened by four of the five ESA section 4(a)(1) factors: (1) present and threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial and recreational purposes; (3) inadequacy of existing regulatory mechanisms; and (4) other natural or manmade factors. In addition to requesting that we analyze whether the tope shark warrants listing based on its status throughout all or a significant portion of its range, the petition requests that we analyze whether any distinct population segments (DPS) of tope shark warrant listing. The petition also requests that, if we determine the tope shark or any DPSs of tope shark warrant listing as a threatened species, we promulgate a protective regulation under section 4(d) of the ESA, and requests that we promulgate a regulation under section 4(e) of the ESA for species similar in appearance to the tope shark.

On April 28, 2022, we published a 90-day finding announcing that the petition presented substantial scientific or commercial information indicating that the petitioned action may be warranted (87 FR 25209). We also announced the initiation of a status review of the species, as required by section 4(b)(3)(A) of the ESA, and requested information to inform the agency's decision on whether this species warrants listing as endangered or threatened under the ESA. In response to this request, we received six public comments which expressed general support for listing the tope shark under the ESA without providing any supporting information.

Section 4(b)(3)(B) of the ESA requires that within 12 months of receiving a petition that is found to present substantial scientific or commercial information indicating that the petitioned action may be warranted, the Secretary shall make a finding on whether the petitioned action is warranted. On June 24, 2025, the Petitioners filed a complaint seeking a court-ordered deadline for issuing the 12-month finding; and pursuant to a court-approved settlement agreement, NMFS was required to submit this finding to the **Federal Register** by April 15, 2026.

Listing Determinations Under the ESA

We are responsible for determining whether species under NMFS' jurisdiction are threatened or endangered under the ESA (16 U.S.C. 1531 *et seq.*). To make this determination, we first consider whether a group of organisms constitutes a "species," which is defined in section 3 of the ESA to include "any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature" (16 U.S.C. 1532(16)). On February 7, 1996, NMFS and the U.S. Fish and Wildlife Service (FWS; together, the Services) adopted a policy describing what constitutes a DPS of a taxonomic species ("DPS Policy," 61 FR 4722). The joint DPS Policy identifies two elements that must be considered when identifying a DPS: (1) the discreteness of the population segment in relation to the remainder of the taxon to which it belongs; and (2) the significance of the population segment to the remainder of the taxon to which it belongs.

Section 3 of the ESA defines an endangered species as any species which is in danger of extinction throughout all or a significant portion of its range and a threatened species as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (16 U.S.C. 1532(6), 16 U.S.C. 1532(20)). Thus, an "endangered species" is one that is presently in danger of extinction. A "threatened species," on the other hand, is not presently in danger of extinction, but is likely to become so in the foreseeable future (that is, at a later time).

Under section 4(a)(1) of the ESA, we must determine whether any species is endangered or threatened as a result of any one or a combination of any of the following factors: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence (16 U.S.C. 1533(a)(1); 50 C.F.R. 424.11(c)). We are also required to make listing determinations based solely on the best scientific and commercial data available, after conducting a review of the species' status and after taking into account efforts, if any, being made by any state or foreign nation (or subdivision thereof) to protect the species (16 U.S.C. 1533(b)(1)(A)). The status review (described in more detail below) and this determination are based on analyses and information that are fully consistent with the Gold Standard Science Executive Order (E.O. 14303) in that they are reproducible; transparent; communicative of error and uncertainty; collaborative and interdisciplinary; skeptical of findings and assumptions; structured for falsifiability of hypotheses; subject to unbiased peer review; accepting of negative results as positive outcomes; and without conflicts of interest.

Status Review

To determine whether the tope shark warrants listing under the ESA, a Status Review Report was completed (Manning, Rippe, and Lohe 2026), which summarizes information on the species' taxonomy, distribution, abundance, life history, ecology, and biology; identifies threats or stressors affecting the status of the species; and assesses the species' current and future extinction risk. We appointed three biologists in the Office of Protected Resources Endangered Species Conservation Division to compile and complete a scientific review of the best scientific and commercial data available on the tope shark. These biologists conducted an Extinction Risk Analysis to assess the threats affecting the tope shark, as well as demographic risk factors (abundance, productivity, spatial distribution, and diversity), using the information in the scientific review. The Status Review Report presents their assessment of the level of extinction risk facing the tope shark but makes no recommendation as to the listing status of the species.

The Status Review Report was subject to independent, unbiased peer review pursuant to the Office of Management and Budget Final Information Quality Bulletin for Peer Review (M-05-03; December 16, 2004). It was peer reviewed by seven independent specialists selected from the academic and scientific community with expertise in tope shark biology, conservation, or management. The peer reviewers were asked to evaluate the adequacy, appropriateness, and application of data used in the Status Review Report. All peer reviewer comments were addressed prior to finalizing the Status Review Report and publication of this finding.

We subsequently reviewed the Status Review Report, its cited references, and peer review comments, and concluded that it synthesizes the best available scientific and commercial information on the tope shark. In making our listing determinations, we have applied the statutory provisions of the ESA, including evaluation of the factors set forth in section 4(a)(1)(A)–(E), our regulations in 50 CFR 424 regarding listing determinations, and relevant policies identified herein.

The Status Review Report and the peer review report are available electronically (see **ADDRESSES**). Below is a summary of the information from the Status Review Report and our analysis of the status of the tope shark.

Biological Review

Taxonomy and Species Description

The tope shark, *G. galeus* (Linnaeus 1758), is a member of class Chondrichthyes, subclass Elasmobranchii (sharks and rays), order Carcharhiniformes (ground sharks), and family Triakidae (houndsharks) (ITIS and FishBase, accessed June 13, 2022). Once thought to each be distinct species, other nominal species, including *G. australis* (Macleay 1881), *Galeus canis* (Bonaparte 1841), *G. chilensis* (Pérez Canto 1886), *G. communis* (Owen 1853), *G. cyrano* (Whitley 1930), *G. linnei* (Malm 1877), *G. molinae* (Philippi 1887), *G. nilssoni* (Bonaparte 1846), *G. vitaminicu*s (de Buen 1950), *G. vulgaris* (Fleming 1828), *G. zyopterus* (Jordan and Gilbert 1883), are now considered synonyms of *G. galeus* (Compagno 1984; Fricke *et al*. 2022). Available genetic data for *G. galeus* provide evidence of strong population structuring by major geographic regions, but there is currently no evidence supporting the identification of any subspecies (Chabot and Allen 2009; Chabot 2015; Chiaramonte *et al*. 2016; Bester-van der Merwe *et al*. 2017).

Other common names for this species have origins in the species' appearance, behavior, or common uses. It is often called soupfin shark in the United States and South Africa (also "vaalhaai" in South Africa), school shark or snapper shark in Australia and New Zealand, "cazón" (dogfish), "tiburón vitamínico" (vitamin shark), or "tiburón trompa de cristal" (glass-snouted shark) in Argentina and Uruguay, "tiburón aceitoso" (oily shark) or "sulfin" in Mexico, "çãcao-bico-de-cristal" (glass-snouted shark) in Brazil, "tollo" in Peru and Chile, and "requin-hâ" in French-speaking countries of the NE Atlantic (Walker 1999; Chiaramonte *et al*. 2016; Walker *et al*. 2020).

The tope shark is a medium-sized shark, generally reaching lengths of about 183 centimeters (cm) (6 feet). Maximum reported lengths vary by region, and range from a maximum total length (TL) of 155 cm for the southwestern Atlantic (Peres and Vooren 1991) to 200 cm TL in the Mediterranean Sea (Tunisian coast; Capapé and Mellinger

1988). The body is slender and gray or grayish brown dorsally and whitish ventrally, and young have black markings on their fins (Olsen 1984; Compagno *et al*. 1989). The snout is long and pointed, with a wide, crescent-shaped mouth. The small, triangular shaped teeth are serrated on the outer edges (Olsen 1984; Compagno *et al*. 1989). The large and horizontally oval eyes are positioned low on the sides of the head and have a nictitating membrane (external in juveniles and internal in adults and subadults), and the nostrils are positioned closer to the mouth and upper lip than to the tip of the snout (Compagno 1984; Olsen 1984). The second dorsal and anal fins are of roughly the same height and located opposite of each other, just anterior to the caudal peduncle (Ripley 1946; Olsen 1984). The caudal fin is fairly short and notched, with a well-developed lower lobe that gives it somewhat of a double-tailed appearance (Olsen 1984).

Range, Distribution, and Habitat Use

Tope sharks occur in most of the world's oceans but have a discontinuous range that includes parts of the North and South Atlantic, North and South Pacific, Indian Ocean, and Mediterranean Sea (Compagno 1984; Walker *et al*. 2020). More specifically, in the NE Atlantic Ocean, they range from Iceland, Faroe Islands, Norway, United Kingdom, Ireland, throughout the Mediterranean, southward to Cabo Verde (Cape Verde) and Senegal. In the SW Atlantic, they range from southern Brazil to Argentina. In the Eastern South Atlantic and Western Indian Oceans, they range from Angola to South Africa. In the Western South Pacific, they range from southern Australia to New Zealand. In the Eastern North and South Pacific, they range from British Columbia, Canada, south along the Baja California Peninsula and Gulf of California, Mexico, and from Ecuador south to Peru and Chile. Following the advent of improved species identification and reporting for sharks in the Gulf of Alaska in 1997, at least one tope shark has been documented in the Gulf of Alaska, but their occurrence in this region is considered quite rare (King *et al*. 2017; Tribuzio *et al*. 2022). Within the Mediterranean Sea, tope sharks are known to occur mainly in western parts of the sea, but do extend farther, including rare occurrences in the Adriatic Sea (Tsagarakis *et al*. 2021). There are no records of tope sharks in the Sea of Marmara or the Black Sea (Colloca *et al*. 2019). Occurrence of tope sharks is questionable along western Africa, from roughly Gambia and Guinea-Bissau to the Democratic Republic of the Congo, as well as off Mozambique in southeastern Africa and off Laysan Island in the Northwestern Hawaiian Islands (Cadenat and Blanche 1981; Compagno 1984; Compagno *et al*. 2005; Walker *et al*. 2020; *https://www.fishbase.org*). Although observations of tope shark within intertropical western Africa are recorded in FishBase (*https://www.fishbase.org,* last accessed on February 23, 2026), it is possible these are misidentifications, as other researchers specifically report having no observations of tope sharks in this region, and there are no reported catches of tope sharks in the Food and Agriculture Organization (FAO) of the United Nations (UN) fishery database for this region (*https://www.fao.org/fishery/en/collection/capture*).

Tope sharks are semi-pelagic and occur in shallow coastal areas, in continental shelf and slope waters, and in oceanic waters (Compagno 1984; Walker 1999; Thorburn *et al*. 2019; Walker *et al*. 2020; Schaber *et al*. 2022). Distribution patterns and movements of tope sharks are complex and vary with multiple factors, including size, sex, habitat, and season. Immature tope sharks are typically found in coastal areas and in waters less than 200 meters (m) deep, with the smallest individuals (*e.g.*, < 40 cm) remaining in shallower, coastal areas and larger juveniles having more expanded distributions (Olsen 1954; Olsen 1984; Stevens and West 1997; McAllister *et al*. 2015; Thorburn *et al*. 2019). Adult tope sharks occur in continental and insular shelf and slope waters, but also use pelagic, open-ocean areas and have been tracked at depths up to 826 m (Ripley 1946; Olsen 1984; Thorburn *et al*. 2019; Schaber *et al*. 2022).

Tagging studies indicate that while tope sharks can undertake long-distance migrations, they also exhibit general fidelity to a region. In several tagging studies, most sharks returned to or remained within 500 kilometers (km) of where they were initially released, while some sharks were recaptured thousands of kilometers away (Holden and Horrod 1979; Stevens 1990; Hurst *et al*. 1999; Brown *et al*. 2000; Fitzmaurice *et al*. 2003; Thorburn *et al*. 2019). The average distance that tope sharks range increases with size and age of the sharks (Stevens and West 1997; Brown *et al*. 2000; Thorburn *et al*. 2019). Medium and large-sized females are often recaptured at farther distances on average than males of the same size class (Brown *et al*. 2000; Francis 2010; Thorburn *et al*. 2019; Cameron *et al*. 2025). However, several studies have found that some adult females travel similar distances as the adult males (Brown *et al*. 2000; Walker *et al*. 2000; Francis 2010; Thorburn *et al*. 2019). Some researchers have hypothesized that this pattern of "partial female migration" reflects, at least in part, the use of local pupping areas by some females and use of more distant pupping areas by others (McMillan *et al*. 2019; Thorburn *et al*. 2019). Additional data are needed to understand the extent to which adult females display diversity in their use of pupping areas.

Spatial segregation of adult male and female tope sharks has been reported from many parts of its range including Australia (Olsen 1954; Olsen 1984; Walker 1999), California (Ripley 1946; Nosal *et al*. 2021), Argentina (Lucifora *et al*. 2004), South Africa (Freer 1992), Ireland (Fitzmaurice *et al*. 2003, Cameron *et al*. 2025), Scotland (Stevens 1990, Little 1995), England (Holdon and Harrod 1979), and the Alboran Sea (Muñoz-Chápuli 1984), indicating this is a common behavior within the species.

Tope sharks exhibit various migratory patterns that are often generally described as involving migration towards the poles during warmer months and migration towards the equator or into deeper, offshore waters during colder months (de Buen 1952; Olsen 1954, 1984; Lucifora *et al*. 2004; Thorburn *et al*. 2019). For example, in the SW Atlantic, tope sharks are present in greatest abundance off the coast of southern Brazil from June through September and move southward to Argentina by austral summer, peaking in abundance in Puerto Quequén (around 38°32' S) from September to December, in Anegada Bay (around 40°30' S) from October to December, and gulfs further south (around 43° S) between January and April (Peres and Vooren 1991; Ferreira and Vooren 1991; Elías *et al*. 2005; Lucifora *et al*. 2004; Chiaramonte 2015; Klippel *et al*. 2016; Trobbiani *et al*. 2021). These seasonal movement patterns are thought to be driven by oceanographic conditions, particularly by the seasonal shift in the front between the warm, subtropical, Brazil Current and the cold, subantarctic Malvinas (Falkland) Current and the associated changes in water temperature (Klippel *et al*. 2016). A slightly different pattern occurs in the NE Atlantic, where tope sharks exhibit a cyclical seasonal movement pattern rather than north-south migration. Evidence from tagging and mark-recapture studies here show migration away from tagging sites and into deeper waters during winter and spring, and a return to coastal areas or areas close to (within about 50 km of) their original tagging site during summer and fall, consistent with the observed timing of mating in the region (Fitzmaurice *et al*. 2003; Thorburn *et al*. 2019).

Tope sharks also exhibit different patterns of vertical movement and use epipelagic (0–200 m depths) as well as mesopelagic habitats (200–1,000 m depths), depending on several factors including time of day and bathymetry (West and Stevens 2001; Thorburn *et al*. 2019; Gonzalez-Garcia *et al*. 2020; Schaber *et al*. 2022). The vertical movements observed in tope sharks may be related to feeding behavior, including searching for prey (Cuevas *et al*. 2014; Schaber *et al*. 2022).

During spring and summer, pregnant females are often observed in shallow, coastal areas typically to give birth (Olsen 1984; Ripley 1946). Repeated observations of neonates, immediately post-partum females and/or late-stage pregnant females have been used to confirm specific pupping and nursery areas in certain regions, although they have not been identified or fully resolved across the range. Within southeastern Australia, a number of bays and estuaries in Victoria and Tasmania have been identified as tope shark pupping and nursery areas, including the estuaries of Port Sorell, Pittwater, Georges Bay, and Great Oyster Bay in Tasmania, and Port Phillip Bay and Western Port Bay in Victoria (Olsen 1954, 1984; Steven and West 1997; Xiao *et al*. 1999) and potentially inshore areas of the Great Australian Bight (Prince 1996; Braccini *et al*. 2009; Rogers *et al*. 2017; M. N. McMillan unpublished, cited in McMillan *et al*. 2018). Stevens and West (1997) estimated that known pupping areas in southeastern Australia account for less than 10 percent of pup production needed to sustain the Australia tope shark stock, suggesting that other pupping areas exist. In New Zealand, pupping areas may be limited to coastal waters between the Hauraki Gulf and Kaipara Harbor along the North Island and between Oamaru and Jackson Bay along the South Island (Blackwell and Francis 2010; International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Shark Specialist Group 2024a,b). However, Fisheries New Zealand (2024b) reports that the geographic location of the most important pupping and nursery grounds in New Zealand is not known. Available evidence indicates that pupping occurs throughout the Northeast Atlantic including near mainland Portugal, the Canary Islands, the Azores, inshore waters of England, Wales, and Ireland, and in the southern North Sea (Muñoz-Chápuli 1984; J. R. Ellis pers. comm., cited in Walker 1999; Thorburn *et al*. 2019; Schaber *et al*. 2022; Das *et al*. 2025; Edwards *et al*. 2025; IUCN SSC Shark Specialist Group 2025a,b,c; Loughs Agency *n.d.*; National Museums Northern Ireland *n.d.*). It is unclear if pupping occurs within the Mediterranean (Capapé *et al*. 2005). In the SW Atlantic, pupping and nursery habitats are thought to be located in inshore waters of northern Argentina, and may include Bahía Blanca, Bahía de Samborombón, Bahía San Blas, Bahía Engaño and Golfo San Matías, as well as the Albardão region off Rio Grande do Sul, Brazil (G.E. Chiaramonte, pers. comm., cited in Walker 1999; Lucifora *et al*. 2004; Bovcon *et al*. 2018; IUCN SSC Shark Specialist Group 2025e). In South Africa, pupping has been reported to occur in the Gansbaai area and juvenile tope sharks have been caught in various embayments, including Struis, St. Helena, Walker, and False Bay, suggesting that these and/or nearby coastal areas may function as pupping or nursery grounds (Freer 1992; McCord 2005). Finally, in the NE Pacific, pupping areas include (or historically included) central California, the Santa Barbara coast, Tomales and San Francisco Bay, and potentially areas off Baja California Sur (Ripley 1946; Ramírez-Amaro *et al*. 2013; Nosal *et al*. 2021). No information is available on pupping or nursery areas in the SE Pacific.

Diet

Tope sharks prey on a wide range of demersal and pelagic fishes, as well as crustaceans, cephalopods, worms, and echinoderms (Compagno 1984). The diet of the species changes significantly with their development: juveniles consume more crustaceans and benthic invertebrates than adults, while adults consume a greater diversity of fishes and overall higher trophic level prey relative to juveniles (Lucifora *et al*. 2006; Taborda 2018; Poiesz *et al*. 2021; Priester *et al*. 2024). Differences in the diet of males and females have been observed in some studies, although this could be explained by habitat use and seasonality rather than diet preferences (Ripley 1946). Although data are limited, tope sharks appear to be somewhat selective rather than strictly opportunistic foragers (Lucifora *et al*. 2006; Biton-Porsmoguer 2022). Detailed information on prey species by region is available in section 2.5 of the Status Review Report.

Growth and Reproduction

Tope sharks are relatively long-lived, reaching a maximum age of at least 55 years (Coutin 1992; Walker *et al*. 2020). Because sharks lack the calcified structures (*e.g.*, otoliths) typically used to age teleosts (bony fishes), age and growth estimates are often produced by counting vertebral growth bands or by using time at liberty and differences in length measurements collected during mark-recapture studies (Cailliet and Goldman 2004; Cailliet 2015; Harry 2018). For tope sharks, counting growth bands is considered reliable for small and medium-sized individuals but is likely to underestimate the age of older, larger individuals (*i.e.*, ≥ 140 cm total length (TL) or ≥ ~11 years old) and therefore mark-recapture studies likely produce more accurate maximum age estimates (Moulton *et al*. 1992; Walker *et al*. 2001; Harry 2018). Studies relying on counts of vertebral bands have produced maximum age estimates on the order of 33 years for tope sharks off the coast of South Africa (Freer 1992; McCord 2005), 41 years for tope sharks off the coast of Brazil (Ferreira and Vooren 1991), and 50 years in Australia (Thomson *et al*. 2020). Studies using tag-recapture growth data have produced maximum age estimates ranging from 46–59 years for females (n = 37) and 43–55 years for males (n = 16) in the NE Atlantic (Dureuil and Worm 2015), and 55 years to possibly 60 years for tope sharks tagged off southern Australia (Olsen 1953, 1954; Walker 1999).

Tope sharks exhibit fairly slow overall growth rates. Available estimates of von Bertalanffy's growth coefficient (K) for tope sharks are 0.164 year^{-1} in Australia, 0.075 year^{-1} for females and 0.092 year^{-1} for males in Brazil, 0.124 year^{-1} in Australia, 0.086 year^{-1} for females and 0.154 year^{-1} for males in New Zealand, 0.190 year^{-1} in South Africa, and 0.076 year^{-1} for females and 0.081 year^{-1} for males in the NE Atlantic (Grant *et al*. 1979; Ferreira and Vooren 1991; Moulton et al 1992; Francis and Mulligan 1998; McCord 2005; Dureuil and Worm 2015). Higher growth coefficients for males suggests that they reach their maximum lengths faster than females. Individuals grow most quickly during the first several years, followed by steady growth up to age 7–11 years, slowed growth as they approach or reach maturity, and then an eventual plateau (Grant *et al*. 1979; Moulton *et al*. 1992; Francis and Mulligan 1998; Fitzmaurice *et al*. 2003; McCord 2005). Relative to females, male tope sharks reach maturity at smaller sizes and earlier ages, and attain slightly smaller maximum lengths and lower weights (Ripley 1946; Grant *et al*. 1979; Freer 1992; Lucifora *et al*. 2004; Capapé *et al*. 2005; Walker 2005). Maximum theoretical length ranges from 163–201 cm for females and

142–177 cm for males (Ferreira and Vooren 1991; Francis and Mulligan 1998; Dureuil and Worm 2015). Tope sharks have an estimated age at maturity ranging from about 10 to 15 years in females, and 6 to 17 years in males. Length at first maturity ranges from 118–150 cm in females and 107–135 cm in males. Tope sharks are therefore considered a late-maturing species. Additional information on age and growth parameters for the species can be found in Table 2-1 of the Status Review Report.

Tope sharks exhibit yolk sac viviparity, meaning that eggs are fertilized and hatched internally, young are born alive, and nourishment of the embryo comes from the egg rather than from a placental connection to the mother. Gestation is thought to last 12 months (Ripley 1946; Peres and Vooren 1991; Lucifora *et al*. 2004; Capapé *et al*. 2005); however, Theron (2001) and Walker (2005) suggest it may exceed 12 months. Data from multiple locations across the species' range, including Argentina, Brazil, southern Australia, South Africa, and California, provide evidence of a triennial (3-year) female reproductive cycle (Peres and Vooren 1991; Theron 2001; Lucifora *et al*. 2004; Walker 2005; Nosal *et al*. 2021). Males are thought to reproduce annually, and mating occurs seasonally within a local population (Peres and Vooren 1991; Freer 1992; Theron 2001). Females are capable of storing sperm for periods of weeks to months, and therefore mating may occur well in advance of fertilization (Peres and Vooren 1991; Theron 2001; Walker 2005). There is also evidence of multiple paternity (*i.e.*, multiple sires in the same litter) in tope sharks (Hernandez Muñoz 2013; Kelly *et al*. 2025). Female fecundity increases with the size of the adult female as evidenced by increased number of oocytes per female, number of embryos per female, and number of pups per litter in larger females (Ripley 1946; Olsen 1984; Peres and Vooren 1991; Lucifora *et al*. 2004; Capapé *et al*. 2005; Walker 2005; Chiaramonte 2015). Litter size can range from 4–52 pups, with average litter size ranging from about 23–35 pups of equal sex ratio measuring approximately 240–370 millimeters (mm) total length (TL) (Ripley 1946; Peres and Vooren 1991; Freer 1992; Walker 2005).

Demography

The natural mortality rate (M) for tope sharks, which theoretically accounts for predation and all other natural sources of mortality, such as senescence, has been estimated to be low ($M = 0.1006 \text{ year}^{-1}$) for tope sharks of mixed age in Australia (95 percent confidence range: 0.08–0.12, n = 500; Grant *et al.* 1979). This is equivalent to a survival rate (from natural death) of $e^{-0.1006} = 90.43$ percent year^{-1}. Estimates of natural mortality for tope sharks in other regions are also generally low: 0.123 year^{-1} in Australia, 0.26 year^{-1} in Australia, 0.126 year^{-1} in South Africa, and 0.094 year^{-1} in the NE Atlantic (Walker 1970 as cited in Walker 1999; Dow 1986 as cited in Walker 1999; McCord 2005; Dureuil 2013).

The intrinsic rate of population increase (r_{max}), which is a function of fecundity, age of maturity, longevity, and natural mortality rate, is fairly low for tope shark populations. Using life history data available through FishBase (*https://www.fishbase.org*), life history parameter estimation software available through FishLife 2.0 (Thorson *et al.* 2017; Thorson *et al.* 2023), and a Leslie-matrix approach, Winker *et al.* (2019) calculated an r_{max} value of 0.041 (CV = 0.154) for tope sharks. Using five different methodologies, Cortés (2016) calculated r_{max} values of 0.042–0.086 for tope sharks in the SW Atlantic and 0.047–0.169 for tope sharks in the SW Pacific. Smith *et al.* (1998) developed a model that uses female age at maturity, maximum reproductive age, and average fecundity to calculate a productivity metric referred to as the intrinsic rebound potential (IRP), which essentially estimates potential population growth rate after harvest mortality is removed. Using biological data collected for tope sharks in southern Australia and under an assumption of no increase in fecundity, Smith *et al.* (1998) calculated an IRP of 0.033 and a corresponding population doubling time of

21.3 years. Under an assumed 25 percent increase in fecundity (to account for increased survival of older, larger females), the IRP increased to 0.045 with an associated doubling time of 15.4 years (Smith *et al*. 1998). Across the 26 shark species considered in their comparative analysis, these authors found a wide range of rebound rates (*i.e.*, 0.017–0.202), with the tope shark among the species estimated to have a relatively low to moderate IRP (Smith *et al*. 1998).

Winker *et al*. (2019) estimated a median generation length of 23.1 years (CV = 0.066). Similarly, the most recent IUCN Red List assessment of tope shark applied a similar estimated generation length of 26.3 years (Walker *et al*. 2020), while the Australian Fisheries Management Agency (AFMA), in their rebuilding strategy for the species, uses an estimated generation length of 22 years (AFMA 2015).

Population Structure

Tagging and genetic data indicate that *G. galeus* is structured as at least six regional populations: 1) a NE Atlantic population that extends from the North Sea and UK waters into the Mediterranean Sea and southward to northwest Africa; 2) a So. Africa population that extends from Namibia to East London, South Africa; 3) a SW Atlantic population that ranges from southern Brazil to Patagonia; 4) a NE Pacific population that ranges from British Columbia, Canada to southern Baja California, Mexico, and including the Gulf of California; 5) a SE Pacific population that ranges from Ecuador to Chile; and 6) a SW Pacific population that includes Australia and New Zealand. No movement of tope sharks among these regions has been reported, and available genetic data indicate that gene flow among these six regional populations is limited (Ward and Gardiner 1997, Chabot and Allen 2009, Chabot 2015, Hernández *et al*. 2015, Bester-van der Merwe *et al*. 2017).

Current understanding of tope shark population structure is based largely on several studies that examined population genetics of tope sharks on broad geographic scales. Most recently, Bester-van der Merwe *et al*. (2017) investigated population structure of tope sharks by collecting and analyzing genetic samples from five countries: Argentina, Chile, South Africa, Australia (Tasmania), and New Zealand. Genetic variation was assessed based on both nuclear DNA (nDNA) (19 microsatellite markers, $n = 185$ samples) and mitochondrial DNA (mtDNA) ($n = 96$ samples). Similarly, a pair of studies by Chabot and Allen (2009) and Chabot (2015) used both microsatellites ($n = 11$ markers) and an mtDNA marker (1,068-base pair fragment in the control region) to investigate the population structure of tope sharks from multiple locations across the species range: South America (Peru, $n = 11$; Argentina, $n = 1$), South Africa (Cape Town, $n = 16$), Australia (GAB, New South Wales, and Tasmania, $n = 50$), North America (Southern California, $n = 26$), and the United Kingdom (Irish and Celtic Seas, $n = 12$). (Note: Chabot (2015) pooled their single sample from Argentina with the Peru samples into a collective South America population based on the observation of Chabot and Allen (2009) that it shared an identical mtDNA haplotype with two samples from Peru.) All three studies detected a high degree of genetic differentiation among the sampled regions (Bester-van der Merwe *et al*. 2017: $F_{CT} = 0.137$, $\Phi_{ST} = 0.895$, $p < 0.05$; Chabot and Allen 2009: $\Phi_{ST} = 0.84$, $p < 1 \times 10^{-6}$; Chabot 2015: $F_{CT} = 0.15$, $p < 0.001$). The results of pairwise comparisons between regions provide additional support for population structuring at a regional scale. For instance, pairwise comparisons by Bester-van der Merwe *et al*. (2017) using microsatellite data indicated significant but varying magnitudes of genetic differentiation between all sampled regions ($F_{ST} = 0.050$ to 0.330, $p < 0.05$), with the lowest observed differentiation occurring between Chile and New Zealand ($F_{ST} = 0.050$) and highest between Argentina and Australia ($F_{ST} = 0.330$). Similarly, pairwise comparisons by Chabot (2015) using microsatellite data and three different statistics (F_{ST}, G''_{ST}, and Jost's D) consistently indicated significant genetic differentiation between all sample regions. Pairwise comparisons by Chabot and Allen

(2009) using mtDNA also revealed significant differences ($\Phi_{ST} = 0.34–0.90$, $p < 1 \times 10^{-6}$) for all pairs, and, based on Φ_{ST} values, among-population differences accounted for 83.96 percent of the observed genetic variation. These researchers identified 38 unique haplotypes, 2 of which were shared between sampling regions. One, as noted earlier, was shared between Argentina and Peru, and the other was shared between South Africa and Australia. With the exception of Australia and New Zealand, all pairwise comparisons of mtDNA in Bester-van der Merwe *et al.*'s (2017) study also indicated significant and strong population structuring ($\Phi_{ST} = 0.151–0.934$, $p < 0.05$), with the lowest difference between Chile and Argentina ($\Phi_{ST} = 0.151$). Bester-van der Merwe *et al.* (2017) identified 15 unique haplotypes, one of which was shared between Chile and Argentina and one between Australia and New Zealand. The very low and non-significant measure of pairwise variation for the mtDNA marker between Australia and New Zealand ($\Phi_{ST} = -0.180$) reported by Bester-van der Merwe *et al.* (2017) is an exception to the otherwise consistent pattern of significant genetic differentiation among sampled regions. An earlier study by Hernández *et al.* (2015) also examined genetic samples from Australia and New Zealand using a different mtDNA marker, 8 microsatellite markers (versus 19), more sample locations within each country, and substantially more mtDNA samples and microsatellite samples than Bester-van der Merwe *et al.* (2017). Results of Hernández *et al.*'s (2015) study indicated that genetic differentiation between the Australia and New Zealand samples based on mtDNA was low and non-significant (after sequential Bonferroni correction, $\alpha = 0.0014$), and that the microsatellite variation was also low and non-significant ($p > 0.05$; Hernández *et al.* 2015).

Estimates of gene flow (in terms of migrants per generation) by Chabot and Allen (2009) among sampled locations were very low and ranged from 0.05 to 0.97. Estimates of gene flow by Chabot (2015) between sampled locations were also very low (0.002–0.013), with the exception of the migration rate from South into North America, which was higher than all others (0.257). However, the estimated migration between North and South America in this study was well below the estimated self-recruitment rates (0.692 and 0.988); and, as discussed earlier, the pairwise comparisons between North and South America based on mtDNA and microsatellites showed significant genetic differentiation (Chabot and Allen 2009; Chabot 2015).

Overall, and notwithstanding data gaps due to under- and non-sampled parts of the range, these studies indicate a regionally isolated population structure, with little to no contemporary connectivity between tope shark populations across ocean basins or the equator. Additional information about finer-scale population structure is available in section 2.8 in the Status Review Report (see also **Distinct Population Segment Analysis** section of this document).

Population Abundance and Trends

A global abundance estimate for tope sharks is not available; however, the most recent IUCN Red List assessment (Walker *et al*. 2020) provides a trend analysis for the species on a range-wide level as well as several regions. This analysis was based on the following data from five geographic locations and four of the six regional tope shark populations (the NE and SE Pacific populations were omitted): 1) standardized catch per unit effort (CPUE) data for the NE Atlantic from fisheries-independent trawl surveys and the Azorean bottom long-line fishery (International Council for the Exploration of the Sea (ICES) 2019); 2) nominal CPUE data from the demersal trawl fisheries in Argentina (G. Chiaramonte unpublished data 2019); (3) estimated biomass trends from a stock assessment for South Africa (Winker *et al*. 2019); (4) estimated biomass trends from a stock assessment for Australia (Thomson and Punt 2009); and (5) standardized CPUE from longline and gillnet surveys in New Zealand (Dunn and Bian 2018). The trend data from each source were analyzed over three generation lengths using a Bayesian state-space modeling tool specifically designed for use in IUCN Red List assessments for pelagic sharks, referred to as the ‘Just Another Red List Assessment’ (JARA) tool (see Sherley *et al*. 2020). This modeling tool was built off of the existing and open-source software referred to as ‘Just Another Bayesian Biomass Assessment’ (JABBA), which is an extension of a standard Surplus Production Model framework that incorporates a Bayesian approach to account for potential process (*i.e.*, model-based) and observation (*i.e.*, sampling-based) error (Winker *et al*. 2018). The JARA analysis yields an annual rate of change, a median percentage change over three generation lengths, and the probability of the most likely IUCN Red List Category.

Population trends were estimated using the JARA framework for each of the five datasets mentioned above, and those regional trend estimates were then used to estimate a global population trend, with regional trend data weighted by the size of the particular region in proportion to the species’ total distribution. This analysis estimated a median percentage decline of -76.6 percent, -99.3 percent, -91.4 percent, -90.1 percent, and -29.8 percent over three generations (79 years) for the NE Atlantic, SW Atlantic, So. Africa, Australia, and New Zealand populations, respectively, and a global decline of -88 percent (95 percent CI: -99.6 to -65.7 percent) (Walker *et al*. 2020, see Supplemental Information). However, the authors do note several important caveats. For example, to incorporate regions where the species is known to occur but where trend data were not available (*e.g.*, NE Pacific, SE Pacific), Walker *et al*. (2020) assumed that each missing regional population had declined by between 0 and 100 percent by randomly sampling from a uniform distribution, U(-100,0), and then combined this value (weighted by proportional area) with other regional estimates to calculate the global trend. Additionally, when datasets do not span three generation lengths, as was the case for all the regions in this analysis, JARA requires that trends be projected forward in time, effectively extrapolating beyond the available data and compounding the uncertainty in the estimated trends. For several regions (*i.e.*, NE Atlantic, SW Atlantic, and New

Zealand), these extrapolations represented approximately two-thirds of the time series used in the analysis. Overall, given the lack of long-term monitoring for this species, each regional trend estimate was necessarily derived from very limited information—sometimes just a single fishery-dependent CPUE series or assessment—which may not capture important underlying factors, such as stock structure, age and size composition, or regional differences in fishing practices (see also Kai 2021). Available information on abundance and trends by region is discussed below.

In some cases, stock assessments have been conducted on the regional tope shark population to evaluate the status of the stock for fisheries management purposes. Stock assessments often indicate the status of a stock using the terms "overfished" and "overfishing." Specific to the context of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), a stock or stock complex is considered "overfished" when its biomass has declined below minimum stock size threshold (MSST), defined as the level of biomass below which the capacity of the stock or stock complex to produce maximum sustainable yield (MSY) on a continuing basis has been jeopardized (50 CFR 600.310(e)(2)(i)(E)–(F)). Overfishing occurs whenever a stock or stock complex is subjected to a level of fishing mortality or total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis (50 CFR 600.310(e)(2)(i)(B)). While the stock assessments referenced in this finding do not define "overfished" and "overfishing" using the exact language above, they use the two terms with equivalent meanings. It is important to note that the terms "overfished" and "overfishing" do not have any specific relationship to the terms "threatened" or "endangered" as defined in the ESA. While a stock that is overfished is not able to sustain an exploitive fishery at MSY (*i.e.*, the highest possible annual catch that can be sustained over time), it can still be at a stable biomass level and thus not in danger of extinction due to overutilization. Similarly, one goal of the MSA (and fisheries management organizations) is to “rebuild” overfished stocks to biomass levels that will support MSY. This level can be significantly above the biomass levels necessary to ensure that a species is not in danger of extinction. Thus, evidence of declining abundance that threatens the ability of the fishery to provide MSY is relevant, but not dispositive of a threatened or endangered species determination. Therefore, while available information about whether specific stocks are overfished or experiencing overfishing is relevant to and considered in the ESA extinction risk analysis, the fact that a stock may be considered “overfished” or experiencing “overfishing” does not automatically indicate that any particular status is appropriate under the ESA. Stock assessments, which provide information for determining the sustainability of a fishery, are based on different criteria than status reviews conducted under the ESA, which provide information to assess the likelihood of extinction of the species. When conducting a status review under the ESA, we use relevant information from available stock assessments, such as levels of biomass and fishing mortality, and apply the ESA’s definitions of threatened and endangered species to the information in the record using NMFS’ standard tools of ESA extinction risk analysis. As part of the ESA extinction risk analysis, when examining whether overutilization for commercial purposes is a threat to the species, the status review considered whether the species has been or is being harvested at levels that contribute to or pose a risk of extinction to the species.

NE Atlantic

Quantitative data on abundance trends of *G. galeus* in the NE Atlantic region are limited. While several fishery-independent surveys are available from across the region, there are various design and sampling flaws or errors preventing us from drawing strong conclusions about population trends. Five research surveys coordinated by ICES and spanning 1992 to 2022 were considered by the ICES Working Group on Elasmobranch Fisheries (WGEF) in their 2023 review of the tope shark. Tope sharks are not sampled effectively in these surveys due to low gear selectivity, and therefore, trend analyses using these data should be “viewed with care” (ICES 2022). However, one of the five surveys, International Bottom Trawl Survey (IBTS)-Q1, had a low catch rate of tope sharks over the time period and was not subject to further analysis by WGEF (ICES 2023a), and a second of these surveys, IBTS-Q3, included some questionable data and species identification issues such that the WGEF concluded the dataset could not be relied upon until the data could be verified (ICES 2022). Two other trawl surveys considered by the WGEF are France’s “Evaluation Halieutiques Ouest de l’Europe” Groundfish Survey (EVHOE-WIBTS-Q4), which is conducted in the Bay of Biscay and Celtic Sea, and the Irish Groundfish Survey (IGFS-WIBTS-Q4), which is conducted in the shelf waters around Ireland (ICES 2023a). Neither dataset indicates a clear abundance trend: the data show sporadic peaks in annual catch generally related to a large number of specimens captured in single hauls (ICES 2023a). The fifth survey considered by the WGEF is the spring bottom longline survey of waters around the Azores archipelago (ARQDAÇO) that has been conducted almost annually since 1995. The survey is not particularly well-suited to capturing tope sharks, and both the biomass estimates and standardized abundance index derived from these survey data are highly variable over time and do not indicate a clear trend (ICES 2023a). Santos *et al*. (2020) analyzed ARQDAÇO survey data and compared them to commercial landings data, and reported that annual landings for tope sharks showed a decreasing trend from 1998/2000 to 2009, and then some rebound after this period. Santos *et al*. (2020) hypothesized that the relatively lower landings in the more recent years reflect an increased discard rate, which may have been driven in part by low market demand. This hypothesis receives some support from their finding that the standardized CPUE for tope sharks in the fisheries data is fairly stable over time. The authors cautioned that neither the abundance index nor the CPUE data should be interpreted as an accurate proxy for tope shark abundance in the region due to the low and variable catch rates of tope sharks and likely changes in discard rates in the longline fisheries.

As part of the most recent IUCN Red List assessment of tope sharks, Walker *et al*. (2020) assessed trends for the entire NE Atlantic regional population of tope sharks using three datasets: the Bay of Biscay and Celtic Sea trawl surveys (*i.e.*, EHVOE-WIBTS-Q4) from 1997–2016; the Irish Ground Fish Survey (*i.e.*, IGFS-WIBTS-Q4) from 2005–2018, and the Azorean bottom long-line fishery landings during 1990–2015 (see Walker *et al*. 2020, Supplementary Information). Results of the JARA analysis using these three datasets indicate an annual rate of reduction of 1.7 percent for the combined 29 years of survey data (1990–2018) and projected an estimated median reduction of 76.6 percent over the next three generations (79 years). Walker *et al*. (2020) noted that this trend was largely driven by the higher catch rates occurring at the start of the time-series, with data from the latter part of the time-series indicating more stable trends. The authors also reiterated the concerns raised by the WGEF that the various datasets for the NE Atlantic may not be representative of the population due to low catchability of tope sharks in the surveys and gears used and therefore cautioned how the data were interpreted. In addition, the 95 percent credible intervals on the model-predicted population trend are wide and skewed upwards over the forecasted three generations. Lastly, it is also worth noting that the more recent years (*i.e.*, since 2018) of trawl survey data from EHVOE-WIBTS-Q4 (Bay of Biscay and Celtic Sea) in which CPUE and biomass estimates show some increases are not captured in this analysis as these data were likely not available at the time.

Beyond these available survey data, additional, reliable quantitative data regarding tope shark abundance trends in the North Atlantic Ocean are very limited. Some data, however, are available from the Irish Marine Sportfish Tagging Program, which between 1970 and 2015, recorded 448 recaptures of 7,641 tagged tope sharks

(ICES 2020). Using Jolly-Seber mark-recapture modeling, the WGEF reported that these data indicate a stable population trend around Ireland between 1970 and 2015 (ICES 2020).

Within the Mediterranean and Black Seas, fishery-independent survey data are available from the Mediterranean International Trawl Survey (MEDITS), an international survey effort formalized in 1993 by Spain, France, Italy and Greece, and expanded in 1996 to include Albania, Croatia and Slovenia. These standardized bottom-trawl surveys have been conducted since 1994 throughout 19 subregions along the northern margin of the Mediterranean basin. Encounters with tope sharks are generally infrequent, varying by geographical subarea (GSA) (Relini *et al*. 2010; Marongiu *et al*. 2017, Ramírez-Amaro 2017; Geraci *et al*. 2017; Follesa *et al*. 2019). Ramírez-Amaro (2020) provided MEDITS summary data for 199 hauls completed during 1994–2015 in the western Mediterranean, specifically the northern Alboran Sea (GSA 1), northeastern coast of Spain (GSA 5), and Balearic Islands (GSA 6). A total of 38 tope sharks were captured across 13 of the 22 survey years in the Alboran Sea (GSA 1); no tope sharks were captured in GSA 5 or GSA 6. Previously, Muñoz-Chápuli (1984) had reported that, in 1981, in 95 commercial longline sets and 81 commercial trawls in the western Alboran Sea, a total of 34 male and 3 female tope sharks were recorded as captured off the southern coast of Spain, and 9 males and 2 females were recorded as being captured off the coast of northern Morocco. At the time of their study, Muñoz-Chápuli (1984) also described *G. galeus* as a species that was very often caught by hook-and-line gear. Although the differences in gear types and fishing effort prevent a direct comparison of the MEDITS data to the data provided by Muñoz-Chápuli (1984), the apparent decline in captures of tope shark between these two datasets may indicate an abundance decline in the Alboran Sea area.

No tope sharks were observed in the MEDITS trawl surveys conducted around Sardinia (GSA 11) from 1994 to 2015 (Marongiu *et al*. 2017, Ramírez-Amaro 2017). Tope sharks were also not observed in MEDITS surveys conducted from 1994 to 2009 in the northern Tyrrhenian Sea (GSA 9), south of Sicily (GSA 16), in the Adriatic Sea (GSA 17, 18), or in the western Ionian Sea (GSA 19) (Relini *et al*. 2010). Two individuals were captured in the southern Tyrrhenian Sea (GSA 10) during this period—one in 1995 and one in 2001 (Relini *et al*. 2010). Follesa *et al*. (2019) provided MEDITS data for the period 2012–2015 for GSA 1, 5–11, 16–20, 22, 23, and 25. Tope sharks were captured only in GSA 16 (south of Sicily) during this period, but at very low frequency (0.5 percent of hauls in 200–800 m depth strata). No tope sharks were observed in MEDITS surveys in GSA 16 from 1994 to 2012 (Geraci *et al*. 2017).

Additional information on the general distribution and abundance of tope sharks comes from an international, standardized assessment of shark bycatch rates in commercial swordfish and tuna longline fisheries across nine regions of the Mediterranean Sea conducted during 1998–1999. Tope sharks were captured in 6 of the 9 regions, with highest catches occurring in the 3 westernmost regions: the Alboran Sea (n = 10 sharks / 1,391 longline sets), the Balearic Islands (n = 4 sharks / 1,379 longline sets), and the Catalan region (n = 2 sharks / 331 longline sets) (Megalofonou *et al*. 2005). A single tope shark was also reported in each of 3 other regions where reported fishing effort was much lower: the Straits of Sicily, the Aegean Sea, and the Levantine basin (32, 141, and 218 longline sets, respectively). Catch rates (expressed as number of fish/1,000 hooks) were low across all areas, with the highest catch rates occurring in the Levantine basin (0.143) and Aegean Sea (0.057). The species was not observed in the Adriatic Sea (777 longline sets), the Ionian Sea (833 longline sets), or the Tyrrhenian Sea (9 longline sets) (Megalofonou *et al*. 2005). Authors note that this may indicate low or depressed abundances and/or low capture efficiency of the gear used (Megalofonou *et al*. 2005).

The above data contrasts with landings of tope sharks reported to International Commission on the Conservation of Atlantic Tunas (ICCAT) by Türkiye averaging 565 metric tons (mt) per year (ranging from 413 mt to 668 mt) from 2004 to 2009 in their shark longline fishery (*https://www.iccat.int/en/accesingdb.html*, accessed on June 27, 2024). The large difference between the ICCAT data and the tope shark landings reported by Megalofonou *et al*. (2005) may be explained by the fact that the catches reported to ICCAT by Türkiye came from the longline fishery specifically targeting sharks. No tope shark landings, which are reported voluntarily, were reported by Türkiye after 2009. We also note that no tope shark landings data for Türkiye are included in available FAO data (*https://www.fao.org/fishery/statistics-query/en/capture*), which creates significant uncertainty regarding the reliability of the available data. The only other Mediterranean landings data in the ICCAT database are for France, which reported landing 5 mt by trawl in 2010, and Morocco, which reported landing 6 mt in 2011, 2 mt in 2012, and 4 mt in 2013 by handline, longline, and purse seine.

Some available evidence suggests a decline in tope shark abundance within the western Mediterranean. In 2016–2017, a group of 42 bottom trawl, bottom longline, and drifting longline fishermen who were interviewed in Costa Brava, Spain (coastal Catalan region) generally considered tope shark populations to be declining locally, although the statistical distribution of answers was not significantly different than that expected by chance (Nuez *et al*. 2021). Around this same time period, in 2015, the government of the Balearic Islands classified the species as “critically endangered” in local waters using the IUCN Red List criteria, stating that it had “gone from being frequent in shops and markets to being rare, with a sharp decrease in catches” (Grau *et al*. 2015). The critically endangered classification is described as being based on direct observations and actual or potential exploitation levels indicating a reduction in biomass of at least 80 percent in the last ten years or in three generations of the species, and that the reduction and its causes had not ceased, or are not understood, or are not reversible (Grau *et al*. 2015). It is not clear, however, what data were used in support of the observed decline. Additionally, a historical abundance decline in the northern Tyrrhenian Sea over the years 1898–1922 is indicated by Ferretti *et al*. (2005)'s analysis of commercial landings data for fish "traps" targeting Atlantic bluefin tuna: large declines (> 90 percent) were observed for all sharks species over this 25-year period, with tope sharks estimated to have declined by 99.97 percent (95 percent CI: over 99.99 percent to 99.38 percent). While Ferretti *et al*. (2005) do not discuss taxonomic or reporting issues for tope sharks in the data, given the documented issues with species-specific landings records in this region, confidence in the historical landings records used in the study is somewhat limited.

G. galeus is also known to occur along the coast of Algeria and Tunisia, in some cases arriving after long-distance migrations from the North Atlantic (Holden and Horrod 1979, Fitzmaurice *et al*. 2003). Capapé *et al*. (2005) noted that, at the time of their study, tope sharks were the most "abundantly and regularly" landed shark species off the coast of Algeria, and that tope sharks were also being captured off the coast of Tunisia, where it was later referred to as "quite common" by Ragonese *et al*. (2013). Likewise, Bradaï *et al*. (2006) described the Gulf of Gabès as an area where tope sharks are "regularly observed." As part of a population genetics study, Thorburn (2015) was able to acquire 28 samples of *G. galeus* from sport fishers and fish markets along the Algerian coast in 2009–2013, indicating that the species was still encountered in local waters at that time. We are not aware of any additional data or surveys that have been conducted along the southern margin of the Mediterranean Sea that would aid in characterizing the species' relative abundance or abundance trends.

In a relatively recent review of published literature and existing databases, tope sharks were categorized as rare in the western, central, and eastern Mediterranean and Adriatic Sea, and as having a declining probability of occurrence (Serena *et al*. 2020).

This study involved a comprehensive review of available data and reports for both European Union (EU) and non-EU countries bordering the Mediterranean, and examined both fisheries-independent data (*e.g.*, MEDITS) and landings data from industrial and small-scale fisheries. When considered collectively, this recent review, and other evidence (*e.g.*, Ferretti *et al*. 2005) suggest that tope sharks may have undergone a substantial decline in abundance within the Mediterranean.

No assessments of abundance trends are available for the eastern central Atlantic.

In sum, population trends and abundance of tope sharks within the NE Atlantic region remain poorly understood. Quantitative assessments of tope shark abundance in the NE Atlantic region suffer from various design and sampling flaws or errors, preventing us from drawing strong conclusions about population trends. Overall, however, data from the individual systematic surveys of the North Sea, Celtic Seas, English Channel, and Biscay Bay do not indicate that the NE Atlantic tope shark population has changed significantly over the respective data collection periods. Systematic surveys around the Azores also provide no evidence of a decline in abundance of tope sharks. Tope sharks are relatively rare in the Mediterranean, and available evidence suggests a large historical decline in abundance in this subregion. While the most recent IUCN assessment (*i.e.*, Walker *et al*. 2020) projects a declining trend overall for tope sharks in the NE Atlantic, the high level of uncertainty associated with this projection weakens confidence in this result.

So. Africa

There are two main studies that characterize *G. galeus* population abundance and trends in the So. Africa region. Both studies are focused on the waters around South Africa, which is the core of the species' distribution here. First, Best *et al*. (2013) compiled landings and observation data from a wide array of sources to assess the status and long-term population trends of the major chondrichthyan species in False Bay, as well as their vulnerability to extinction. The data sources included historical trawl and beach-seine scientific surveys, commercial trawl, demersal shark longline, linefish, and beach-seine catch returns, recreational shore-angling records, underwater observations, spearfishing competition records, and rotenone surveys. These datasets cover various time periods that collectively span 1897 to 2011, and the authors note that the quality and quantity of the data varied considerably, preventing them from using a consistent protocol to analyze the datasets together. Of the 37 chondrichthyan species documented in the combined dataset, *G. galeus* was the most commonly encountered species, with over twice as many records as the second-most commonly recorded species, *M. mustelus* (Best *et al*. 2013). It was also the only species for which multiple data sources consistently indicated a statistically significant decline in abundance based on rank correlation analysis. This analysis used CPUE estimates based on catch and effort data from the commercial beach seine, recreational shore-angling, and demersal longline datasets, which collectively spanned the years 1969 to 2011. However, it is important to note that the recreational shore-angling fishery began on the eastern and western shores of the bay, which are adjacent to the deeper-water habitats where tope sharks may be found, but has since moved to shallower, more accessible sandy beach areas, where tope sharks do not typically reside. Thus, the declining trend in *G. galeus* CPUE based on the recreational shore-angling dataset may in part be attributable to this evolution of the fishery.

More recently, Winker *et al*. (2019) also used a combination of datasets, including fisheries catch data and fishery-independent survey data, to estimate the population trend and stock status for tope sharks throughout South African waters more broadly. Using JARA, an abundance trend for tope sharks was estimated based on a fishery-independent demersal trawl survey conducted along the south coast of South Africa roughly every autumn and spring from 1991 to 2016. Tope shark abundance was found to have steadily declined at an average rate of approximately -2.7 percent per year from 1991 to 2016, yielding an estimated population decline of -50.9 percent over the full survey period (Winker *et al*. 2019). Winker *et al*. (2019) then used this procedure to project the population trend over three generation lengths (~69 years, based on an estimated generation length of 23.1 years) beginning in 1991. This analysis predicted a total population decline of -85.1 percent by the year 2060, compared to 1991, though the 95 percent confidence interval around this estimate is very wide, spanning a range of possibility that includes a stable population trend and even slight population growth (Winker *et al*. 2019).

In addition to estimating the abundance trend from the demersal trawl survey, Winker *et al*. (2019) also evaluated the status of the *G. galeus* fishery stock in South Africa relative to estimated harvest levels using the JABBA modeling procedure. Inputs to this analysis included the abundance index derived for the JARA analysis described above and an aggregated time series using data from the aforementioned demersal trawl survey (1992–2016), commercial linefish catch reported in South Africa's National Marine Linefish System (NMLS) database (1990–2016), catch data from the Department of Agriculture, Forestry, and Fisheries demersal shark longline database (1992–2016), and historical catch reconstructed from shark dealer sales in Gansbaai (described as the center of the South African shark fishery in the 1950s) (1952–1989). It is worth noting that the authors relied on several assumptions to address various uncertainties in these datasets, and these may have influenced the results of the analysis to some degree. For the demersal trawl and linefish datasets, for example, a portion of the shark catch was not reported to the species level. In order to include this portion of the catch in their analysis, the authors used two slightly different approaches to estimate the proportion of *G. galeus* in the unidentified portion of the two datasets. Each applied a conversion function that was based on the proportion of *G. galeus* observed in the species-specific portion of the shark catch. Additionally, for the linefish dataset, to estimate the historical catch before the beginning of official reporting to South Africa's NMLS database (*i.e.*, before 1990), the authors relied on shark dealer sales from the Gansbaai fishing port, which they scaled up by a factor of 1.54 to account for catches from other regions. This value was based on the ratio of total catch reported in Gansbaai compared to total catch in the NMLS database in the year 1987. It is not clear how potential inaccuracies in these assumptions may have affected the downstream modeling results, so the conclusions of this analysis should be interpreted with caution. Commercial catch of *G. galeus* was found to have declined substantially from 1952 to 2016, corresponding to a predicted decline in population biomass that largely matched the results of the JARA analysis. Model estimates from four modeling scenarios indicated that biomass of the *G. galeus* population in South Africa has declined from approximately 93–94 percent of carrying capacity in 1952 to 10–14 percent of carrying capacity in 2016, and that there is a greater than 97.5 percent likelihood that if catch of *G. galeus* continues at its catch rate at the time (~329 mt per year), commercial extinction of the species in South Africa (*i.e.*, when biomass reaches a point where fishing the species is not commercially viable) would occur by 2055 (Winker *et al*. 2019). According to Winker *et al*. (2019), the harvest rate must be reduced to less than 100 mt per year in order to reverse the declining trend and allow for positive population growth.

We did not find any information on population abundance or trends from other parts of the region outside of South Africa, such as along the southwestern African coast where the species is also thought to occur.

In sum, the best available information indicates that abundance of *G. galeus* has declined significantly in South Africa, which is the core of its distribution in this region, since the mid-20th century. An analysis of multiple fisheries datasets (*e.g.*, recreational angling, demersal longline, and beach seine fisheries) indicates that *G. galeus* was the most commonly encountered chondrichthyan species in the region from 1969 to 2011, but underwent a "dramatic and consistent" population decline (Best *et al*. 2013). This decline was attributed to the species' long history of commercial exploitation in the region, exacerbated by its low biological resilience to such exploitation (Best *et al*. 2013). A broader analysis using several, novel modeling approaches, indicates that *G. galeus* has likely experienced unsustainable fishing pressure since at least the 1950s and that current population biomass is estimated to be less than 15 percent of the population's carrying capacity (Winker *et al*. 2019). Model projections suggest that fishing pressure must be significantly reduced (by over 60 percent) for the species to begin to rebound. Together, these studies indicate a major long-term reduction in *G. galeus* abundance in So. Africa caused by past and ongoing fishing pressure.

SW Atlantic

There have not been any formal assessments of tope shark abundance in the SW Atlantic region. However, several fisheries-derived CPUE datasets, anecdotal accounts from regional experts, and reported changes in local fishing strategies indicate, in aggregate, that the tope shark population in the SW Atlantic has declined significantly since the peak of fishing effort in the 1980s and 1990s.

A 24-year CPUE dataset from the demersal trawling fleet in Argentina provides some indication of the *G. galeus* population trend from 1992 to 2015 (Chiaramonte unpublished 2019, cited in Walker *et al.* 2020). Based on this relative abundance index, tope shark abundance declined significantly from 1992 to 2000 and remained at this reduced level until the end of the dataset (Walker *et al*. 2020). Using JARA, Walker *et al*. (2020) estimated an annual rate of population reduction of -5.9 percent, consistent with an estimated median reduction of -99.3 percent over three generation lengths (79 years). It is worth highlighting that CPUE in this study was calculated in terms of kilogram (kg) per trip, so the dataset does not account for variations in fishing effort between trips.

Lucifora (2003) designed a matrix-based population model to describe the baseline demographics of tope sharks in the Bahía Anegada region in Buenos Aires Province, Argentina. The model was also used to simulate population trends under several hypothetical scenarios based on existing fishing conditions at the time and potential alternative scenarios. Lucifora (2003) found that the predicted population trend was negative for all scenarios that simulated the possible fishing conditions at the time. The scenario that best represented the existing conditions in Bahía Anegada based on the author's knowledge of the fishery (*i.e.*, fishing for both adults and large juveniles) yielded a projected rate of population decline between -6.7 and -12.8 percent annually. Notably, this model-based estimate roughly reflects the average rate of population decline derived from the 24-year CPUE dataset discussed above (-5.9 percent; Walker *et al*. 2020).

Chiaramonte (1998) provided an estimate of CPUE from the tope shark gillnet fishery in Necochea from 1990 to 1996, which the author described as "the most important directed shark fishery in the South-West Atlantic." CPUE fluctuated significantly during this period without any discernible trend. Moreover, the author noted that changes to certain features of the fishery during the study period, such as to the gear and fishing effort, limit the reliability of this CPUE estimate as an indicator of tope shark abundance (Chiaramonte 1998).

A study by Villwock de Miranda and Vooren (2003) estimated CPUE in Brazil's Rio Grande do Sul fishery in the period 1975–1997, basing their estimates on the associated number of fishing trips for each of the main gear types in which *G. galeus* is captured. While the study differentiated landings by broad categories of sharks rather than by species, varying seasonality of landings from each of the five gear types was used as a reasonable indication of the species that are likely represented by the CPUE estimates for each fishery. For example, the authors note that until 1988, the majority of "cação" landings came from the simple trawl fishery, of which approximately 81 percent was caught during the winter months from May to October. Given the winter residency of *G. galeus* and *M. schmitti* in this region, the authors assumed that simple trawl CPUE estimates generally reflected the combined abundance of these two species. Overall, CPUE estimates of both the simple and pair trawl fisheries show a similar pattern of severe decline following a peak in landings in the mid-1980s. Simple trawl CPUE increased from 1975 to 1987, which the authors interpreted as reflecting a shift in the fishery from targeting primarily *G. galeus* in earlier years to increasingly retaining *M. schmitti* as well. In the ensuing years, simple trawl CPUE declined dramatically and from 1992 to 1997 averaged approximately 20 percent of its peak level in 1985–1987. As oceanic bottom gillnets gradually replaced trawls as the principal gear type for capturing "cação" in the early 1990s, oceanic gillnet CPUE estimates were nearly ten times greater than those of the simple trawl fishery. However, Villwock de Miranda and Vooren (2003) cautioned that the two datasets were not directly comparable, because the oceanic gillnet fishery specifically targeted "cações," operated in areas inaccessible to trawls, and used more effective gear than trawling—extensive nets whose effort was not captured by the simplified count of vessel trips. CPUE increased during the 5 years in which oceanic gillnet CPUE estimates were available (1993–1997), contradicting the trend in simple trawl CPUE. However, because the index of fishing effort used in this study (*i.e.*, vessel trips) does not account for possible changes in the length, duration, or mesh size of gillnets deployed, it is uncertain to what extent oceanic gillnet CPUE accurately reflects the abundance of *G. galeus* and *M. schmitti*. It is perhaps more notable that CPUE estimates of both the simple and pair trawl fisheries, while likely representing different shark species, show a similar pattern of severe decline following a peak in landings in the mid-1980s. These datasets suggest a broader collapse of elasmobranch fisheries in southern Brazil during this time.

There are also several anecdotal reports of fishery collapse and changes in fishermen behavior to adapt to the declining populations (Chiaramonte 1998; Barbini *et al*. 2015; Irigoyen and Trobbiani 2016). For example, Chiaramonte (1998) noted that in the late 1990s, Necochea-based trawlers were forced to set gillnets further from the coast due to declining yields near shore. The fishermen allegedly attributed this to a movement of the tope shark population away from shore, but the author suggested that it was more likely an indication of declining abundance (Chiaramonte (1998)).

Taken together, the data described above show a generally consistent pattern of tope shark population decline in the 1990s resulting from intensive historical fisheries in the region. The best scientific and commercial information available provide no indication that the population has rebounded since falling to its lowest levels on record in the 1990s and early 2000s.

NE Pacific

Based on catch data in California from 1938 to 1944 (Ripley 1946), Holden (1977) roughly estimated an unexploited population size for the tope shark of 29,600 tons (~26,853 mt) (6.7×10^5 mature females). However, following the intensive fishery for *G. galeus* in the 1940s and 1950s, there appear to have been no other estimates of population size that could be compared to this baseline. Similar to other regions, we must instead rely on various qualitative accounts of the fishery, as well as sporadic catch data from fishery-independent and fishery-dependent sources gathered in the decades since to estimate relative population trends.

As fishing pressure rapidly intensified in the late 1930s and 1940s, sufficient resources were not available to quickly establish a system of fishing logs or thoroughly conduct interviews with the fishers at landing sites (Ripley 1946). However, available accounts from the time identified early signs of population depletion based on observations of the underlying fishery dynamics. Following the peak of the fishery in

1938–1939, when total shark landings in California ballooned by over tenfold to more than 4,000 mt per year, Ripley (1946) observed that landings began to decrease significantly despite increasing fishing effort. Comparing the December, January, and February landings of tope shark livers at the port of Seattle from 1943 to 1944, the FWS noted a 63 percent, 20 percent, and 70 percent decrease, respectively, despite observing that “fishermen had intensified their efforts and were using more gear” (FWS, April 10, 1944).

Ripley (1946) provided quantitative estimates of the tope shark population trend in this region based on CPUE in the gillnet fishery. Effort data was based on interviews with gillnet fishers in four regions spanning the coast of California and consisted of boat records from 489 fishing trips between 1942 and 1945. Dividing into the total number of tope sharks caught yielded a rough estimate of the average number of sharks taken by 1,000 fathoms (~1.8 km) of net fished for 20 hours. The data show a declining trend in CPUE for all four ports, which is particularly evident in Eureka (northern California), where data were collected for all 4 years. Ripley (1946) warned of several limitations with the data, including the relatively small sample size and inconsistency in the timing of the interviews with respect to the seasonal peak of the fishery (see also Roedel and Ripley 1950). However, he found “little doubt” that fishing success had declined from 1942–1943 to 1944–1945 and suggested that the trend observed in Eureka was likely representative of the tope shark population along the entire California coast (Ripley 1946).

Two years later, Barraclough (1948) reported a similar trend in British Columbia, with landings of tope shark livers rapidly declining from a peak of 27.9 mt in 1944 to 4.1 mt in 1946, concurrent with marked declines in two rough estimates of CPUE: (1) the average monthly catch of tope shark livers per boat, and (2) the average monthly catch per fishing trip per boat. Data were collected from the sunken gillnet fishery in Hecate Strait, and both metrics indicated a sharp decline from 1943 to 1946.

Landings continued to decline through the end of the 1940s, largely due to reduced fishing yields from the depleted tope shark population, but also in part due to the re-opening of international markets for other vitamin-bearing fish oils after the end of World War II, as well as the development of synthetic vitamin A alternatives, which substantially lowered demand (Roedel and Ripley 1950). As the fishery tailed off, species-specific data collection for *G. galeus* was largely discontinued. The State of California returned to the practice of reporting shark landings in aggregate until 1978, and while there are sporadic landings data for *G. galeus* in Oregon and Washington in the 1950s and 1960s (NMFS Office of Science and Technology), there is no information on fishing effort to accurately assess the species' relative abundance during this period.

Beginning in the late 1970s and 1980s, various Federal, State, and international monitoring programs were established to more thoroughly assess NE Pacific fisheries. Several of the resulting datasets include *G. galeus* catch statistics, which can be used to estimate more recent population trends. The West Coast Groundfish Bottom Trawl Survey began in 1977 and was streamlined in 2003 to conduct surveys annually from May to October along the U.S. West Coast. Generally, tope shark encounters in this survey have been quite rare, with eight being the most individuals recorded in a single year. The species is most commonly encountered in central California. There is some indication that catch rate increased briefly in this region in 2016–2018; however, after a suspension of the survey in 2019 and 2020, catch rate returned to relatively low levels in 2021–2023.

The International Pacific Halibut Commission (IPHC) conducts a Fisheries-Independent Setline Survey (FISS) to monitor halibut stocks in the NE Pacific. The FISS is conducted annually from May to September using bottom-set longline gear and covers a random subset of 1,890 sampling stations ranging primarily from northern California to the Bering Sea. The survey includes bycatch data starting in 1998 collected using two different sampling protocols: vessels counting bycatch for the whole longline haul and vessels counting bycatch on only the first 20 hooks of each 100-hook skate. Both subsets of data show tope shark CPUE to be highly variable over time. To assess population trend, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) applied a pair of generalized linear models (GLM) to each portion of the data. They found that the mean number of tope sharks caught per sampling station did not change from 1998 to 2002 but then increased significantly from 2003 to 2018 (COSEWIC 2021). They also highlighted that tope shark observations have particularly increased in the waters east of Haida Gwaii, British Columbia. According to COSEWIC, the species was not recorded in this area between 1996 and 2005, despite substantial fishing effort (7,243 hours of trawl and 1,632 sets with hook and line gear) (COSEWIC 2021). However, since 2005, 295 tope sharks have been recorded by the FISS in this area. This is notable, as the area was heavily fished during the peak of the Canadian tope shark fishery in the 1940s, suggesting that population abundance in this region was once quite high (Barraclough 1948).

To expand the COSEWIC modeling analysis and incorporate the years since 2018, we applied a similar approach to assess population trend but modified the model framework in a few ways. For detailed information on model inputs, please see the Status Review Report. Model predictions indicate that population abundance has generally increased over the study period. The positive trend is consistent regardless of the method of model prediction. Moreover, the population trend varies according to latitude, corroborating the earlier observation by COSEWIC (2021). By plotting the modeled trend against Latitude along the x-axis, it is clear that the population trend is significantly greater at higher latitudes. There is also some indication that the population may be slightly declining in the middle of the survey distribution (~45°N). COSEWIC (2021) suggested that the disproportionate increase in British Columbia might reflect a northward movement of the population in response to warming waters. However, the history of this area as a prime fishing ground for tope sharks in the 1940s suggests that the species once occupied the area in great numbers. Therefore, we find it equally possible that the increase in CPUE is indicative of population growth.

Since 2002, tope sharks have also been recorded as a bycatch species in two fisheries observer programs that are jointly administered by NMFS and the Pacific States Marine Fisheries Commission. The West Coast Groundfish Observer Program (WCGOP) monitors at-sea bycatch discard rates for many of the commercial groundfish fishery sectors along the U.S. West Coast, including the Federally-managed limited-entry trawl fishery, several State-managed trawl fisheries, as well as various nearshore and pelagic fixed gear fisheries (*e.g.*, longlines, hand lines, fish pots/traps) (see Northwest Fisheries Science Center (NWFSC) 2024a for more information). The At-Sea Hake Observer Program (A-SHOP) monitors discard rates for the three components of the at-sea midwater trawl fishery targeting Pacific hake (whiting): the Mothership, Catcher-Processor, and Tribal sectors (see NWFSC (2024b) for more information). Both datasets provide limited insight into tope shark population trends, as discards are sporadic for most gear types. However, there is some indication in the bottom and midwater trawl fisheries, where tope sharks are most commonly encountered, that discard rate has generally increased since 2015 following a low period in the early 2010s. The trend is particularly apparent in the at-sea Pacific hake fishery north of 46.25°N (*i.e.*, waters off the coast of Washington). The WCGOP also records landings statistics for bycatch species, which combined with observed discards provides a rough estimate of total catch rate since 2002. Here, CPUE is calculated in terms of the total tope shark catch (*i.e.*, landed plus discarded weight) per vessel for each type of fishing gear. Tope sharks are encountered relatively infrequently in Oregon and Washington, mainly in the midwater trawl fisheries, and there is no discernible trend in CPUE. In California, similar to the discards-only data, total catch per vessel has generally increased since 2015 for each gear type where tope sharks are consistently encountered (*i.e.*, bottom trawl, bottom/midwater trawl, fixed gear, and non-trawl net gear fisheries). For vessels using non-trawl net gear in California, CPUE declined substantially from an average of 8.9 x 10^{-2} mt per vessel per year in 2002–2006 to 9.1 x 10^{-4} mt per vessel in 2013, before increasing again in subsequent years.

Logbook data from the State-managed gillnet fishery in California indicate that CPUE in the California gillnet fishery fluctuated around 0.5 individuals caught per vessel trip from 1981 to 2006. Based on the reported net length and soak time for each vessel trip where a tope shark was caught, we can roughly compare this value to the estimates reported by Ripley (1946). Average net length and soak time per vessel trip in the logbook dataset are approximately 603.3 fathoms (~1.1 km) and 29.5 hours, respectively. Thus, scaling to the unit of CPUE used by Ripley (1946), 0.5 individuals caught per vessel trip is roughly equivalent to 0.6 individuals caught in 1,000 fathoms (~1.8 km) of gillnet fished for 20 hours. That is approximately a 15- to 100-fold decrease in CPUE from 1942 to 1981–2021. It is important to note that the California Department of Fish and Wildlife (CDFW) cautions against using set-specific features (*e.g.*, net length, soak time) as the basis for CPUE calculations; however, broadly summarizing the data as above provides a rough indication of the scale of population reduction since the peak of the fishery in the early 1940s. From 2006 to 2013, CPUE declined substantially from 0.48 to 0.02 tope sharks caught per vessel trip and then generally increased from 2015 to 2021. Notably, by dividing the logbook dataset by month, it is clear that the annual CPUE during warmer months (May–August) declined significantly in 2008 and has remained relatively low in the years since, rebounding only slightly in recent years. By contrast, CPUE during cooler months (October–November) has increased substantially in 2018–2021 compared to prior years. The trends in CPUE, however, take place alongside several regulatory changes, which have gradually constrained the effort and location of gillnet fishing in California since the 1980s. This includes a series of depth- and area-based gillnet bans throughout central California in the late 1980s and 1990s (Forney *et al.* 2001), a 1994 ban on gillnet fishing within 3 nautical miles (nm) of the California mainland and within 1 nm of the Channel Islands (CA Proposition 132), an emergency gillnet closure in 2000 and 2001 limiting the fishery to Federal waters south of Point Conception, and a permanent extension of the set gillnet ban in 2002 in all waters offshore of central California (from Point Reyes to Point Arguello) less than 60 fathoms (110 m) in depth (California Code of Regulations, Title 14, Section 104.1). As a result, the total effort in the California gillnet fishery has drastically declined since 1986, as gillnet fishing has largely been restricted to offshore waters in southern California. As discussed in *Range, Distribution, and Habitat Use*, tope sharks tend to migrate seasonally toward the poles in the summer and toward the equator or into deeper, offshore waters in the winter. Thus, the disproportionate increase in winter CPUE, as compared to summer CPUE, in recent years may be related to the concentration of gillnet fishing effort in the southern, offshore portion of the species' distribution in this region.

Since 1980, tope sharks have also been recorded by California commercial passenger vessel (CPFV) (*i.e.*, charter fishing) operators, who submit mandatory logbooks to CDFW. Tope sharks have been reported only sporadically in northern California. In central and southern California, the species is encountered more consistently; however, there is not a clear long-term trend in CPUE, as it has fluctuated on an approximately 15-year frequency in both regions. Peaks in CPUE in the mid-1980s, around 2000 (in central California) or 2008 (in southern California), and in the mid-2010s are separated by periods of lower CPUE in intervening years. In both regions, CPUE peaked most recently in 2016 but has generally declined in the years since.

In sum, following the collapse of the North American tope shark fishery in the 1940s, observations of the species have been relatively rare in the NE Pacific. Throughout the majority of the last 4 decades, the species has been only sporadically encountered in the wide-ranging West Coast Groundfish Bottom Trawl Survey and by NMFS observers in various Federal and State-managed fisheries. In the California gillnet fishery, a rough comparison between the data presented by Ripley (1946) and logbook data from 1981–2021 reveals that tope shark CPUE is approximately 15- to 100-fold lower than it was during the peak of the fishery in the 1940s. However, it must be noted that the effort and location of the fishery has changed dramatically since the 1940s, which may skew recent estimates of CPUE. Two fisheries-independent surveys and several fisheries reporting databases provide insight into the recent population trend in the NE Pacific. With the exception of the CPFV logbooks, available datasets consistently show an increase in CPUE since 2016. In several datasets, such as the WCGOP and A-SHOP discards, and the California gillnet logbooks, this increase follows an inverse period of decline in the early 2010s. Thus, the extent to which this pattern may be part of a natural population cycle or may reflect changes in fishing behavior is not clear. Data from the fishery-independent IPHC FISS, which is the most statistically robust dataset available, suggest that CPUE has significantly increased since 1998, particularly in the northern portion of the species' distribution. Thus, while the population remains depleted compared to its unexploited level, there is consistency among datasets suggesting that the population is likely increasing to some degree.

SW Pacific

In the SW Pacific, tope shark populations in Australia and New Zealand are monitored and managed independently. Although tagging and genetic data indicate that some migration and interbreeding occurs between the two regions (see *Population Structure*), the rarity of trans-Tasman recaptures in tagging studies and the substantial geographic separation suggest that such movements are fairly infrequent. Most animals tend to stay within a home range of less than 500 km, in close proximity to local pupping and nursery areas (Hurst *et al*. 1999; Walker *et al*. 2020). Accordingly, given the separate management of tope sharks in Australia and New Zealand, available information on abundance and population trends is presented separately for the two countries.

Sustained harvest of tope sharks in Australia since the early 20th century has driven a significant long-term decline in population abundance (Davis *et al*. 2024). Early signs of overexploitation date back to the 1940s, when both large, gravid female and juvenile tope sharks were heavily targeted in inshore nursery areas of southern Australia and Tasmania (Olsen 1959; Olsen 1984; Fowler *et al*. 2005). Olsen (1959) reported declining juvenile abundance in two Tasmanian nurseries, which he attributed to the intense fishing pressure on both juveniles and gravid females during their pupping migration (see also Olsen 1984). He reported a sharp increase in fishing effort between 1944 and 1956 alongside a concurrent decline in mean body size and CPUE, warning that the fishery was showing "trends which are suggestive of depletion" and may follow the patterns of collapse observed in the NE Pacific unless stronger regulations were put in place (Olsen 1959). In 1991–1997, Stevens and West (1997) resurveyed several nursery areas in Tasmania and Victoria that were originally identified by Olsen. They found that catch rates were "much lower" at all sites and that pups may no longer be present at certain sites where they were once fairly common, such as in Georges Bay and D'Entrecasteaux Channel (Stevens and West 1997). During Olsen's original tagging program from 1947–1956, only 0.3 percent of the 1,170 juveniles tagged in Pittwater were recaptured at the same site. Stevens and West (1997) conducted a similar tag-recapture experiment in Upper Pittwater in 1996, and 18 percent of the 100 tagged juveniles were recaptured at the same site, a nearly 60-fold higher recapture rate. The authors interpreted this result as indication of reduced population abundance, although differences in site fidelity or dispersal behavior might also have played a role. While Olsen (1984) reportedly caught up to 80 juveniles per day in Pittwater by handline in the 1940s–1950s, Stevens and West (1997) were not able to catch a single tope shark in 23 hours of fishing in 1992 using the same methods and gear. Likewise, in Port Phillip Bay, Victoria, where Olsen could reportedly catch more than 200 juveniles and subadults per day in 1947–1951 (pers. comm., cited in Walker 1998), artisanal fishers caught fewer than 10 per day during a 3-year research study in the 1990s (Walker 1998). Moreover, demersal gillnet and longline surveys conducted in Bass Strait showed an 87 percent reduction in CPUE between 1973–1976 and 1998–2001 (Walker *et al*. 2005).

In response to the observed population declines, the Australian government listed the tope shark as "conservation dependent" under the Environment Protection and Biodiversity Conservation (EPBC) Act in 2009. A formal Rebuilding Strategy was introduced in 2008 and updated in 2015. This strategy set a target to rebuild the stock to the limit reference point (B_{20}) within three generations (66 years) from 2008 (Davis *et al*. 2024). Despite these measures, subsequent assessments have consistently shown that the population in Australia remains overfished (Davis *et al*. 2024). One of the earliest formal stock assessments for the Australian tope shark fishery was developed by Punt and Walker (1998). Based on a spatially aggregated, age- and sex-structured model, estimates of adult biomass at the start of 1995 ranged from 13 percent to 45 percent of pre-exploitation levels, depending on model specifications. Punt *et al*. (2000a) suggested that age-1+ biomass (B_{1+}) at the start of 1997 was likely between 17 percent and 25 percent of pre-exploitation levels, while pup production was likely between 12 percent and 18 percent of pre-exploitation levels (discounting model scenarios that the authors deemed unrealistic). Thomson and Punt (2009) later updated the assessment model by incorporating fisheries-independent data from gillnet research surveys conducted between 1973 and 2008, along with several fisheries-dependent datasets. Model estimates suggested that B_{1+} at the start of 2007 ranged from 7 percent to 20 percent of pre-exploitation levels, while estimates of pup production ranged from 6 percent to 17 percent of pre-exploitation levels (Thomson and Punt 2010). Thomson and Punt (2009) found significant differences between models that assumed a single fishery stock in Australia versus those that assumed two. Specifically, the two-stock models consistently provided a better fit to the data and estimated less depletion (B_{1+}: 14–20 percent pre-exploitation; pup production: 11–17 percent pre-exploitation) than one-stock models (B_{1+}: 7–9 percent pre-exploitation; pup production: 6–8 percent pre-exploitation).

In the past decade, fishery managers in Australia have transitioned away from CPUE-based stock assessment models toward a new framework based on close-kin mark-recapture (CKMR) analysis (Shark Resource Assessment Group (SharkRAG) 2011; Davis *et al*. 2024). To apply the CKMR framework to the Australian tope shark population, Thomson *et al*. (2020) collected and genotyped over 2,400 individuals from across South Australia, Bass Strait, and Tasmania between 2010 and 2017. Their analysis yielded an estimate of approximately 50,000 mature individuals in the population in the early 2000s (Thomson *et al*. 2020). This figure was three to four times lower than the abundance estimated by the conventional stock assessment model (Thomson 2012). Thomson *et al*. (2020) suggest that there are likely multiple overlapping biological stocks of tope sharks in Australia, perhaps structured according to different pupping grounds, which are differentially depleted (Thomson *et al*. 2020). They also interpret the relatively small abundance estimate from the CKMR analysis as evidence that the immigration rate from the considerably larger tope shark population in New Zealand is limited and likely does not significantly influence local demographics; although Walker *et al*. (2020)

suggested that migration from New Zealand may have helped stabilize the Australian population since the early 2000s.

Thomson *et al*. (2020) also generated projected population trends to the year 2037 by testing four rates of constant exploitation: zero catch, the 2016 catch rate, the 2017 catch rate, and the mean catch rate between 2013 and 2017. All four scenarios resulted in a modest upward trend in adult abundance, with estimated annual increases of approximately 1–11 percent depending on the exploitation scenario. However, the confidence intervals were very wide, and a declining trend could not be ruled out in any case. Based on the results of this analysis, SharkRAG adopted a fishery management strategy based on the mean 2013–17 catch rate scenario, which predicted a 3 percent average annual increase in population abundance (Davis *et al*. 2024).

Recently, Thomson *et al*. (in prep) applied generalized linear modelling to updated CKMR data with roughly 3,000 additional tope shark samples collected between 2018 and 2023. Results of the modified GLM, accounting for ageing error and the triennial female reproductive cycle, indicate that adult abundance has increased approximately 7.5 percent (90 percent CI: 2.7 percent–12.3 percent) annually over the period 2006–2020. According to the authors, these results confirm the finding of Thomson *et al*. (2020) that tope sharks in the Southern and Eastern Scalefish and Shark Fishery (SESSF) are recovering. A full age-structured CKMR model, incorporating individual ageing error and fecundity-at-size effects, is under development and will be presented to SharkRAG in 2026.

Lastly, an analysis of CPUE in the trawl sector of the SESSF (1996–2020) provides additional insight into recent population trends in Australia. The data show a decline in catch rate from 1996 to 2003, consistent with the datasets used by Thomson and Punt (2009). After 2003, however, catch rate has increased steadily, reaching a level in 2020 that approaches or slightly exceeds that of 1996. Notably, unlike the gillnet fishery, where changes in fishing behavior towards greater avoidance have undermined the reliability of CPUE datasets, the trawl fishery is unlikely to have targeted tope sharks at any time and therefore provides a more consistent record of catch and effort (Tuck 2022). But Davis *et al*. (2024) caution that the trawl fishery accounts for only a small proportion of the total tope shark catch landed in southern Australia, and generally operates in locations different from those fished by the Gillnet, Hook, and Trap sector. Therefore, observed CPUE trends may not be representative of the broader Australian population.

There have been several efforts to establish a standardized CPUE index to estimate a population trend throughout New Zealand using available commercial fisheries data. The use of data from targeted set gillnet and bottom longline fisheries resulted in unreliable abundance indices due to sparse, inconsistent data and the potential for hyperstability (when CPUE remains artificially high despite an underlying decline in abundance, typically because fishers non-randomly target dense aggregations of the population) (Bradford 2001). Analysis of CPUE from bycatch fisheries by Ayers *et al*. (2006) revealed no consistent nationwide abundance trend but suggested a possible southward shift in distribution, possibly driven by warming sea temperatures. More recently, Fisheries New Zealand evaluated relative biomass indices in five spatial monitoring units that encompass the New Zealand exclusive economic zone (Fisheries New Zealand 2024b). As with the previous studies, although the tope shark population in New Zealand is assumed to be connected, Fisheries New Zealand was not able to establish a biomass index for the population as a whole. Therefore, monitoring units were delineated using boundaries that roughly correspond to gaps between where tope shark catch is concentrated (Dunn and Bian 2018; see Figure 3-32 in the Status Review Report). The biomass indices used in the assessments are based on CPUE data from inshore research trawl surveys as well as commercial set gillnet, bottom longline, and bottom trawl fisheries operating within each monitoring unit (Tremblay-Boyer 2021). The Inshore Fisheries Working Group (INSWG) determined which datasets to include in each regional biomass index based on the amount of data available and whether or not the data were judged to be reliable. Reference points (*e.g.*, biomass at MSY (B_{MSY}), fishing mortality at MSY (F_{MSY})) for relative biomass assessments were established for three of the five monitoring units based on reference periods when the catch rate was assumed to be sustainable. The INSWG then assigned qualitative likelihood scores to evaluate the status of each regional stock with respect to the reference points (*i.e.*, "Very Likely": > 90 percent probability; "Likely": 60–90 percent probability; "About as Likely as Not": 40–60 percent probability; "Unlikely": 10–40 percent probability; "Very Unlikely": < 10 percent probability) (Fisheries New Zealand 2024b).

In the Far North region (N/1E), the biomass index derived from the combined set gillnet, bottom longline, and bottom trawl CPUE series has increased steadily since 1995, alongside an approximately 75 percent decrease in fishing effort. The INSWG found it likely that current biomass was at or above B_{MSY}. They also found it unlikely that biomass would decline at the current level of catch (Fisheries New Zealand 2024b). In the eastern North Island region (2/3N), none of the available CPUE data from set gillnet, bottom trawl, or bottom longline fisheries were accepted by the INSWG as indicative of population biomass, as there were conflicting trends in the data series that could not be explained. Furthermore, while there is some indication from the east coast South Island survey data that biomass was generally higher after 2007 compared to pre-1996, the survey almost exclusively sampled juveniles and was therefore not considered as a suitable biomass index (Fisheries New Zealand 2024b). In the Lower South Island region (3S/5), the set gillnet CPUE dataset was accepted as a valid biomass index. The INSWG found it very likely that overfishing is occurring and about as likely as not that current catch levels will cause biomass to decline below 50 percent of the target B_{MSY} baseline.

As compared to a B_{MSY}-compatible baseline established based on a period of relatively stable catch rates between 1989 and 1999 (assuming that the stock was not in a depleted state during this reference period), biomass has declined gradually as fishing intensity has increased (Fisheries New Zealand 2024b). In the Chatham Rise region (SCH 4), tope sharks are mainly caught in the bottom longline fishery, which was the only fishery in the region with sufficient data to be developed into a biomass index (Tremblay-Boyer 2021). Based on 16 years of available CPUE data, the biomass index has fluctuated without a discernible trend since 2003–2004 alongside a gradual increase in fishing intensity (Fisheries New Zealand 2024b). Because the dataset is relatively short and does not show any clear trends, the INSWG was not able to establish a reference baseline for the biomass index in this region. In the West Coast region (7/8/1W), the INSWG elected to use the WCSI research trawl survey, excluding the Tasman Bay and Golden Bay region, as the primary index of biomass. Based on this dataset, biomass declined from the late 1990s to 2000 and has largely fluctuated without a discernible trend in the years since. The INSWG established a target B_{MSY} baseline as the mean estimated biomass from 2005 to 2017, on the basis that biomass remained stable during this period while fishing intensity was "high and relatively stable" (Fisheries New Zealand 2024b). They concluded that the stock was about as likely as not to be at or above this reference baseline and about as likely as not to be experiencing overfishing at current catch levels (Fisheries New Zealand 2024b).

In June 2018, Fisheries New Zealand conducted a qualitative risk assessment for local chondrichthyan species, in accordance with the objectives of the country's National Plan of Action for Sharks (NPOA-Sharks, discussed further under **Protective Efforts**) (Ford *et al*. 2018). Using 5 years of fishing data and knowledge of the species' biology, an expert panel evaluated the risk to each species from commercial fishing by scoring two factors on a scale of one to six: the intensity of the fishery and its consequence on the species' status. Fishing intensity for tope sharks was scored at the highest level, reflecting that "captures are locally to regionally high or continual and widespread." The consequence of the fishery on the species' status was assessed as intermediate (3 out of 6), reflecting a "moderate and sustainable level of impact such as full exploitation rate," but no indication that actual or potential impact is unsustainable.

Overall, although there is clear genetic and demographic connectivity between the Australian and New Zealand tope shark populations (see *Population Structure*), the low rate of trans-Tasman migration suggested by tagging and CKMR analyses indicates that the New Zealand population is unlikely to substantially influence the trajectory of the Australian stock. The tope shark population in Australian waters has experienced a significant, century-long decline due to high fishing pressure; however, population abundance is now increasing. Historical targeting of both mature females and juveniles in critical nursery areas led to early signs of depletion by the 1940s. Subsequent stock assessments confirmed the overfished status of the stock, with biomass estimated to have fallen to as low as 7–12 percent of pre-exploitation levels by the late 2000s. A formal rebuilding strategy has been in place since 2008 and recent analyses (fisheries independent and dependent) indicate that the stock is recovering. The New Zealand component of the population has sustained high levels of commercial catch for several decades without evidence of a similar, widespread collapse. While a single, nationwide biomass trend is unavailable, regional assessments present a mixed but generally more stable picture. The population status varies across different management areas, with some regions appearing stable or increasing while others show signs of localized depletion and are likely experiencing overfishing.

SE Pacific

A population abundance estimate and population trend data are not available for tope sharks in the SE Pacific region. Available landings data are limited for this region, and species-level assessments based on these data are hampered by species misidentifications and the practice of grouping shark landings under generic names—*e.g.*, “tollo” or “tiburon” (Sebastian *et al*. 2008; López de la Lama *et al*. 2018). Despite extensive fishing effort and targeted shark fisheries in the region, reported landings for tope sharks are low (Doherty *et al*. 2014; Walker *et al*. 2020), and no capture data are available in the FAO database. Given the extensive fishing effort in the region and the low reported catches, the species may not be abundant in the region. A trend analysis was not conducted for this region as part of the most recent IUCN assessment due to the limited data available (Walker *et al*. 2020). Based on the available information, it is not possible to estimate the abundance and trends for tope sharks in the SE Pacific.

Distinct Population Segment Analysis

Section 3 of the ESA defines the term “species” to include “any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature” (16 U.S.C. 1532(16)). As mentioned above, the DPS Policy jointly established by FWS and NMFS in 1996 provides an interpretation of the term “distinct population segment” for purposes of listing, delisting, and reclassifying species under the ESA and outlines two elements that must be considered when determining whether a population of a vertebrate species qualifies as a DPS: (1) the discreteness of the population segment in relation to the remainder of the taxon to which it belongs; and (2) the significance of the population segment to the remainder of the taxon to which it belongs.

The petition expressly requested that if we find that there are DPSs of tope shark, we evaluate each of those DPSs for listing under the ESA. After initiating the status review, it became clear that the severity of threats and management measures differed across the species’ range. As suggested by the IUCN’s analyses, population trends also appeared to vary across the range. Given this information, the highly structured nature of tope shark populations, and the coincident discontinuity in the species' range, we elected to evaluate whether the regional populations of tope sharks qualified as DPSs pursuant to the DPS Policy.

Discreteness

The discreteness criterion of the DPS Policy may be satisfied if a population is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic discontinuity may provide evidence of separation. International boundaries may also be used to delimit a distinct population segment if differences in the control of exploitation of the species, management of the species' habitat, the conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the ESA. As noted in the DPS Policy, absolute reproductive isolation is not required in order to recognize a distinct population segment, as this would be an impracticably stringent standard.

As discussed previously, the species' global distribution is discontinuous, with populations inhabiting temperate coastal zones separated by vast expanses of open ocean or by warm equatorial waters that coincide with gaps in the species' range. Tagging, telemetry, and observational data indicate fairly extensive migrations of tope sharks within most of the aforementioned regions but have not shown movement of individuals among regions, suggesting a lack of physical and demographic connectivity. Furthermore, as noted previously, multiple independent genetic studies using both mtDNA and nuclear microsatellites consistently reveal a high degree of genetic structuring among the major regional populations (Bester-van der Merwe *et al*. 2017: $F_{CT} = 0.137$, $\Phi_{ST} = 0.895$, $p < 0.05$; Chabot and Allen 2009: $\Phi_{ST} = 0.84$, $p < 1 \times 10^{-6}$; Chabot 2015: $F_{CT} = 0.15$, $p < 0.001$). These analyses show high and statistically significant pairwise measures of genetic differentiation, the presence of unique regional haplotypes, and extremely low estimates of inter-oceanic gene flow, confirming a long history of reproductive isolation. Collectively, and notwithstanding data gaps due to under- and non-sampled parts of the range, these studies indicate a regionally isolated population structure, with little to no contemporary connectivity between tope shark populations across major ocean basins or the equator. Thus, overall, and as discussed in further detail below, the best available scientific and commercial information demonstrates that the regional populations of tope sharks in the NE Atlantic, SW Atlantic, So. Africa, NE Pacific, SE Pacific, and SW Pacific (Australia/New Zealand) are markedly separated from each other, as evidenced by the best available genetic, tagging, and distribution data.

NE Atlantic

In the NE Atlantic, tope sharks are known to range from Iceland, the Faroe Islands, and Norway; throughout the Celtic and North Sea; south to the Bay of Biscayne, the Azores, the Canary Islands, and the northwestern coast of Africa; and into the Mediterranean Sea (Stevens 1990; Capapé *et al*. 2005; Thorburn 2015; Colloca *et al*. 2019; Thorburn *et al*. 2019; Schaber *et al*. 2022). Available tagging data gathered over many decades (~1959–2015) indicate that some tope sharks in the region tend to stay within a relatively small home range, others may undertake long-distance migrations of ~1,800 km to over 3,500 km away to other locations within the region (Holden and Horrod 1979; Stevens 1990; Little 1995; Fitzmaurice *et al*. 2003; Colloca *et al*. 2019; Thorburn *et al*. 2019; Schaber *et al*. 2022). No trans-equatorial movements have been recorded.

As noted previously, global genetic studies (Chabot and Allen 2009, Chabot 2015) also show a lack of population connectivity and a significant degree of genetic differentiation from other regional populations (Africa, South America, Australia, and North America). Thorburn *et al*. (2015) evaluated the genetic structure of tope sharks in the region using mtDNA and microsatellite samples from Ireland, Celtic Sea, southern North Sea, Isle of Wight, Channel Islands, Balearic Islands, Algeria, SW Scotland, Isle of Man, NW England, and Azores. All pairwise mtDNA Φ_{ST} values (-0.0614–0.1936) and pairwise microsatellite F_{ST} values (F_{ST} = -0.0079–0.0192) were low and non-significant ($p > 0.05$) (Thorburn *et al*. 2015). Results of STRUCTURE analysis (testing $k = 1–8$ populations) also provided no evidence of population structure within the region. Although additional sampling in the eastern Mediterranean and other areas are needed, results from Thorburn *et al*. (2015) provide no evidence of population structure within the region, and in combination with the movement data, support a conclusion that tope sharks in the NE Atlantic comprise a single population.

So. Africa

Although there is some uncertainty regarding the exact range of this species within the So. Africa region, tope sharks are considered to range from southern Angola to East London, South Africa (Walker *et al*. 2020; see Figure 2-2). Freer (1992) noted that tope sharks appear to be present throughout the area between Walvis Bay, Namibia and Cape Agulhas, South Africa. This population is physically separated from the NE Atlantic population by warm equatorial waters, which likely poses a thermal barrier to tope shark movements (Chabot and Allen 2009), and from other populations by ocean basins. Genetic analyses confirm this isolation, with studies by Bester-van der Merwe *et al*. (2017) and Chabot (2015) indicating high and significant genetic differentiation between tope sharks in So. Africa and those from the NE Atlantic, Australia/New Zealand, and South America. Several studies have also examined the population structure of tope sharks along the coast of South Africa and, in particular, across the transition zone between the southern Atlantic and southern Indian Oceans. However, the several studies investigating potential structuring within this region have found no significant genetic differentiation between the two ocean regions (Bester-van der Merwe *et al*. 2017, Maduna *et al*. 2017) and overall moderate to high gene flow within this portion of the South Africa coastline (Bitalo *et al*. 2015, Bester-van der Merwe *et al*. 2017, Maduna et al 2017).

NE Pacific

In the NE Pacific, tope sharks range from British Columbia, Canada, and southward to Baja California, Mexico, and into the Gulf of California (COSEWIC 2021). Tagging data show that some tope sharks in this region will undergo long-distance movements along the North American coast from Southern California to Baja California, Mexico, or to British Columbia, Canada (Herald and Ripley 1951, Nosal *et al*. 2021), but no trans-equatorial or trans-Pacific movements have been documented. Available genetic data indicate that tope sharks sampled off the coast of southern California are genetically differentiated from those of So. Africa, NE Atlantic, Australia, and South America (Chabot and Allen 2009, Chabot 2015). In particular, results of genetic analyses using both microsatellite and mitochondrial data, indicate that tope sharks off southern California are genetically distinct from those off the coast of Peru ($F_{ST} = 0.09$, $p < 0.001$; $mtF_{ST} / \Phi_{ST} = 0.19 / 0.67$, $p < 0.001$; Chabot and Allen 2009, Chabot 2015). Estimated number of migrants per generation between regional populations was also low (Chabot and Allen 2009), and while the gene flow estimate from California to Peru was found to be higher (*i.e.*, 0.257) relative to other comparisons, it was well below the estimated self-recruitment rates for each region (*i.e.*, 0.998 and 0.692, Chabot 2015). While genetic data to explore potential population structuring at a finer-scale within the NE Pacific are not available, the available data suggest that tope sharks within the NE Pacific are part of single, seasonally-migratory population.

SW Pacific

Tope sharks in this region have been reported from Houtman’s Abrolhos to Cape Leeuwin in Western Australia, eastward to Moreton Bay in Southern Queensland, around

Lord Howe Island, Tasmania, around the North and South Islands of New Zealand, and as far east as the Chatham Islands (Olson 1954; Hernandez *et al*. 2015; *https://GBIF.org* database, accessed on August 25, 2023). As noted previously, three large-scale genetic studies, which included samples from Australia and New Zealand, showed a high degree of genetic differentiation among all sampled regions (Bester-van der Merwe *et al*. 2017: $F_{CT} = 0.137$, $\Phi_{ST} = 0.895$, $p < 0.05$; Chabot and Allen 2009: $\Phi_{ST} = 0.84$, $p < 1 \times 10^{-6}$; Chabot 2015: $F_{CT} = 0.15$, $p < 0.001$). A fourth study, using both mitochondrial and microsatellite DNA and samples collected from six sites in Australia, four sites in New Zealand, and one site in Chile (Santiago), indicated significant genetic differences in all pairwise comparisons involving the samples from Chile ($p < 0.001$) but supported a single population model for Australia and New Zealand (Hernández *et al*. 2015).

Tagging data support the patterns indicated by the genetic data. Specifically, extensive tagging efforts in both Australia and New Zealand have indicated migration of tope sharks between the two countries in both directions across the Tasman Sea, but there has been no indication of movements to other regions (Coutin *et al*. 1992; Walker *et al*. 1997; Hurst *et al*. 1999; Brown *et al*. 2000; Francis 2010). Whether the observed migrations between Australia and New Zealand are associated with genetic exchange has been the subject of considerable study in the region. As noted above, Hernández *et al*. (2015), using both mtDNA and nuclear microsatellites from numerous locations, found no significant genetic structure between the two countries. A subsequent, high-resolution study on juvenile sharks from nursery areas in Tasmania and New Zealand also found no significant genetic differentiation based on thousands of genome-wide single nucleotide polymorphisms (Devloo-Delva *et al*. 2019). While one study (Bester-van der Merwe *et al*. 2017) reported statistically significant genetic differentiation based on a panel of microsatellite markers, a re-analysis of those samples suggested the result may have been influenced by small sample sizes and the presence of related individuals (Devloo-Delva *et al*. 2019). Overall, the best available genetic data indicate that tope sharks in Australia and New Zealand are genetically distinct from other regional populations, and that there is sufficient demographic and genetic exchange to consider Australia and New Zealand a single, interbreeding population.

SW Atlantic

Within the SW Atlantic, tope sharks range from Rio Grande do Sul, Brazil, south to Península San Julián in Argentine Patagonia (Peres and Vooren 1991; Menni *et al*. 2010; Chiaramonte 2015). The results of a genetic study of tope sharks across the Southern Hemisphere indicated significant differentiation based on both mtDNA and microsatellites between Argentina and all other sample locations (South Africa, Australia, New Zealand), as well Chile ($\Phi_{ST} = 0.151$, $F_{ST} = 0.236$, $p \leq 0.05$; Bester-van der Merwe *et al*. 2017). Although Bester-van der Merwe *et al*. (2017) detected a single shared haplotype between Chile and Argentina and similarly, Chabot and Allen (2009) noted a shared mtDNA haplotype between single samples from Argentina and Peru, the presence of these shared ancestral haplotypes does not imply contemporary gene flow, and this finding is not sufficient to override the broader pattern of differentiation observed in the nuclear DNA, which reflects a longer history of reproductive isolation. Taken together, the limited, available data suggest that the populations of tope sharks on the Pacific and Atlantic coasts of South America likely share some degree of historical connectivity, but contemporary gene flow appears to be limited (Bester-van der Merwe *et al*. 2017). There are no tagging data to suggest any movement of individuals between the two South America populations; although, this does not appear to have been thoroughly investigated.

Tope sharks have been observed to make seasonal migrations within this region, moving from shelf waters off southern Brazil in colder months to areas southward and deeper during warmer months (Ferreira and Vooren 1991; Peres and Vooren 1991; Elías *et al*. 2004; Lucifora *et al*. 2004; Cuevas *et al*. 2014; Klippel *et al*. 2016; Trobbiani *et al*. 2021). Results from two tagging studies are consistent with this pattern and indicate long-distance movements of tope sharks within the region from Golfo Nuevo, Argentina (~42.4°S, n = 3) to points northward with the shifting seasons (to ~40°12'S, ~38ºS, ~35°18'S), with one shark having travelled a minimum distance of 1,425 km in 6 months (Irigoyen *et al*. 2015; Jaureguizar *et al*. 2018). An analysis of mtDNA from tope sharks sampled in 2 areas along the coast of Argentina—off Buenos Aires (n = 10) and in Golfo San Matías (n = 12)—indicated no significant differences between locations (statistics not provided; Cuevas *et al*. 2016). Although relatively limited, the available data collectively provide support for the hypothesis that tope sharks within this region comprise a single migratory population and provide no indication of finer-scale population structuring.

SE Pacific

Tope sharks in this region are considered to range from Ecuador to Chile (Walker *et al*. 2020). As discussed previously, results of several studies indicate that tope sharks in this region are significantly genetically differentiated from tope sharks in the NE Pacific (California), SW Atlantic (Argentina), NE Atlantic (Irish and Celtic Seas), South Africa, Australia, and New Zealand (Chabot and Allen 2009; Chabot 2015; Hernández *et al*. 2015; Bester-van der Merwe *et al*. 2017). In particular, and as discussed above, tope shark populations on the Pacific and Atlantic coasts of South America have been found to be significantly differentiated based on assessments of both mitochondrial and microsatellite DNA ($\Phi_{ST} = 0.151$, $F_{ST} = 0.236$, $p \leq 0.05$; Bester-van der Merwe *et al*. 2017). We are not aware of any tagging data indicating movement of individuals between the two South America populations or between the NE and SE Pacific populations.

As noted above, both Bester-van der Merwe *et al*. (2017) and Chabot and Allen (2009) noted a shared mitochondrial haplotype between single samples from both sides of

South America. However, the presence of these two shared ancestral haplotypes does not necessarily indicate contemporary gene flow, and we do not find this to be sufficient evidence to override the broader pattern of differentiation observed in the nuclear DNA, which reflects a longer history of reproductive isolation.

Significance

If a population segment is considered discrete, the biological and ecological significance of the population segment(s) is considered relative to the taxon to which it belongs. As outlined in the DPS Policy, considerations with respect to the "significance" criterion may include, but are not limited to, whether a loss of the discrete population segment would result in a significant gap in the species' range; whether the discrete population segment persists in a unique ecological setting; and whether the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

With respect to the six discrete populations identified above, we conclude that the loss of any of the populations would create a significant and possibly permanent gap in the species' range. Although tope sharks are capable of long-distance migrations (*e.g.*, 4,000 km), the available tagging data also indicate that tope sharks exhibit general fidelity to their region and, in some cases, fidelity to particular coastal habitats (Stevens 1990, Thorburn *et al*. 2019, Brown *et al*. 2000, Nosal *et al*. 2021). There is no evidence of movement between regional populations, and the available genetic data provide strong support for the conclusion that major ocean basins and warm equatorial waters are barriers to dispersal for tope sharks. Additionally, as established in the analysis of discreteness above, there is clear evidence of marked genetic differences among the populations. The high estimates of genetic differentiation and presence of unique haplotypes and genotypes within regions (*e.g.*, Chabot and Allen 2009, Chabot 2015, Hernandez *et al*. 2015) indicate that these populations represent significant components of the species' overall genetic diversity. Loss of any one of the regional populations would result in the loss of unique genetic variation within the taxon as a whole.

DPS Conclusion

Based on a review of the best scientific and commercial data available, we find that the six regional populations of tope shark—NE Atlantic, So. Africa, SW Atlantic, NE Pacific, SE Pacific, and SW Pacific—satisfy the discreteness and significance criteria of the DPS Policy. The discreteness of these populations is supported by the discontinuous and spatially isolated distribution of the species, the high degree of genetic structuring among the regional populations, and the lack of known movement between them. Each of the regional populations is also significant to the larger taxon, as the loss of any one regional population would result in a significant gap in the species' global range and a loss of unique genetic diversity. For these reasons, we have determined that the regional populations of tope shark in the NE Atlantic, So. Africa, SW Atlantic, NE Pacific, SE Pacific, and SW Pacific each qualify as a DPS.

Extinction Risk Analysis

After compiling and reviewing the best scientific and commercial data available, as summarized in this document, the three-person team of biologists from the Office of Protected Resources systematically evaluated the overall risk of extinction facing each DPS now and in the foreseeable future. The analysis integrated two components: a threats assessment and a demographic risk analysis. This approach allowed the team to connect the sources and nature of past and ongoing threats to the tope sharks, the biological consequences of past threats, and the likely biological response to present and future threats - thereby providing a comprehensive evaluation of the overall extinction risk of each DPS.

The threats assessment drew upon the information presented in Section 4.0 of the Status Review Report, which is summarized in this document, to characterize the impact of threats identified in section 4(a)(1) of the ESA: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting its continued existence.

Demographic risks to the DPSs were assessed using basic principles of conservation biology and by following an approach modified from McElhany *et al*. (2000) that focused on four key demographic factors: abundance, productivity, spatial distribution, and diversity. These four demographic factors, outlined in McElhany *et al*. (2000), have been used in many previous ESA status reviews conducted by NMFS and reflect concepts that are well-founded in conservation biology and that individually and collectively provide strong indicators of extinction risk. The demographic risk analysis served as an assessment of the manifestation of past threats that have contributed to the DPS's current status and informed the consideration of the biological response of each DPS to present and future threats.

In evaluating both the threats and the demographic risks, the team considered the extent to which relevant data were available and the quality of those data. To ensure a consistent and systematic approach to assessing each threat and demographic risk factor across the six DPSs, they rated each factor according to the following qualitative scale:

> Unknown: The current level of information is either unavailable or unknown for this threat or demographic factor, such that its contribution to the extinction risk of the DPS cannot be determined;
>
> Very low: It is unlikely that this threat/factor contributes significantly to risk of extinction, either by itself or in combination with other threats/factors;

Low: It is unlikely that the threat/factor contributes significantly to the species' long-term or near future risk of extinction by itself, but there is some concern that it may in combination with other factors;

Moderate: This threat/factor contributes significantly to long-term risk of extinction, but does not in itself constitute a danger of extinction in the near future;

High: This threat/factor contributes significantly to long-term risk of extinction and is likely to contribute to near-term risk of extinction;

Very high: This threat/factor by itself indicates danger of extinction in the near future.

Each of the three team members independently assigned a qualitative rating to each of the identified threats and the four demographic risk factors, considering the scope (spatial extent), severity (magnitude), and persistence (timeframe) for the particular factor. Each member was also asked to rate the level of data sufficiency or certainty by applying one of the following three categories to their ratings: + (high): an abundance of data is available for the threat and its effects on the species, and the reviewer has no reservations in reaching a rating decision; 0 (medium): data are available for the threat and its effects on the species, and a rating can be assigned but additional data are desired; - (low): ratings are based on expert opinion, based on biological concepts or inferences from data or information on other species or areas. After rating each threat and risk factor independently, the team convened to discuss their ratings, associated rationales, and the sufficiency of the relevant data, to assign a final rating for each threat and risk factor. Results of those discussions are provided in the Status Review Report and are summarized here.

Lastly, to assign an overall extinction risk level, the team considered each of the threats and demographic risk factors, their interactions, and the associated ratings and levels of certainty. They rated the overall risk of extinction to each DPS qualitatively, using categories of “high risk,” “moderate risk,” or “low risk” consistent with previous NMFS status reviews and as described as follows:

> High risk: A DPS with a high risk of extinction is at or near a level of abundance, productivity, spatial structure, and/or diversity that places its continued persistence in question. The demographics of a DPS at such a high level of risk may be highly uncertain and strongly influenced by stochastic or depensatory processes. Similarly, a DPS may be at high risk of extinction if it faces clear and present threats (*e.g.*, confinement to a small geographic area; imminent destruction, modification, or curtailment of its habitat; or disease epidemic) that are likely to create imminent and substantial demographic risks;
>
> Moderate risk: A DPS is at moderate risk of extinction if it is on a trajectory that puts it at a high level of extinction risk in the foreseeable future (see description of “High risk” above). A DPS may be at moderate risk of extinction due to current and/or projected threats or declining trends in abundance, productivity, spatial structure, or diversity;
>
> Low Risk: A DPS is at low risk of extinction if it is not at moderate or high level of extinction risk (see “Moderate risk” and “High risk” above). A DPS may be at low risk of extinction if it is not facing threats that result in declining trends in abundance, productivity, spatial structure, or diversity. A DPS at low risk of extinction is likely to show stable or increasing trends in abundance and productivity with connected, diverse populations.

To assign an overall extinction risk rating while accounting for uncertainty, the team applied the same “likelihood point” method as has been used in many prior NMFS status reviews (*e.g.*, scalloped hammerhead, shortfin mako shark, Pacific salmon, Pacific herring, black abalone). In this approach, each individual distributed 10 likelihood points among the three extinction risk levels to rate the overall extinction risk to each DPS throughout its range. After likelihood points were independently assigned, ratings were shared and discussed. Following this initial discussion, each team member was allowed, but not required, to revise their ratings. After a subsequent team discussion, the final likelihood point distributions from each team member were compiled and used to assign the overall risk category to each DPS. Results of that analysis are provided in section 6.0 of the Status Review Report and are summarized below. Lastly, and as explained further in *Significant Portion of its Range Analysis* below, this same general approach was applied to evaluating extinction risk within potentially significant portions of each DPS's range.

The team did not make recommendations or conclusions with respect to whether any tope shark DPSs should be listed under the ESA or classified as threatened or endangered species under the ESA. Rather, the team limited their analysis to considering the best available data, as summarized in this draft report, and drew scientific conclusions about the overall risk of extinction faced by each DPS under present conditions and over the foreseeable future.

Foreseeable Future

As noted previously, section 3 of the ESA defines an endangered species as any species which is in danger of extinction throughout all or a significant portion of its range and a threatened species as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (16 U.S.C. 1532(6) and (20)). When evaluating threats and risks to each DPS, the team considered how each identified threat or risk factor may affect the tope sharks over the "foreseeable future." The term foreseeable future is described in our regulations as extending as far into the future as we can make reasonably reliable predictions about the threats to the species and the species' responses to those threats (50 CFR 424.11(d)). As stated in the regulations, we describe the foreseeable future on a case-by-case basis using the best available data and taking into account considerations such as the species' life-history characteristics, threat-projection timeframes, and environmental variability (50 CFR 424.11(d)). While we are not required to identify a specific period of time for the foreseeable future (50 CFR 424.11(d)), we do indicate a specific time period for the foreseeable future where possible. In other cases, where data are not sufficient to allow for such precision, we describe the foreseeable future as a range of years or qualitatively.

On November 21, 2025, the Services proposed to revise portions of the ESA section 4 regulations (90 FR 52607). The proposed regulations would, in part, revise the regulatory framework for determining the "foreseeable future" in 50 CFR 424.11(d). If finalized, those section 4 regulations would apply prospectively only, and thus would not apply to listing determinations finalized prior to their effective date. For purposes of this determination, however, we considered the proposed revisions to the "foreseeable future" framework regulation and whether the conclusions would be any different from those reached under the existing regulations in 50 CFR 424.11(d). We have determined that the analysis and conclusions presented here would not be any different.

As a long-lived, late-maturing species, tope sharks have a fairly long estimated generation length of about 23 to 26.3 years (Walker *et al*. 2020; Winker *et al*. 2020). Given these life history characteristics, it could take at least several generations for the impacts of any operative threat to have a demonstrated impact on tope shark populations. Likewise, it would likely take at least several generations for the benefits of any management measure to manifest themselves at the population level. Thus, a biologically relevant foreseeable future was considered to be about three generations, *i.e.*, about 69–

79 years. Where the best available data indicate a different or more specific foreseeable future, that specific information is provided in the discussion below.

Significant Portion of its Range Analysis

As part of the extinction risk assessment, the team was also asked to consider whether any DPSs were facing greater risk of extinction within any significant portion of their ranges relative to their status throughout the range. Under the ESA, a species may qualify as “threatened species” or “endangered species” based on its status throughout all or in a “significant portion of its range” (16 U.S.C. 1531(6) and (20)). In other words, species may be listed on the basis of their status across their entire range or based on their status in a significant portion of their range (*Defenders of Wildlife* v. *Norton*, 258 F.3d 1136 (9th Cir. 2001); *CBD* v. *Everson*, 435 F. Supp. 3d 69 (D.D.C. 2020)).

A policy for interpreting the statutory phrase “significant portion of its range” (or SPR) was developed by NMFS and FWS in 2014 (79 FR 37578, July 1, 2014); however, the standard outlined in that policy for determining whether a portion of a species’ range qualifies as a significant one has since been invalidated (*Desert Survivors* v. *DOI*, 336 F. Supp. 3d 1131 (N.D. Cal. 2018) (Bi-state sage grouse remedy order; vacating the definition of “significant”). NMFS has since adopted an approach that focuses on the biological significance of the members of the species within a particular portion of the range to the long-term viability of the species as a whole—or, in this case, to the DPS as a whole.

In conducting an SPR analysis, we may elect to first ask either of the following: (a) what is the status of the species in that portion or (b) is the “portion” biologically significant to the overall species. If the answer to the first question analyzed is affirmative (*i.e.*, the species is at moderate or high risk in the portion or the portion is biologically significant), then we would continue the analysis to consider the other question. If either question is answered in the negative, we would not need to investigate the remaining question, as there would be no basis to change the range-wide conclusion (79 FR 37578, July 1, 2014).

The 2014 SPR Policy defines "range" in geographic terms, and therefore the selection of portions for consideration are premised on a geographically oriented rationale. Because there are infinite ways in which a range could be divided for purposes of an "SPR analysis," the only portions ultimately considered in the analyses are those that that were considered to have a reasonable likelihood of being at moderate or high risk of extinction and a reasonable likelihood of being biologically significant to the DPS. Unless portions met both of these conditions, they were not further considered in the SPR analysis. In the sections below, we explain how this conclusion was reached for each DPS.

In evaluating whether a particular portion of a DPS's range was "significant," the team was asked to consider the contribution or role of the sharks within that portion to the viability of the DPS as a whole. To the extent possible with the available data, they considered the role of the portion from a historical, current, and future perspective, as each of these temporal contexts are relevant to assessing the biological importance of that portion to the long-term viability of the DPS. For instance, sharks in some portion of the DPS's range may no longer be contributing to the viability of the DPS because tope sharks may currently be at very low abundance (or productivity or diversity, *etc.*) in that area; but, historically, sharks in that portion may have served a biologically important role for the DPS's viability (*e.g.*, served as an important source population, or provided connectivity and gene flow among members of the DPS). In conducting this part of the analysis, the team was also mindful that to qualify as a significant portion, they had to also conclude that the particular portion was not so important to the DPS that it actually drives the range-wide status of the DPS. In other words, the biological importance of individuals within the portion cannot be so great that status in that portion is determinative of the status of the DPS throughout its entire range, as that would render the statutory SPR phrase superfluous to the "throughout all" phrase (see *Defenders of Wildlife* v. *Norton*, 258 F.3d 1136 (9th Cir. 2001)).

Summary of Section 4(a)(1) Factors Affecting All DPSs

In this section we present information relating to section 4(a)(1) factors as they apply to all of the tope shark DPSs. For certain threats to tope sharks, information is available only at a global scale or generically for the species and thus generally applies to all six DPSs of tope sharks, rather than any one specific DPS. For other threats, such as overutilization and inadequacy of existing regulatory mechanisms, background information that applies to all six DPSs is presented here, and more specific information about the factors affecting each DPS is presented in subsequent sections. We considered the information presented here in our extinction risk analyses for each DPS as detailed in later sections of this document.

The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Ocean temperature, which is projected to increase over the foreseeable future under plausible future greenhouse gas emission scenarios (Fox-Kemper *et al*. 2021), appears to be an important driver of tope shark distributions (Klippel *et al*. 2016). While tope sharks occur in a wide range of water temperatures, ranging from minimums of at least 8.1°C to maximums of at least 27°C, they typically occur in waters between 12 and 21°C and are hypothesized to avoid warmer, equatorial waters (West and Stevens 2001; Menni *et al*. 2010; Cuevas *et al*. 2014; Kippel *et al*. 2016; Rogers *et al*. 2017; Jaureguizar *et al*. 2018). Although thermal tolerances and preferences are not fully resolved for this species, increases in ocean temperatures are likely to influence the future distribution of tope sharks and may affect the availability of suitable habitat. Poleward range shifts are generally predicted for marine fishes (bony and cartilaginous) under modeled future oceanic conditions (Morley *et al*. 2018; Braun *et al*. 2023; Hodapp *et al*. 2023). For species with cross-equatorial distributions, changing ocean conditions are also predicted to cause a widening gap in suitable habitat around the equator (Hodapp *et al*. 2023). Many marine fishes are also predicted to experience net losses in suitable habitat with continued ocean warming, with the magnitude of these losses varying by species and region (Braun *et al*. 2023; Hodapp *et al*. 2023). Some fish species, on the other hand, are predicted to have a net increase in suitable habitat (Morley *et al*. 2019).

No published analyses of ocean warming-driven range shifts specifically for tope sharks are available; however, the team estimated potential future shifts by applying the same basic approach as Hodapp *et al*. (2023), comparing current "suitable" habitat to model-predicted "suitable" habitat in the foreseeable future. The habitat suitability model uses verified occurrence data from publicly available sources (*e.g.*, FishBase) and seven environmental data layers—depth, surface and bottom temperature, salinity, primary productivity, dissolved oxygen, sea ice concentration, and distance to land—that represent key physical and biological factors structuring the species' distribution at large scales and thus which can be used as predictors of species presence. These data are assigned and modeled at the scale of 0.05 degree grid cells (Kaschner *et al*. 2019, Kesner-Reyes *et al*. 2020; Reygondeau *et al*. 2026). In their analysis, the team quantified the projected change in suitable habitat area using the Habitat Suitability Index (HSI) for present-day versus future conditions, which was calculated on a scale of 0 to 1,000. They first defined "suitable" habitat as any grid cell with an HSI value greater than or equal to a presence/absence cutoff value of 685. This is essentially the point at which the trade-off between correctly predicting where the species occurs (*i.e.*, values greater than the cutoff) and where it does not occur (*i.e.*, values less than the cutoff) is maximized. They then compared the total suitable area (square (sq.) km) in each time period to calculate the percent change between present and predicted suitable habitat. The results of this analysis indicate a potential loss of suitable habitat for tope sharks around the equator and an expansion of suitable habitat near the poles. This analysis also predicts that the global range of tope sharks would increase by roughly 13.2 percent, particularly in the Northern Hemisphere, but that changes would vary considerably by region. The NE Pacific is projected to experience the greatest increase in suitable habitat area by percentage (28.6 percent), followed by the NE Atlantic (13.6 percent), SW Pacific (13.4 percent), SW Atlantic (12.1 percent), and SE Pacific (6.6 percent). The So. Africa region is predicted to experience an estimated 6.4 percent reduction in suitable habitat area. The team noted, however, that this habitat suitability model does not account for various biological, ecological, or other physical factors that may influence habitat use by tope sharks in future ocean conditions, such as changes in migratory behaviors, shifts in ecological interactions, or barriers to migration (Kashner *et al*. 2019). Thus, we caution that while the qualitative results of this analysis are consistent with observations and other analyses of range shifts in marine species and are informative for tope sharks, the quantitative results of the team's analysis are associated with an unknown level of uncertainty and are not considered to be precise predictions.

In addition to the first-order impacts of elevated ocean temperatures, marine systems are also expected to experience more complex, cascading changes over the next century, including altered ocean currents, oceanographic cycles, productivity, and food web dynamics, which have been shown to impact coastal sharks (Howard *et al*. 2013; Holbrook *et al*. 2019; Fox-Kemper *et al*. 2021; Matich *et al.* 2024). Available data suggest that tope sharks are likely vulnerable to these broader environmental shifts. For example, using tope shark landings data from Andalusia (southern Spain) from 1986 to 2013, Baez *et al*. (2016) found a significant negative correlation between tope shark landings and the North Atlantic Oscillation of the prior year (r = -0.506, p = 0.006), and a significant positive correlation of tope shark landings and accumulated snow from the prior year (r = 0.596, p = 0.009), suggesting that tope shark landings in this region may be influenced by the main climatic oscillation and conditions associated with increased input of land-based nutrients into the marine environment (and presumably increased plankton productivity). In addition, results of a sensitivity analysis by Ortega-Cisneros *et al*. (2018) for 40 species in the southern Benguela current system, which was developed using 14 life-history traits for each species, indicated that tope sharks were among the most sensitive species in this region, and that they would likely have a low capacity to respond to the effects of ocean warming and associated environmental impacts. Taken together with the previously discussed modeling results, this information suggests with a high degree of certainty that ocean warming and associated impacts on marine systems will affect tope shark populations over the foreseeable future; however, the nature (*e.g.*, changed distribution, productivity, abundance) and severity of any effects remain difficult to predict given the available data.

In addition to potentially altering the availability of their suitable habitat, increased water temperatures and other direct effects from changing ocean conditions on marine habitats, such as ocean acidification, could result in physiological and behavioral consequences for tope sharks. Ocean temperature, for instance, may provide important cues for migration and influence aspects of tope shark biology and physiology (*e.g.*, gestation, spermatogenesis, swimming, foraging; Olsen 1954; Theron 2001; Jaureguizar *et al*. 2018; Thorburn *et al*. 2019; Nosal *et al*. 2021). Increasingly acidic ocean conditions as the oceans continue to take up atmospheric carbon dioxide (*e.g.*, pH = 7.5–7.9; Canadell *et al*. 2021) have been shown in controlled, laboratory experiments to have various effects on sharks, including reduced survival and growth and impaired foraging behavior (Rosa *et al*. 2017; Vilmar and Di Santo 2022). As evident from the available studies, which do not address tope sharks, there is also considerable intra-specific variation in sharks’ sensitivities and responses to these habitat stressors. Therefore, although ocean warming and acidification trends are expected to continue over the foreseeable future regardless of the rate of carbon dioxide (CO_2) emissions (IPCC 2023), additional study is needed to understand both the independent and combined effects of warmer water temperatures and ocean acidification on tope sharks.

The shallow coastal habitats that serve as important pupping and juvenile nursery areas for tope shark are naturally subject to large environmental fluctuations; however, as weather patterns continue to change, these natural fluctuations are expected to become more extreme (Cooley *et al*. 2022) and could present physiological challenges for tope sharks. One potential challenge within these shallow, nearshore habitats is increased variability in salinity as a result of changes in evaporation and freshwater input (*e.g.*, increased droughts, increased frequency and severity of extreme rain events). As osmoconformers (*i.e.*, organisms that maintain their internal body fluids at the same salt concentration as their environment), sharks may experience negative physiological effects as a result of rapid or extreme changes in salinity, but evidence of this is limited. In one study, which examined the effects of hypersaline conditions by exposing young-of-year (YOY) tope sharks (n = 3–8) to elevated salinity (41 parts per thousand (‰)) for 48 hours, the tope sharks exhibited a decline in metabolic rate (35 percent decline in oxygen consumption) and some signs of protein damage (Tunnah *et al*. 2016). Overall, however, the tope sharks showed an effective physiological response to hypersalinity (Tunnah *et al*. 2016). Another study by Morash *et al*. (2016) examined the effects of hyposalinity by exposing YOY tope sharks (n = 10) to low salinity conditions (25.8 ‰) for 48 hours. Results of this study also indicated a significant decline in metabolic rate (~15 percent), but no evidence of protein damage and an overall effective response to hyposalinity (Morash *et al*. 2016). As both of these studies were short-term and examined salinity changes in the absence of other physical changes to the habitat (*e.g.,* increase temperatures), it is not clear how tope sharks would respond to more frequent or longer duration events.

In addition to the various impacts to tope shark habitats from changing ocean conditions, coastal development and other human activities within the coastal zone can modify, disturb, or degrade important nearshore areas, as has been clearly evidenced by observed declines in species abundance and diversity and losses of seagrasses in estuaries and coastal seas around the world (Lotze *et al*. 2006). Coastal development and urbanization can negatively affect coastal habitats by, for example, increasing sedimentation and nutrient input, and reducing habitat complexity. Degradation of tope shark nursery areas in southern Tasmania and Victoria, Australia, has been cited as a possible cause for the substantial decline in the abundance of tope shark pups in these areas between the 1950s and 1990s (TSSC 2009; Stevens and West 1997); however, causal links between the habitat degradation and the observed declines in juvenile tope sharks were not established. Subsequent surveys in southern Tasmania (Upper Pittwater and Frederick Henry Bay) during 2012–2014 also suggest that abundance of YOY tope sharks have increased or at least stabilized in these nursery areas since the 1990s (McAllister *et al*. 2018).

Various toxic pollutants, including heavy metals (*e.g.*, arsenic, cadmium, lead, mercury), plastics, pesticides, and hydrocarbons, are also likely to be elevated within coastal waters adjacent to human population centers. As long-lived, fairly high-trophic level consumers, tope sharks can bioaccumulate various contaminants, which could potentially have negative consequences on the health and physiology of the sharks (Scheuhammer *et al*. 2007; Skomal and Mandelman 2012; Alves *et al*. 2022). Tope sharks are known to bioaccumulate mercury, with larger, older adults having higher concentrations in their muscle tissue (sometimes in excess of legal limits set for human consumption) (Walker 1999; McKie and Topping 1982; Domi *et al*. 2005; Torres *et al*.

2014). Based on sampling of tope sharks bycaught off the relatively pristine Azores (where hydrothermal vents are a natural source of metals) in 2013, Torres *et al*. (2014) found levels of bioaccumulated arsenic and mercury (maximums of 28.98±1.26 and 0.57±0.01 milligram/kg wet weight, respectively) in the largest size-class of males and females (> 100 cm TL, n = 23–26) that exceeded the maximum limits established in some countries for human consumption. Ingestion of plastics, which are now ubiquitous in marine environments, has been reported for various marine species, including sharks, and is an environmental issue of growing concern (Harris 2020; Janardhanam *et al*. 2022; Munno *et al*. 2024). Other than the report of mesoplastics (5–20 mm) in one tope stomach (of 31) collected from the English Channel in 2012 (Biton-Porsmoguer 2022), however, we are not aware of any assessments of rates of plastics ingestion by tope sharks or resulting health consequences (see also Munno *et al*. 2024).

With respect to the pollutants that have been found at elevated levels within tope sharks, the health implications for the sharks are poorly understood. In the study conducted by Torres *et al*. (2014), the bioaccumulated levels of mercury in tope sharks were highly correlated with selenium (r = 0.91), which is thought to play a role in mercury detoxification (Storelli and Marcotrigiano 2002; Braco *et al*. 2007). A preliminary study by Bonwick *et al*. (1990) also showed relatively high levels of metallothionein-like proteins in the liver of an adult male tope shark (126 cm TL) that had been captured in the northern Irish Sea/Liverpool Bay, an area considered to be heavily contaminated with trace metals. Metallothioneins are thought to play a role in regulating essential trace metals and detoxification of non-essential trace metals (Hauser-Davis 2020). Both studies, thus, provide some limited evidence that tope sharks may be capable of preventing or inhibiting the toxic effects of mercury, at least to some extent. Overall, however, it remains unclear to what extent toxic pollutants—operating alone or in combination with other potential threats (*e.g.*, disease)—are affecting the health and status of tope sharks.

In summary, the available data indicate that, due to ocean warming and associated effects on marine systems, the distribution of tope sharks will likely change, and the availability of suitable habitat may expand in some locations, particularly in the Northern Hemisphere, while declining elsewhere, particularly in equatorial and tropical regions. Other forms of habitat degradation, particularly reduced water quality, are also likely to affect tope shark habitats, particularly those nearshore habitats used predominantly by juveniles and pregnant females. Exposure to and bioaccumulation of certain contaminants like mercury, while well documented in tope sharks, has poorly understood consequences on their health and survival. Because sufficient data to evaluate the extent to which tope sharks' health and abundance are affected by these forms of habitat degradation are currently lacking, we cannot make firm conclusions about the severity of these threats or how they will affect tope sharks over the foreseeable future. Discerning whether any observed declines in tope shark abundance within coastal habitats were driven by habitat degradation, such as those observed in nursery areas in Australia, is further challenged by the fact that observed population declines are largely attributed to overfishing. Lastly, we acknowledge that impacts to tope shark habitat will co-occur and interact, and the extent to which the various changes to their habitat from changing environmental conditions will alter or exacerbate their susceptibility to other threats (*e.g.*, fishing and bycatch, toxic pollutants) is uncertain.

Overutilization

To evaluate threats to tope sharks under section 4(a)(1)(B) of the ESA, the team considered information regarding commercial, recreational, scientific, and educational use of this species. They found no evidence or indication that tope sharks have been or are currently being overutilized for scientific or educational purposes; therefore, those topics are not discussed further. Instead, our review focuses on fishing activities, which have been an important driver of population dynamics for this species in every region where it occurs.

Tope sharks are mainly taken in industrial fisheries but are also taken in artisanal, recreational, and subsistence fisheries. Primary capture methods include pelagic and demersal gillnets and longlines; tope sharks are also taken in bottom and pelagic trawls, troll lines, trammel nets, and by hook-and-line (Bureau of Marine Fisheries (BMF) 1949; Braccini *et al*. 2009; Walker *et al*. 2020). The species' use of both epipelagic (0–200 m depths) and mesopelagic waters (200–1,000 m depths) and behaviors including vertical movements put them at risk of capture in both demersal fishing gear when over continental shelves and deeper-set gear when in oceanic waters (West and Stevens 2001; Rogers *et al*. 2017; Thorburn *et al*. 2019; Gonzalez-Garcia *et al*. 2020; Schaber *et al*. 2022).

Tope sharks have been targeted in commercial fisheries primarily for their meat, fins, and liver oil in areas across their range. Historically, tope sharks were harvested for use in shark fin soup, for consumption or sale, for skins, and for various other purposes (*e.g.*, fertilizer; Ripley 1946; Walker 1999). Harvest of tope sharks quickly accelerated in some regions during the late 1930s and early 1940s when World War II disrupted cod fishing and access to European sources of cod liver oil, which had served as an important source of vitamin A. Tope shark liver oil, which is rich in vitamin A, became an effective replacement (Ripley 1946; BMF 1949; Olsen 1954; Freer 1992). Fisheries expanded rapidly in response to this market demand, largely without regulation. Following the war, tope shark landings decreased as a consequence of the renewed availability of cod liver oil, the advent of commercially available synthetic vitamin A in the 1950s, and declines in tope shark abundance (Olsen 1984, Freer 1992, Walker 1999). Commercial harvest did continue, and in some regions even expanded, as tope sharks were targeted for fins and meat in addition to liver oil, which was then used in multiple manufactured products (Freer 1992; Walker 1999; Vannuccini 1999). In the early 1970s, commercial harvest of tope sharks declined relatively rapidly as the public became increasingly aware of the significant mercury load in larger fishes and as various legal restrictions on the concentrations of mercury in fish products were put in place (Olsen 1984; Walker 1999; Freer 1992). As concerns about mercury eased, global landings peaked in the 1980s with annual harvest estimated at over 12,000 mt, though this is likely an underestimate. Multiple factors contributed to this later peak in global landings, such as improved fishing gears and technology (*e.g.*, monofilament gillnets), and concurrent declines in the abundance of other inshore finfish species (Olsen 1984; Francis 1998; Walker 1999; Megalofonou *et al*. 2005).

Currently, tope sharks are not a primary commercial target in most regions; however, they are often retained when captured incidentally (*i.e.*, as bycatch; Walker *et al*. 2020). Incidentally captured tope sharks are sometimes discarded; however, discards appear to make up a small percentage of overall estimated fisheries mortality of tope sharks (Pauly *et al*. 2020). Discard mortality can be categorized as at-vessel mortality, which refers to mortality that occurs prior to when gear is brought on-board or alongside the vessel, and post-release mortality, which refers to mortality that results from fishing activity but occurs sometime after the animal is released alive. For sharks in general, discard mortality can be significantly affected by a variety of factors, including soak times, gear type, and water temperatures, and shark size and sex (Ellis *et al*. 2017). For tope sharks in particular, available data indicates that discard mortality rates are highly variable. For instance, at-vessel mortality of tope sharks in gillnets was estimated at 2 percent to 70 percent (6–6.5” mesh, mean soak time of 8.2 hours, fishing depth 17–130 m; n = 187; Walker *et al*. 2005) and 73 percent (4–8” mesh, 2.4–20.6 hour soak time, fishing depths of 9–230 m; n = 1,308; Braccini *et al*. 2012). At-vessel mortality in longline gear has been reported as 0 percent (soak times ~6 hours, n = 5; Megalofonou *et al.,* 2005; soak times ~13 hours, n = 25, Coelho *et al*. 2012) and 25 percent for demersal automatic longlines (Rogers *et al*. 2017). Post-release mortality in gillnets has been estimated at approximately 50 percent (Braccini *et al*. 2012).

Tope sharks are internationally traded, largely for meat (Dent and Clarke *et al*. 2015), although their fins have been documented in markets of China's Hong Kong Special Administrative Region (SAR) and Singapore, both of which are major trade hubs for shark fins and other shark products (Fields *et al*. 2018; Cardeñosa *et al*. 2022; Saigal *et al*. 2024). However, tope shark fins were found to have a relatively low incidence of occurrence in sampled markets, and tope shark is not considered a premium value species in Hong Kong SAR (Fields *et al*. 2018; Cardeñosa *et al*. 2022). Species-specific trade records are extremely limited for shark meat; however, a recent analysis by MacNeil *et al*. (2025) estimated the median annual trade of tope shark meat at 3,002 mt (90 percent posterior density: 1,383–5,938 mt). The "smooth-hounds, dogfish, tope" group of sharks (which includes at least 17 species) was characterized as highly export-oriented, with approximately 78 percent of global landings being exported, primarily to Europe and Australia (MacNeil *et al*. 2025). The team concluded, and we concur, that trade in tope shark meat, and to a lesser extent, fins, is one driver of overutilization. Further discussion of shark fin and meat trade is provided in section 4.3 of the Status Review Report.

Additional discussion of the threat of overutilization and fishing practices, which vary by region, is provided for each DPS in later sections of this document.

Disease and Predation

Tope sharks host numerous parasites throughout their range, including various ectoparasitic flatworms (class Monogenea), isopods (*Aega serricauda*), copepods (class Copepoda), and marine leeches (*Branchellion lobata*), as well as endoparasitic flatworms (class Cestoda, class Nematoda, *Staphylorchis pacificus*), cnidarians (*Ceratomyxa* *sphaerulosa*, *Chloromyxum ovatum*), and acanthocephalans (*Corynosoma* spp.) (see Pollerspöck and Straube 2025). However, to the extent that the host-parasite interactions have been described for tope sharks, there is no indication that any of the observed parasites affect tope sharks with the prevalence or virulence that would constitute a significant threat to the survival of the species. The team was unable to find any information about viral or microbial diseases in tope sharks.

Several studies have reported on observed tope shark predation, mostly by other elasmobranchs and occasionally by marine mammals. Broadnose sevengill sharks (*Notorhynchus cepedianus*) are considered one of the main predators of tope sharks, as they co-occur in all regions except the NE Atlantic (Olsen 1984; Stevens and West 1997; Fowler *et al*. 2005; Lucifora *et al*. 2005, 2006). Stevens and West (1997) found that sevengill sharks were the most likely predator of juvenile tope sharks in known nursery areas in Tasmania, but did not find evidence that predation rates were particularly high. Tope sharks are also considered a primary prey item for white sharks in South Africa (Fisher 2021) and have been observed being hunted and consumed by grey seals in Northern Ireland (Jones *et al*. 2021). However, as with parasites and disease, there is no indication that predation constitutes a significant threat to the survival of the species.

Inadequacy of Existing Regulatory Mechanisms

Given the global distribution and migratory nature of tope sharks within the range of each DPS, as well as the species' high degree of population structuring, regulatory mechanisms at different spatial scales are needed for adequate management, particularly with respect to harvest and trade.

Several international agreements form the basis for global cooperation on the conservation and management of the tope shark. The Convention on the Conservation of Migratory Species of Wild Animals (CMS) is an environmental treaty of the UN that aims to conserve migratory species, their habitats, and their migration routes. Nearly all of the countries within the geographic range of *G. galeus* are Parties to the CMS; although, notable exceptions include the United States, Canada, and Mexico. Tope sharks were listed under Appendix II of CMS in 2020, thereby obligating Parties to work regionally to promote their conservation. The CMS defines Appendix II species as "those that have an unfavorable conservation status and that require international agreements for their conservation and management, as well as those that have a conservation status which would significantly benefit from the international cooperation that could be achieved by an international agreement." The primary instrument for achieving international cooperation for sharks under CMS is the Memorandum of Understanding on the Conservation of Migratory Sharks (Sharks MOU), a non-binding global agreement established in 2010 that aims to maintain a favorable conservation status for migratory sharks based on the best available scientific information and taking into account the socio-economic value of these species. In 2023, the tope shark was added to Annex 1 of the Sharks MOU, which includes species that have an unfavorable conservation status and that require international agreements for their conservation or would benefit significantly from such an agreement. The current 49 signatories to the Sharks MOU aim to better understand migratory shark and ray populations, ensure sustainability of fisheries, protect critical habitats, increase public awareness, and enhance regional and international cooperation.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a legally-binding international agreement that aims to ensure that international trade in wild animals and plants does not threaten their survival. Its primary tool for achieving this goal is through the listing of species in one of three Appendices, which subjects their trade to certain regulations depending on the degree of protection that the species needs. The tope shark was listed on Appendix II of CITES during the 20th Conference of the Parties (CoP20) in November/December 2025. Appendix II includes species not necessarily threatened with extinction, but for which trade must be controlled to ensure utilization is compatible with their survival. This listing will go into effect June 5, 2027. International trade in specimens of the species will be allowed with an export permit, re-export certificate, or introduction from the sea (IFS) certificate granted by the proper management authority. The above permits or certificates may be granted if the trade is found to be nondetrimental to the survival of the species in the wild and the specimen was found to have been legally acquired. An IFS certificate applies when a specimen is taken on the high seas (not under the jurisdiction of any state) and is landed in a state. The recent listing of the species on Appendix II should help to ensure the sustainability of tope shark fisheries by regulating international trade in their parts and products, largely their meat.

Other Natural or Manmade Factors Affecting its Continued Existence

Because they generate electromagnetic fields (EMFs), undersea power cables have been identified as a potential concern for marine organisms that rely on electroreception and/or magnetoreception to perform basic life functions like orienting, navigating, and locating prey or predators. The IUCN Red List assessment for the tope shark (*i.e.*, Walker *et al*. 2020) specifically mentions high-voltage undersea cables as an indirect source of mortality that may affect feeding and navigation of tope sharks. However, no studies are cited to support the statement in the IUCN assessment and specific studies with respect to how tope sharks may rely on natural electrical or magnetic signals and how EMFs may impact their behaviors appear to be unavailable. Although more research is needed, the research available to date has not indicated that EMFs pose more than a negligible or minor impact on marine fishes (Kavet *et al*. 2016, U.S. Offshore Wind Synthesis of Environmental Effects Research (SEER) 2022).

Summary and Analysis of Section 4(a)(1) Factors for the NE Atlantic DPS

The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

The assessment of this threat focused on projected impacts on tope shark habitat over the foreseeable future from changes in environmental conditions, in particular the impact of increased ocean temperatures. Ocean temperature appears to be an important driver of tope shark distributions (Klippel *et al*. 2016), and significant changes in temperature could affect the future availability of suitable habitat. Available literature also suggests that tope shark habitat may be influenced by other variables, such as precipitation and salinity (Baez *et al*. 2016, Tunnah *et al*. 2016; Morash *et al*. 2016), but the impact of changes in these environmental variables on habitat for the NE Atlantic DPS is unclear.

Despite the likely importance of ocean temperatures on tope shark habitat, this threat was assigned a partial rating of Very Low based on available evidence indicating that the net effect of changing environmental conditions on the availability of suitable habitat for this DPS may be neutral or even positive over the foreseeable future. In particular, a 13.6 percent (239,103 sq. km) increase in suitable habitat area for the NE Atlantic DPS is projected under future ocean conditions. Analyses also indicate a likely poleward shift in habitat, with potential losses in the southern part of the range (*e.g.*, the Mediterranean Sea and off Northwest Africa) being more than offset by substantial projected habitat gains in the North Atlantic. Based on this, the team concluded that habitat curtailment as a result of changing environmental conditions is likely not a significant threat to this DPS by itself currently or in the foreseeable future.

Several limitations of the results of the habitat suitability model were noted, however, including its inability to account for various ecological and behavioral factors that may influence habitat use by tope sharks in the future under changed ocean conditions. The model, which uses tope shark occurrence data and seven environmental data layers (depth, surface and bottom sea temperature, salinity, primary productivity, dissolved oxygen, sea ice concentration, and distance to land) to project future suitable habitat, does not account for migratory behaviors, intra-specific variation, or altered ecological interactions. In addition, the relatively coarse scale of the habitat suitability model could mask more nuanced impacts of warming in nearshore nursery and pupping areas, which are more susceptible to extreme temperature swings and salinity changes. More severe and/or more frequent warming events in these shallower, coastal areas could elevate metabolic rates in young-of-year and juveniles tope sharks, potentially compromising their growth and energy reserves during a critical stage of development. Given these other considerations, the team ultimately concluded that changing environmental conditions may, in combination with other factors, contribute to the extinction risk of the NE Atlantic DPS over the foreseeable future; and therefore, they adjusted the rating of this threat to Very Low/Low. In summary, the mixed Very Low/Low score reflects the available evidence indicating no physical loss of suitable habitat across the range of this DPS and the potential, though uncertain, impacts on growth and development of juveniles within coastal nursery areas.

The team also assigned a Very Low/Low rating to habitat threats stemming from coastal development and pollution. This rating reflects the conclusion that habitat destruction from coastal development and pollution are not likely contributing significantly to extinction risk for the NE Atlantic DPS and acknowledgement that impacts to more sensitive coastal habitats may, in combination with other factors, contribute to long-term extinction risk. The team did not find any information about known or potential impacts of coastal development on tope sharks in the NE Atlantic specifically. The team instead discussed and considered evidence from the SW Pacific, where coastal development and habitat degradation were cited as a possible cause for observed declines in juvenile tope shark abundance in Australian nursery areas (TSSC 2009; Stevens and West 1997), and whether this may inform their assessment of potential impacts of coastal development on juvenile tope sharks in this DPSs. However, as acknowledged in that particular case, causal links were not established, and thus it is unclear what aspects of coastal development or habitat modification may have played a role in the observed decline in abundance of juvenile tope sharks.

With respect to pollution, bioaccumulation of contaminants is well documented in tope sharks, but evidence of any consequences on tope shark health and survival is lacking. Even in more remote areas, such as the Azores, tope sharks have been found to bioaccumulate heavy metals like mercury and arsenic (Torres *et al*. 2014); however, results of available studies suggest that tope sharks may have some capacity to limit toxic effects of mercury (*e.g.*, Bonwick *et al*. 1990). The team also acknowledged that plastics, which are fairly ubiquitous in the marine environment, have been documented in the stomach of a tope shark captured in the English Channel. However, as no data are available regarding the rates of plastics ingestion by tope sharks or the resulting health consequences, they viewed the available data as insufficient to further assess this potential threat.

In summary, there is very little information regarding the threat of coastal development and pollution to the NE Atlantic DPS. There is concern that this threat could disproportionately affect early life stages and may contribute to the long-term extinction risk of the NE Atlantic DPS in combination with other factors; however, the available information is not sufficient to conclude that this threat is likely to contribute by itself to the long-term or near future risk of extinction of the NE Atlantic DPS.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The threat of overutilization for the NE Atlantic DPS was assigned a rating of Low/Moderate, largely due to the ongoing but greatly reduced level of bycatch within the region. Although there are no directed commercial fisheries for the species within the NE Atlantic and recreational catch appears to be limited, tope sharks continue to be bycaught in commercial trawl, gillnet, and longline fisheries within the region.

Historical landings data for this region are considered unreliable due to under-reporting, species misidentifications, and the aggregation of shark landings into generic categories (like “dogfish” or “hound”) by many countries. The team concluded that the lack of any stock assessment and robust fishing effort data prevent a clear understanding of the level to which overutilization of this DPS of tope sharks may have occurred historically or is occurring currently.

Within this region, the North Sea, Irish Sea, English Channel, Bay of Biscay, waters off Spain and Portugal, waters off the northwest coasts of Scotland and Ireland, and waters around the Azores (subareas 4 and 6–10 of FAO Fishing Area 27) are considered the most important in terms of both tope shark occurrence and fishing activity. As there has been no directed tope shark fishery in these waters, the annual commercial catch estimates (live weight equivalent of landings, discards excluded) provided by the 20 ICES member countries reflect bycatch landed from other trawl, gillnet, and longline fisheries in the region (ICES 2023). Although some historical species-specific landings data are available, prior to 2005 many countries did not report species-specific shark landings (ICES 2022). Based on available, species-specific data, over the past 10 years, the highest capture volumes of tope shark have been reported by France, typically followed by Spain and then Portugal (see Figure 4-8 in Status Review Report). During 2018–2021, France accounted for about 78 percent of the reported landings, and in 2022, accounted for about 74 percent of the reported landings (ICES 2023a). Tope sharks are landed in French mixed fisheries operating mainly in the English Channel and Celtic Seas (Bonfil 1994; ICES 2023a; see Figure 4-9 in Status Review Report). In the 1980s, tope sharks ranked as France’s third most important commercial shark species, comprising 6 percent of shark landings, much of which was used domestically or exported to Italy (Bonfil 1994). However, France's export of tope shark to Italy declined after 1983 as a result of mercury contamination (Vannuccini 1999). Reported landings for France peaked in 1979 at 2,335 mt, which is an order of magnitude greater than current landings levels (ICES 2023a; see Figures 4-6 and 4-9 in Status Review Report). Landings reported for the early 1990s, which ranged from 279 to 408 mt per year, are similar to France's more recent landings data (*i.e.*, during 2005–2021), which have remained relatively consistent from year to year. Landings reported by Spain have declined since 2005, and some of the more recent decline may be attributable to management restrictions enacted in 2015 as well as missing data (ICES 2023a). Landings for Portugal, which primarily captures tope sharks in waters around the Azores (FAO subarea 10.a.2), fluctuated without a clear trend during 2005–2022 (see Figure 4-8 in Status Review Report). Portugal's lowest reported landings occur in 2019–2022, which may be attributable in part to the COVID-19 pandemic (ICES 2023a).

Around the Azores (within FAO subarea 10.a.2), tope sharks are landed as bycatch in mainly the swordfish (*Xiphias gladius*) fishery and the demersal longline fishery, and by recreational hand and pole lines (Santos *et al*. 2020). A review of landings data for this subarea from 1990 to 2018 by Santos *et al*. (2020) showed a decreasing trend in annual landings of tope sharks from 1998/2000 to 2009, followed by a small increase during 2010–2017 (see Figure 3-5 in Status Review Report). The estimated standardized CPUE (kg 10^{-3} hooks) fluctuates during the early 1990s but remains fairly stable over the remainder of the time period. Santos *et al*. (2020) hypothesized that the overall decrease in annual landings relative to the 1990s reflects an increased discard rate, which they suspected was driven by low market demand, both in domestic and in international markets, as well as management measures. Discard data for tope sharks necessary to verify this hypothesis are not available.

Within the Mediterranean (FAO Fishing Area 37), tope sharks have been commercially fished since at least 1985; however, there are limited historical landings data, particularly because much of the fishing was artisanal, and such landings were rarely reported or are otherwise difficult to find (Ferretti *et al*. 2005). Fishing for tope sharks in the Mediterranean has been prohibited since 2014 and reporting of incidental capture of tope sharks to the Regional Fisheries Management Organization (RFMO) for the Mediterranean, the General Fisheries Commission for the Mediterranean (GFCM), is required for member countries; however, data on incidental catch of covered sharks and rays by fishery and gear type is limited (GFCM 2018). Tope sharks are now taken as bycatch, primarily in commercial drift (*i.e.*, surface) longlines targeting tunas (*Thunnus spp*.) or swordfish (*Xiphias gladius*), and occasionally in small-scale fisheries, which commonly employ longlines and trammel and gill nets (Carpentieri *et al*. 2021). More rarely, tope sharks have also been reported as incidental catch in bottom otter trawls and small-scale set net fisheries (Carpentieri *et al*. 2021). The number of vessels participating in the bottom trawl fishery has declined since about the year 2000, and at least within the western Mediterranean, bottom trawling effort has shifted from the shelf into deeper waters to target high value shellfish (Ramirez-Amaro *et al*. 2020).

Overall, the frequency of tope shark bycatch in the Mediterranean appears to be moderate to low relative to other elasmobranchs. During 2000–2020, across all fisheries, tope sharks comprised 6.2 percent (by number) of the reported incidental catch of elasmobranch species (~2,339 sharks) in the Mediterranean, whereas the two most commonly bycaught elasmobranchs, the sandbar shark (*Carcharhinus plumbeus*) and the smooth-hound shark (*Mustelus mustelus*), comprised 20.9 percent and 15.9 percent of the reported catch, respectively (FAO 2020). Based on data for the westernmost portion of the Mediterranean (FAO Fishing Area 37.1.1), landings gradually increased to a maximum of nearly 50 mt in 2011, but then sharply declined in 2015–2016 and have remained below 5 mt per year since 2017 (see section 4.3.1.1. in Status Review Report).

Landings data are even more limited for the eastern central Atlantic portion of this DPS's range *(i.e.*, FAO Fishing Area 34), and appear to be available only from the year 2000 onward for three countries (Morocco, Portugal, and Spain). Based on the available data, total annual tope shark catch never exceeds 125 mt in this area and exhibits no clear trend.

Overall, the commercial landings of tope shark within the NE Atlantic region show a substantial decline since the 1980s and a moderate decline from 2005 to 2022, but appear fairly stable in recent years (see Figure 4-13 in Status Review Report). Large declines in tope shark landings ~10–15 years ago indicated in some of the available datasets could potentially reflect a collapse in tope shark abundance as a result of overexploitation. However, given concerns with data reliability and the lack of fisheries-independent abundance estimates or sufficient fishing effort data, the team had low confidence in making inferences based on trends in landings data. Interpretation of the available landings data is further complicated by the enactment of various management measures across the region for sharks and for tope sharks, in particular. For example, following a 2008 prohibition on commercial tope fishing by the UK, the proportion of tope sharks discarded by English and Welsh gillnet fisheries increased significantly, rising from 11 percent (2002–2007) to 67 percent (2008–2016) (Silva and Ellis 2019). Other notable measures include Recommendation GFCM/36/2012/3, which as of 2014, prohibited the retention, sale, and landing of tope sharks in the Mediterranean Sea; and Regulation EU 2015/104, which as of 2015, prohibited targeting and retention of tope sharks taken by longlines throughout most of the NE Atlantic. Some portion of the observed decline in tope shark landings is undoubtedly attributable to these management measures; however, ongoing bycatch in some fisheries, issues with generic labeling of shark landings, and an unknown level of discard mortality, prevent an accurate measure of the reduction in the threat of overutilization.

The team also noted that despite lower reported landings and existing regulatory protections, total tope shark landings have consistently exceeded the precautionary catch limits advised by ICES, often by a substantial amount. For the years 2024–2027, ICES advised that total annual landings not exceed 241 mt per year, but recent reported landings have been around 500 mt (ICES 2023a). In addition, the species' life history characteristics (*e.g.*, low productivity, late age-at-maturity) likely exacerbate this threat or slow the DPS's ability to rebound from historically higher levels of exploitation.

Ultimately, the team assigned a Low/Moderate rating to this threat to reflect the mixed evidence regarding the level of extinction risk posed by commercial fishing in the long and near-terms. Two team members found that, while the consistent exceedance of the precautionary catch limits advised by ICES suggests that overutilization of tope sharks may be occurring, there is insufficient evidence to conclude that overutilization is occurring in this region such that it poses an extinction risk to the DPS. Thus, these team members concluded that the available data are not sufficient to find that this threat, on its own, likely contributes significantly to the long-term or near future extinction risk of the NE Atlantic DPS, but it may in combination with other factors. One team member placed greater weight on indicators of historical overutilization and ongoing exceedance of advised catch limits to reach the conclusion that this threat is contributing to the long-term risk of extinction; thus, this team member assigned a Moderate rating to this threat. Given the limited confidence in the relevant, available data, the team agreed on a rating of "low sufficiency" for the available data, and consequently the ratings are based on best professional judgment and interpretation of the available information. This threat is discussed in more detail in section 4.3.1 of the Status Review Report.

Disease and Predation

This threat category was assigned a Very Low rating, reflecting agreement that, based on the best available information, neither disease nor predation is contributing significantly to the extinction risk of the NE Atlantic DPS now or over the foreseeable future.

Regarding disease, the team noted that while tope sharks are known to host a wide variety of parasites, there is no indication that any of these affect tope sharks with the prevalence or virulence such that they pose an extinction risk to the DPS—either on their own or in combination with other threats. The team also found no information regarding potential impacts from viral or microbial diseases.

Regarding predation, the team noted that several studies have documented predation on tope sharks by other elasmobranchs and marine mammals. However, there is no evidence that predation is posing an extinction risk to this DPS, and one of tope sharks' main predators, the broadnose sevengill shark, does not co-occur with the NE Atlantic DPS. While predation by grey seals has been observed in Northern Ireland, the team found no evidence to suggest that predation occurs at a level that poses any extinction risk to the DPS.

Inadequacy of Existing Regulatory Mechanisms

The inadequacy of existing regulatory mechanisms was assessed as posing a Low risk to the NE Atlantic DPS. Given that overutilization in commercial fisheries was identified as the primary threat to this DPS, the assessment of regulatory mechanisms was focused on a review of relevant fisheries management measures and their effectiveness. The Low rating assigned to this threat reflects the team's conclusion that while management gaps, compliance concerns, and enforcement challenges exist for specific areas of the region, the regulatory measures currently in place across most of the region are fairly comprehensive and are likely effective in reducing fisheries-related mortality of tope sharks.

Tope sharks in the NE Atlantic are managed by two RFMOs (the Northeast Atlantic Fisheries Commission (NEAFC) and the GFCM), the EU, and by individual countries within the region. Regulatory measures implemented by the NEAFC, the GCFM, the EU, and national governments within the region for sharks, and for tope sharks in particular, have increased substantially over the past 2 decades. In 2012, the GFCM adopted Recommendation GFCM/36/2012/3, which among other provisions, prohibits finning and retaining, transshipping, landing, storing, selling, displaying, or offering for sale shark species listed as endangered or threatened in Annex II of the Specially Protected Areas/Biodiversity (SPA/BD) Protocol, which as of 2014 includes the tope shark (Decision IG.20/5). The Recommendation mandates that tope sharks caught with bottom-set gillnets, longlines, and tuna traps shall be promptly released unharmed and alive, to the extent possible; it also includes broader conservation measures, such as a prohibition on finning and the beheading or skinning of sharks at sea and a requirement to record data on incidental catches and release events in logbooks. This Recommendation is binding for all Contracting and Cooperating Parties, which includes the EU and all countries bordering the Mediterranean. However, reports suggest that compliance and enforcement by member countries vary across the region (Koehler and Lowther 2025).

Three years after Recommendation GFCM/36/2012/3 was adopted**,** the NEAFC prohibited Contracting Parties from removing shark fins at sea and required annual reporting of all shark catch, including discards (Recommendation 10:2015). Contracting Parties include the EU, the United Kingdom (UK), Iceland, Denmark, and Norway. Under this same Recommendation, the NEAFC also encouraged, to the extent possible, the release of live sharks that are caught incidentally and are not to be used for food or subsistence, and encouraged research to help improve the management of sharks and reduction of shark bycatch. Multiple range countries have also adopted protections that mirror or support the GCFM or NEAFC regulations.

Beginning in 2009, the EU extended several regulatory protections to tope sharks, which have likely contributed to the modest reduction in landings within the ICES area in recent years. The earliest of these measures restricted bycatch of tope sharks in the spurdog (*Squalus acanthias*) fishery, which mainly operates in the North Sea, off the west coast of Scotland, and in the Celtic Sea, by prohibiting landing of tope sharks less than 100 cm TL and limiting the total bycatch aboard each vessel to 10 percent (by weight) of the catch (Annex Ia to Regulation (EC) 43/2009). Then, in 2011 and 2012, the EU prohibited all retention of tope sharks taken by longline in the spurdog fishery (ICES 2023a). In 2015, the EU adopted Regulation (EU) 2015/104, prohibiting all EU vessels from fishing for, retaining, transshipping, or landing tope sharks when taken by longline in essentially all EU waters of the NE Atlantic, except around Bear Island and Spitzbergen (in the Barents Sea), Skagerrak and Kattegat (in the North Sea), the Baltic Sea, and waters of the greater Azores region, and from the Azores east to Spain and Portugal. This prohibition does not apply to other gear types with significant bycatch of tope sharks, such as trawls and gillnets. Additionally, the exclusion of the Azores region and waters between the Azores and Portugal/Spain (*i.e.*, ICES subareas 27.9 and 27.10) is notable, as these areas account for a significant portion of recent landings (ICES 2023a).

In addition, in 2008, the UK adopted the Tope (Prohibition of Fishing) Order 2008, which prohibited fishing for tope sharks within English waters by any method other than rod and line; prohibited landing in England tope sharks (dead or alive) that were recreationally caught from a boat; prohibited transshipment of tope shark; required landing commercial caught tope sharks with fins and head attached; and set a retention limit for commercial fisheries of 45 kg (live weight) of bycaught tope shark per day (Statutory Instrument No. 2008/691). Based on an informal review of this legislation in

2010, stakeholder support and compliance with this law were found to be high (Department for Environment, Food & Rural Affairs 2013). Likewise, Scotland adopted The Sharks, Skates and Rays (Prohibition of Fishing, Trans-shipment and Landing) (Scotland) Order 2012, which among other provisions, included essentially the same restrictions for tope sharks in Scottish waters (Statutory Instrument No. 2012/63). The UK also passed the Shark Fins Act in 2023, which bans the import and export of detached shark fins and products containing them and amends Regulation (EU) 1185/2003 to extend the prohibition on the removal, retention on board, or transshipment and landing shark fins to all UK fishing vessels wherever they fish and to any fishing vessel in UK waters.

Other national-level measures include Spain's addition of tope sharks in 2015 to its List of Wild Species under Special Protection Regime (Order AAA/1771/2015), under which killing, capturing, hunting, or disturbing the species is prohibited in waters under Spanish jurisdiction or by Spanish-flagged vessels regardless of their location (Artículo 57, Ley 42/2007, Boletín Oficial del Estado no. 299). However, the team noted that Spain continued to land an average of approximately 86 mt of tope shark per year between 2016 and 2021. Further discussion of national-level measures considered by the team are identified in section 4.5.2.4 of the Status Review Report.

The team acknowledged that some critical gaps in the existing regulatory measures remain. For instance, an EU-wide total allowable catch (TAC) limit has not been established for tope sharks, and bycaught tope sharks can still be landed by some EU trawl and gillnet fisheries. The EU's 2015 longline retention ban also does not apply to ICES subareas 27.9 and 27.10 (*i.e.*, waters around the Azores and off Spain/Portugal), which account for a significant portion of landings. Management measures and strategies within the East Central Atlantic (FAO Fishing Area 34) also appear to be relatively poorly defined and weakly enforced, and there is concern regarding potentially unsustainable levels of fishing by foreign industrial fleets operating in this part of the region (*e.g.*, Oceanic Développement 2010). Within the Mediterranean, where a retention ban has been in place since 2014, some information suggests the GFCM measures are being poorly enforced (*e.g.*, in Tunisia), or, in other cases, information is simply lacking with respect to enforcement (*e.g.*, in Egypt and Libya).

Overall, regulatory protections for tope sharks in the NE Atlantic have increased substantially over time, with most being enacted within the past 20 years, which may not be a sufficient amount of time for their effectiveness to be observed at the population level given the long generation time and low productivity of the species. Existing regulatory protections include prohibitions on shark finning, which is now prohibited throughout the EU and Mediterranean, mandates for release of incidentally caught tope sharks, and restrictions on fishing and landing of the species in specific areas or by certain gear types. Given the fairly recent inclusion of tope sharks under two international conventions (*i.e.*, the 2020 Appendix II listing under CMS and 2025 Appendix II listing under CITES) and support of these actions by many range countries, the team concluded that the level of attention and commitment to tope shark conservation within this region is likely to continue over the foreseeable future. The Low risk rating of this threat reflects the team's conclusion that it is unlikely the existing regulatory mechanisms are contributing significantly to the extinction risk of the NE Atlantic DPS by themselves, but they may contribute to extinction risk in combination with ongoing fishing activity and the life history characteristics of tope sharks. The team also concluded that this particular threat is not uniform across the range of the DPS, but is likely greater in the Mediterranean (FAO Fishing Area 37) and East Central Atlantic (FAO Fishing Area 34). This threat is discussed in more detail in section 4.5.2 of the Status Review Report.

Other Natural or Manmade Factors Affecting its Continued Existence

The assessment of this factor focused primarily on the potential threat posed by EMFs generated by undersea power cables, which was highlighted by the Petitioners as a potential risk to tope sharks. While elasmobranchs generally rely on electroreception and magnetoreception to perform essential life functions, such as orienting, navigating, and locating prey or predators; however, the team was unable to find any data or research regarding tope sharks' reliance on natural electrical or magnetic signals and how EMFs may impact their behaviors. Available research to date (*e.g.*, Kavet *et al*. 2016; SEER 2022) has also not indicated that EMFs pose more than a minor impact on marine fishes. Given the general lack of information on this potential threat, the team concluded that the contribution of this threat to the extinction risk of tope sharks is Unknown.

Demographic Risk Assessment for the NE Atlantic DPS

Abundance

The demographic risk factor of abundance was rated as Low, reflecting agreement among the team members that abundance of the NE Atlantic DPS is not likely to be contributing to the species' long-term or near future risk of extinction by itself, but may in combination with other factors. Because most of the relevant, available data are based on studies designed for other species, the data are impacted by the low gear selectivity and low catch rates for tope sharks; and in some instances there are also apparent issues with species misidentifications. Thus, while decades worth of scientific survey data are available across the region, the team had somewhat low confidence in interpreting these data as a measure of tope shark abundance and trends.

In the core of the range of the NE Atlantic DPS (*i.e.*, FAO Area 27), the available survey data generally do not indicate that abundance has changed significantly over the past 2 to 3 decades. The data from multiple ICES surveys spanning 1992–2022, including the IBTS and the French and Irish Groundfish Surveys (EVHOE-WIBTS-Q4 and IGFS-WIBTS-Q4), generally show large fluctuations or sporadic peaks in catch rather than clear trends. Systematic surveys around the Azores also provide no evidence of a decline in abundance of tope sharks, which Santos *et al*. (2020) classified as "frequent" between 1990 and 2018. The team acknowledged that the most recent IUCN assessment (*i.e.*, Walker *et al*. 2020) projects a 76.6 percent decline in tope sharks in the NE Atlantic over the next three generations (79 years) based on data from this part of the range, but given the aforementioned weaknesses of the underlying survey data, the fact this model did not include the survey data after 2018 (which show some increases in tope shark abundance and biomass), and the large confidence intervals associated with this projection, the team had very low confidence in this specific projection as an indicator of extinction risk.

In contrast to the North Atlantic, available information suggests that tope sharks have become increasingly rare in the Mediterranean Sea (FAO Area 37). While the available survey data (*e.g.*, MEDITS) are insufficient for a robust quantitative assessment due to low frequency of capture, anecdotal accounts and historical analyses consistently indicate significant declines over the past several decades. The team also acknowledged the possibility that declines may be even more severe, given the likely under-reporting of shark landings, particularly in historical and artisanal fisheries. The available quantitative data from various surveys spanning 1948 to 2015 suggest that tope sharks are not very abundant in the Mediterranean, particularly in the central and eastern parts of the Mediterranean. In the absence of reliable historical data for most of the Mediterranean, this apparent rarity is difficult to interpret.

Despite the likely substantial declines in the Mediterranean, the team concluded that abundance by itself likely does not constitute a significant extinction risk for the NE Atlantic DPS. The best available data from the core of the population's range in the North Atlantic (including the Azores, Bay of Biscay, and waters surrounding the British Isles) do not indicate a significant, ongoing decline. While the depletion in the Mediterranean is concerning and may exacerbate the species' extinction risk in combination with other factors, the NE Atlantic DPS is unlikely to be at risk of extinction currently or in the foreseeable future due to its abundance alone.

Productivity

This demographic risk factor was assigned a Low rating. Although the tope shark's fairly low productivity clearly limits its capacity to rebound from depletion, the team concluded that this trait does not, by itself, contribute significantly to long-term or near future risk of extinction. However, there is some concern that this demographic factor may, in combination with other threats and/or demographic risk factors, contribute to long-term extinction risk of the DPS. Slow growth and late age-at-maturity, particularly for females, and a triennial reproductive cycle, contribute to a relatively low intrinsic rate of population increase (r_{max}), which is estimated at 0.041(CV = 0.154) globally. Beyond this inherent demographic vulnerability, however, the team found no evidence that population growth is currently below the replacement rate or has been compromised to a level that threatens the persistence of the NE Atlantic DPS (*e.g.*, via depensatory processes). There is evidence of pupping in areas throughout much of the region, including areas near mainland Portugal, the Canary Islands, the Azores, coastal United Kingdom and Ireland, and no evidence indicating reduced mating, fertilization, or shifts in demographic or reproductive traits suggestive of a decline in the per capita growth rate.

Diversity

The team assigned this demographic risk factor a rating of Very Low, reflecting their conclusion that this factor is unlikely to contribute significantly to the risk of the extinction for the NE Atlantic DPS, either by itself or in combination with other factors. Based on the best available information, which is fairly limited, the team found no evidence that the DPS is at risk due to a substantial change or loss of variation in life-history traits, population demography, morphology, behavior, or genetic characteristics.

The team considered the analysis of genetic samples collected from 5 different regions (using 11 polymorphic microsatellite loci), which indicated that tope sharks in the NE Atlantic (specifically, the Irish Sea) have a comparable number of alleles and private alleles and a comparable level of allelic richness relative to other sampled regions, with the exception of Australia where far more samples were taken (49 versus 12; Chabot 2015). Similarly, based on analysis of mtDNA (control region), tope sharks in the NE Atlantic have a fairly low but comparable level of nucleotide and haplotype diversity relative to tope sharks of other regions (Chabot and Allen 2009). Genetic analyses using both mtDNA and microsatellite markers have also found no evidence of significant population structure or barriers to gene flow within the region. Although sampling was limited, Thorburn (2015) found high connectivity and overlap in genotypes among samples collected from the North Sea, British Isles, Azores, and the Mediterranean Sea. Thus, the team found no evidence that natural processes of dispersal, migration, or gene flow have been significantly altered in a way that would pose a demographic risk.

The team also highlighted that the behavioral and ecological plasticity of this DPS likely lessens its extinction risk. Tope sharks in the NE Atlantic exhibit diverse migratory behaviors, including “partial migration,” where some females undertake long-distance migrations exceeding 2,000 km, while others remain within a relatively localized home range. Tope sharks in this DPS also utilize a wide variety of habitats, ranging from shallow coastal waters and continental shelves to deeper oceanic waters and insular areas. The diversity in habitat use and migratory behaviors likely provides the DPS with some resilience against catastrophic events that could affect a specific area or habitat type.

The team acknowledged the decline of tope sharks in the Mediterranean basin and how this distinct environment within the DPS’s range could theoretically select for specific behavioral or life history adaptations. A significant loss of tope sharks with fidelity to the Mediterranean could constitute a loss of diversity if those individuals possessed unique local adaptations. However, there are currently no data indicating that tope sharks that occur in the Mediterranean are demographically, morphologically, or genetically distinct from those in the Atlantic Ocean. Thus, while the decline in abundance in the Mediterranean is a concern, the team found no evidence that this decline represents a critical loss of genetic or life-history variation that would threaten the persistence of the NE Atlantic DPS across its entire range.

Spatial Structure/Connectivity

Spatial distribution for tope sharks in this DPS was assigned a rating of Very Low, as this demographic factor was not viewed by any team members as contributing significantly to risk of extinction for this DPS, either by itself or in combination with other factors. Tope sharks remain broadly distributed across the region, and range from the waters off Iceland, the Faroe Islands, and southern Norway in the north, southward through the British Isles and North Sea, along the coasts of France, Spain, and Portugal, into the Mediterranean Sea, and as far south as Northwest Africa (*e.g.*, Cabo Verde and Senegal). Within their range, tope sharks in this DPS use shallow coastal bays and estuaries as well as deep offshore waters along the continental slope. There are no known physical barriers to dispersal within this region that would prevent the species from accessing available habitat or moving between areas in response to environmental or anthropogenic stressors.

The available scientific data—albeit somewhat limited—support the characterization of the NE Atlantic DPS as a single, large, and well-mixed population, and tagging studies have confirmed a high level of connectivity throughout the region. While some individuals exhibit localized movements (remaining within < 500 km of release sites), others undertake extensive, long-distance migrations spanning 1,800 to 3,500 km. The migratory behaviors coupled with the available genetic data suggest that localized depletions or habitat degradation in specific sub-regions are unlikely to threaten the persistence of the DPS as a whole.

The team acknowledged that future loss of suitable habitat due to changing ocean conditions is likely greater within the Mediterranean and along the Atlantic coast of northeastern Africa (see Figure 4-1 in Status Review Report); however, these habitat losses are projected to be more than offset by the future creation of suitable habitat in the northern part of the range. The lack of genetic structure between the Mediterranean and broader NE Atlantic samples coupled with the species' migratory behavior suggest that the Mediterranean or northeastern Africa portions of the DPS are not isolated, but rather part of the larger, interconnected DPS. Thus, while some individuals may exhibit a level of fidelity to these portions of the range, the risk of declining abundance and/or loss of habitat suitability in these areas likely does not place the DPS as a whole at greater risk of extinction in the foreseeable future.

Extinction Risk Summary: NE Atlantic DPS

Based on their review of best available data regarding threats and demographic risks to this DPS, the team concluded that the NE Atlantic DPS is currently at a Low Risk of extinction. Confidence in this conclusion was moderate, as the majority of the team's likelihood points (60 percent) were allocated to the low risk category, and the remainder of the points (40 percent) were allocated to the Moderate Risk category. The absence of more reliable, historical and long-term abundance data were noted as preventing a higher level of confidence in this rating.

Overutilization for commercial purposes was identified as the most significant threat to tope sharks in the NE Atlantic DPS. Although tope sharks have had relatively limited commercial importance in this region, they were historically taken in larger volumes relative to recent decades for both domestic consumption and trade, and available evidence suggests the population has undergone historical declines in abundance, particularly in the Mediterranean. Tope sharks continue to be taken as bycatch in a variety of commercial fisheries in this region, including trawl, gillnet, and longline operations. However, based on ICES and FAO data, in the years since 2010, reported tope shark landings have remained low and are an order of magnitude lower relative to reported commercial landings from the 1970s and 1980s (ICES 2023a). Reported landings in the most recent decades have also remained stable and do not indicate any clear upwards or downwards trends. The documented decline in landings relative to the 1970s and 1980s can be attributed, at least partially, to various management measures and steadily increased protections for tope sharks throughout the region, including the prohibitions on shark finning throughout the EU and Mediterranean, mandates for release of incidentally caught tope sharks, and restrictions on fishing for and landing tope sharks in specific areas or by certain gear types (*e.g.*, 2008 Tope Order, GFCM/36/2012/3, Regulation (EU) 605/2013, Regulation (EU) 2015/104). Some concerns remain regarding ongoing fisheries-related mortality of tope sharks and effectiveness of existing management measures; however, the impact of ongoing fishing activity on the status of this DPS is poorly understood given data limitations and the lack of any stock assessment.

While the available fisheries-independent data also suffer from sampling flaws and other limitations, when considered together, these data do not indicate that this DPS is undergoing ongoing decline. Data from the individual systematic surveys of the North Sea, Celtic Seas, English Channel, and Biscay Bay indicate that the NE Atlantic tope shark population has not changed significantly over the respective data collection periods, which range from 1991 to 2022. Systematic surveys around the Azores also provide no evidence of a decline in abundance of tope sharks, which are considered relatively frequent in this area (Santos *et al.* 2020), and a preliminary mark-recapture study suggests a stable population around Ireland (ICES 2020). Based on available Gruppo

Nazionale Risorse Demersali (GRUND) trawl survey data for 1972–2004, MEDITS trawl survey data for 1994–2015, and other trawl surveys conducted during 1948–1995, tope sharks appear to have a low frequency of occurrence within the Mediterranean Sea (Ferretti *et al*. 2005, Ferretti *et al*. (2013, Ramirez-Amaro *et al*. 2020), which contrasts with available historical, qualitative descriptions of tope sharks being common or regularly observed within the western Mediterranean (*e.g.*, Capapé *et al*. 2005, Ragonese *et al*. 2013). The low frequency of tope sharks in the available survey data, coupled with likely poor catchability of tope sharks in the trawl surveys, and limited landings data, greatly increase the level of uncertainty regarding both the historical and current abundance of tope sharks within the Mediterranean. While the most recent IUCN assessment (*i.e.*, Walker *et al*. 2020) does project a 76.6 percent decline in tope sharks in the NE Atlantic over a 79-year period, as noted previously, this particular forecast has a high level of associated uncertainty (large 95 percent CIs), such that population growth cannot be ruled out, and it does not capture the most recent years of survey data, which show a slight increase in tope sharks abundance and biomass (ICES 2023a).

The team considered how the life history strategy of this species increases its vulnerability to overutilization relative to many other shark species; however, they found no clear evidence of other demographic risks to this DPS. Based on the limited, available data, they found no indication of declines in productivity or diversity or evidence that the species is at such a low abundance that depensatory processes are at work. Data are also limited with respect to habitat degradation and loss, but based on habitat suitability modelling, they concluded that changes in environmental conditions are not likely to limit the availability of suitable habitat for this DPS over the foreseeable future. There is also no evidence that disease, predation, or other manmade factors are contributing to the NE Atlantic DPS's risk of extinction.

Overall, the team found that this DPS is at fairly low risk of extinction over the foreseeable future. This conclusion was based on: survey data from the core of the range showing relatively stable abundance over recent decades; the lack of clear evidence of ongoing population decline; improved regulatory frameworks that, while imperfect, have reduced retention and landings; and lack of a clear indication of a decline in the area of suitable habitat within the range. Some likelihood points were attributed to "Moderate" risk as result of the significant uncertainty regarding the impact of historical fishing, particularly within the Mediterranean, and the continued pressure from ongoing fisheries-related mortality in parts of the range.

Significant Portion of its Range Analysis: NE Atlantic DPS

Because the team concluded that this DPS is at low to possibly moderate risk of extinction throughout its range, they also considered whether this DPS is at a moderate or high level of extinction risk within an SPR. In order to conduct this analysis, and as explained previously, the team first identified portions of the DPS's range where the species may be at elevated extinction risk and where the members of the species in that portion may be biologically significant to the long-term viability of the DPS. Based on their analysis and in light of the identified threats to this DPS—particularly overutilization for commercial purposes—they considered two potential portions of the range: the East Central Atlantic (FAO Fishing Area 34) and the Mediterranean Sea.

The high level of foreign industrial fishing activity in the East Central Atlantic (*i.e.*, FAO Fishing Area 34), coupled with the relatively weaker management measures and limited capacity for enforcement, were collectively taken as an indication that threats to tope sharks may be relatively greater within this portion of the range. The team also viewed the available evidence indicating that habitat suitability in this southernmost part of the DPS's range may potentially contract under changes in environmental conditions as an additional indication that threats may be elevated in this portion of the DPS's range.

There are, however, extremely limited data with respect to historical or current exploitation levels and tope shark abundance to inform a review of the status of tope sharks within this portion of the range specifically. The team was unable to find any assessments of abundance or trends within this FAO Area, and the limited FAO landings data, which are available for three countries (Morocco, Portugal, and Spain) do not indicate any clear trends in tope shark abundance. In addition, observed migratory movements of adult tope sharks from the coasts of Wales, Ireland, and England to Morocco and the Canary Islands (*e.g.*, Holden and Horrod 1979, Fitzmaurice *et al*. 2003) and the lack of any stock delineation or genetic evidence of population structuring (*e.g.*, Thorburn 2015), frustrated their ability to draw biologically meaningful distinctions between the status of tope sharks in this portion of the range versus the status of tope sharks elsewhere in the region. Essentially, despite any differences in threats to tope sharks in this portion of the range, the seasonal migratory behavior of adult male and female tope sharks and resulting connectivity of tope sharks in this particular area to other parts of the NE Atlantic prevented any clear distinction with respect to the status of tope sharks in this particular area versus their status throughout the range. Overall, given the extremely limited data, the team found they did not have a sufficient basis to conclude that tope sharks in the East Central Atlantic portion of the range are at moderate or high risk of extinction, and more importantly, that their status is even distinct from tope sharks elsewhere in the DPS's range. Given this conclusion, they did not further analyze this portion of the range to determine whether it qualifies as a "significant portion."

The team also identified the Mediterranean Sea as a portion of the NE Atlantic DPS's range warranting further analysis given the evidence of historical declines, the projected loss of suitable habitat over the foreseeable future, and some limited evidence of unique characteristics of tope sharks in this part of range. To conduct this SPR analysis, they first addressed the question of whether tope sharks within the

Mediterranean Sea are at moderate or high risk of extinction. They considered the available information suggesting that tope sharks were once much more common around the Balearic Islands, southern Spain, Algeria, Tunisia, and possibly Italy (*e.g.*, Capapé *et al*. 2005, Ferretti *et al*. (2005, Grau *et al*. 2015); the data from the GRUND and MEDITS scientific trawl surveys indicating that tope sharks were absent or only infrequently captured in recent decades; and the review by Serena *et al*. (2020), which found that tope sharks are now rare throughout all regions of the Mediterranean. Management protections for tope sharks have increased in this part of the range due, in large part, to their listing in 2014 on Annex II of the SPA/BD Protocol and the resulting prohibition on landing, retaining, and selling tope sharks under the 2012 GFCM Recommendation (GFCM/36/2012/3); and these increased regulatory protections may have contributed to the decline in tope sharks bycatch over the last decade. However, multiple Mediterranean countries, including Egypt, Syria, Libya, have not adopted clear shark management plans or other national shark protections, and there is evidence of illegal shark fishing practices and fraudulent trade within the Mediterranean (Barbuto *et al*. 2010, Anesi and Rubino 2020). In addition, a substantial loss of suitable habitat within the Mediterranean was projected to occur due to changes in ocean conditions. Thus, although there are concerns and a high degree of uncertainty associated with the available data, the team concluded that the weight of the evidence indicates tope sharks in this portion of the DPS's range may be at moderate or potentially even high risk of extinction.

Given that conclusion, the team also considered whether tope sharks within the Mediterranean Sea could be considered a "significant portion" of the DPS's range. To address this question, they evaluated whether the available data indicate tope sharks within this portion of the range have historically or currently contribute to the long-term viability of the DPS. In conducting this part of the analysis, they considered the contribution of Mediterranean tope sharks to the DPS's viability in terms of its contribution to the DPS's abundance, connectivity, productivity, and diversity.

As discussed in the Status Review Report, the available quantitative and qualitative data suggest that, historically, tope sharks were likely much more common within the Mediterranean Sea. The available tagging data also indicate that some adult tope sharks, particularly adult females, will undertake long-distance migrations from elsewhere in the NE Atlantic to areas within the Mediterranean, including to Spain, Algeria, and Sicily (Little 1995, Fitzmaurice *et al*. 2003, Colloca *et al*. 2019, Thorburn *et al*. 2019). The team could not, however, determine the extent to which tope sharks within or originating from the Mediterranean "portion" contributed to the DPS's overall abundance, nor could they find any tagging or movement data that would provide insight into movements of tope sharks from the Mediterranean Sea to the remainder of the range. Late-term pregnant females have been observed in the Mediterranean and pupping may occur there, but evidence to confirm this is lacking (Capapé *et al*. 2005). The lack of pupping, tagging, and movement data also prevented the team from evaluating the level of philopatry of tope sharks to the Mediterranean Sea.

Thorburn's (2015) genetic analysis of tope shark samples collected from 11 locations within the NE Atlantic region, including the Mediterranean (Algeria and Balearic Islands), indicated low and homogenous levels of nDNA and mtDNA diversity across the region. Thorburn (2015) found no evidence of population structuring between the Mediterranean and other parts of the NE Atlantic, further suggesting that tope sharks in the Mediterranean do not have a measurable influence on the overall genetic diversity or fitness of the larger DPS. These authors did, however, caution that some genotypes in the Mediterranean were different from the rest of the NE Atlantic and that schooling behaviors and migratory ability of tope sharks could have masked potential differentiation due to heterogeneity within the samples; therefore, they recommended that additional sampling and analysis be conducted to more fully evaluate genetic structure in this region.

Munoz-Chapuli (1984) had previously hypothesized that tope sharks within the NE Atlantic region consist of subpopulations and, in support of this hypothesis, noted that tope sharks appear to reach larger total lengths in the more southern portions of the NE Atlantic (150–170 cm TL in Alboran Sea versus 150 cm TL in British waters). However, a growth model for tope sharks in the NE Atlantic estimates a maximum total length of about 201 cm for females and 177 cm for males (Dureil and Worm 2015), both of which are larger than lengths observed by Munoz-Chapuli (1984). Colloca *et al*. (2019) also reported the tagging of a 175-cm-long adult female off the coast of Scotland in 2009 and its subsequent recapture 5.4 years later in the Mediterranean, at which time it measured 212 cm. This information highlights both the connectivity of tope sharks across the region and the possibility that some of the available data may be confounded by the fact that larger adults undergo longer migrations. Other phenotypic metrics reported for tope sharks in the Mediterranean, including size at birth, litter size, and oocyte size, also do not appear to differ from other geographic locations (Capapé *et al*. 2005), suggesting that tope sharks within the Mediterranean do not bear unique traits. Given the results of Thorburn's (2015) study indicating homogenous gene-flow throughout the region and the lack of any additional lines of evidence, the team concluded that there is insufficient data to support Munoz-Chapuli's (1984) hypothesis.

Overall, the relationship between tope sharks occurring in the Mediterranean Sea portion versus the rest of the NE Atlantic region remains poorly understood. The available abundance, movement, and genetic data do not provide sufficient evidence to conclude that tope sharks originating in the Mediterranean Sea have historically served or currently serve as an important source population for the remainder of the DPS and its overall viability. The available genetic and phenotypic evidence are also too weak to indicate that tope sharks in the Mediterranean have unique genetic characteristics or ecological traits such that they have been or are currently important to the long-term viability of the DPS. Therefore, based on the available data, the team concluded that tope sharks in the Mediterranean Sea do not constitute a significant portion of the DPS's range.

Listing Determination: NE Atlantic DPS

Based on our review of the best available scientific and commercial data and the extinction risk assessment, as provided in the Status Review Report and summarized herein, we have determined this DPS is not in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. We considered efforts being made by any state or foreign nation, or political subdivisions thereof, to protect and conserve the species (see **Conservation Efforts**). These conservation efforts do not change the conclusion we would otherwise have reached regarding the DPS's status. Therefore, we find that the NE Atlantic DPS does not meet the definition of a threatened or endangered species, and thus does not warrant listing under ESA.

Summary and Analysis of Section 4(a)(1) Factors for the So. Africa DPS

The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Based on an evaluation of the best available information, the team determined that the threat of habitat modification from changes in environmental conditions poses a Low/Moderate risk to the So. Africa DPS. (See **Summary of Section 4(a)(1) Factors Affecting All DPSs**, above.)

In contrast to other regions where tope shark habitat is predicted to expand, the team's analysis projects a 6.4 percent (21,748 sq. km) net decrease of suitable habitat area for the So. Africa DPS, driven by the projected loss of suitable habitat in the northern portion of the region and the inability for the population to shift its distribution poleward (as the continent does not extend further south). While this decrease in suitable habitat area over the foreseeable future is not likely to significantly drive the DPS towards extinction on its own, it may exacerbate other threats or demographic risks. Additionally, as noted previously, there is concern that the habitat suitability analysis does not capture more nuanced and potentially more severe impacts of changing ocean conditions in coastal pupping and nursery grounds. These shallow nearshore habitats, which are essential for juvenile development, are also particularly vulnerable to extreme temperature fluctuations and terrestrial runoff. However, the team was not aware of any research that has specifically evaluated these potential impacts on tope sharks in the region; thus, the team was not able to evaluate their likelihood or severity with any certainty.

The team also considered the sensitivity analysis conducted by Ortega-Cisneros *et al*. 2018, which rated tope sharks among the most sensitive species in the southern Benguela upwelling region to ocean warming and associated environmental impacts. The study concluded that tope sharks "likely have a low capacity to respond to effects of climate change," in part due to potential impacts on the timing of the species' seasonal movements and reproductive behaviors.

Ultimately, the mixed Low/Moderate score reflects a balance between the relatively low projected physical loss of habitat and the potentially higher, though uncertain, biological vulnerability of the species. The scope of the threat is generally widespread and expected to persist over the foreseeable future; however, the severity of the threat is difficult to quantify. The team concluded that while the projected habitat loss alone represents a low risk, the combination of range contraction with potentially acute impacts from changing environmental conditions in critical nursery areas, as well as the species' low expected resilience to ocean warming could contribute significantly to the species' extinction risk, particularly when acting synergistically with other threats or demographic risks.

The team assessed the best available information on the impacts of coastal development and pollution on tope sharks throughout their range in **Summary of Section 4(a)(1) Factors Affecting All DPSs**, and no further information specific to this DPS is available. The team acknowledged that impacts to sensitive coastal habitats (and therefore early life stages) could, in combination with other factors, contribute to the extinction risk of the So. Africa DPS; however, there is no evidence that habitat destruction from coastal development and pollution is contributing significantly by itself to the extinction risk of the DPS now or in the foreseeable future. Therefore, the threat was rated as Very Low/Low.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The team determined that overutilization poses a Moderate/High risk to the So. Africa DPS. Although this DPS ranges from Southern Angola to South Africa, very little data regarding shark landings and no species-specific data regarding tope sharks are available from Angola and Namibia. Thus, this discussion focuses on fisheries-related impacts within South Africa. Commercial-scale fishing for tope sharks in South Africa began in the 1930s, and the species continues to be targeted and taken as bycatch in commercial and recreational fisheries today (Walker 1999; McCord 2005; da Silva *et al*. 2015). Tope sharks are currently one of the five most commercially valuable shark species harvested in South African fisheries (Winker *et al*. 2019). Tope sharks are caught most frequently in the demersal shark longline fishery, the commercial linefishery, and the offshore and inshore demersal trawl fisheries (da Silva *et al*. 2015). They are less frequently caught in the pelagic longline fishery, the recreational linefishery, the beach-seine net fishery, the gillnet fishery, and the small-pelagic and midwater trawl fisheries (da Silva *et al*. 2015; Department of Forestry, Fisheries and the Environment (DFFE) 2023).

Historically, tope sharks experienced fluctuating and often heavy fishing pressure in South Africa. During World War II, they were heavily targeted although no landings were recorded prior to 1948 (Freer 1992). Recorded landings in 1948 totaled 250,000 individual tope sharks (roughly estimated at 3,750 mt live weight), and a catch limit of 250,000 sharks was set to protect the fishery (Freer 1992, Walker 1999). Though demand for liver oil declined in the 1950s due to development of synthetic vitamin A, demand for dried and frozen shark meat subsequently increased, leading to catches of approximately 2,000 mt in 1967 (Freer 1992, Walker 1999). Demand temporarily declined again due to concerns about high mercury levels; however, the export market for shark meat rebounded several years later and sustained annual landings above 1,000 mt into the 1990s (Walker 1999).

Today, the species continues to be caught across multiple fisheries, including as a target species in the demersal shark longline fishery. Average annual catch in South Africa has decreased substantially to less than 400 mt since 2011 and less than 200 mt since 2017 (DFFE 2023). The commercial linefishery is responsible for the largest proportion of the catch, accounting for an average of 63 percent of landings between 2010 and 2023 (DFFE 2025).

The team's evaluation relied heavily on the findings of the 2019 stock assessment for tope sharks (Winker *et al*. 2019). All four modeling scenarios used by Winker *et al*. (2019) indicated that fishing pressure (F/F_{MSY}) increased dramatically in 1952 to its peak in the early 1960s ($F/F_{MSY}>4$). The intense fishing pressure during the 1960s resulted in tope shark biomass falling below B_{MSY} in the mid-1960s, which had not been reversed by the time of this assessment (Winker *et al*. 2019). Winker *et al*. 2019 estimated that tope shark abundance in South Africa declined by an average of 2.7 percent per year between

1991 and 2016, resulting in a total decline of 50.9 percent over that period. The assessment concludes with a greater than 99 percent probability that the stock was overfished and subject to overfishing, estimating that population biomass had declined to just 10–14 percent of its carrying capacity (Winker *et al*. 2019). Projections from this assessment indicated that if 2016 catch levels (~329 mt) were maintained, commercial extinction could occur by 2055 (Winker *et al*. 2019). To reverse this decline and allow for even a slow population rebound, the assessment indicated that the annual harvest rate must be reduced to less than 100 mt.

The 2024 DFFE stock assessment of the South African tope shark—referenced in the 2025 "Status of South African Marine Fishery Resources" report (DFFE 2025)—indicated that the tope shark is no longer subject to overfishing, but that the species remains overexploited with an 87 percent loss of historical biomass since the 1920s. The 2024 DFFE stock assessment is not publicly available, so the team was not able to compare the data and methods with those of Winker *et al*. (2019). The 2025 "Status of South African Marine Fishery Resources" report (DFFE 2025) estimates that average annual landings of tope sharks during 2010–2012 ranged from 101–400 mt (dressed weight) and, during 2013–2023, ranged from 101–200 mt (dressed weight) across all South African fisheries. This report (DFFE 2025) also states that the most recent total catch assessment was 96 mt for tope sharks; it is unclear which year this represents, so we assume it is from 2021, the last year of the 2024 stock assessment time-series. Notably, both Winker *et al*. (2019) and DFFE's 2025 report recommended that annual mortality be maintained under 100 mt per year to increase biomass to sustainable levels. Even with annual landings below 100 mt, however, Winker *et al*. (2019) cautioned that the rebound would be extremely slow.

Regarding the projection of Winker *et al*. (2019) that commercial extinction could occur by 2055 at recent catch levels, the team discussed the distinction between “commercial extinction” and biological extinction. Commercial extinction refers to the population level at which a commercial fishery is no longer financially sustainable. It is very difficult to measure in absolute terms given the various socioeconomic factors at play, but by definition, commercial extinction of the fishery stock would occur before biological extinction of the species. Extrapolating from the projection of commercial extinction (Winker *et al*. 2019), biological extinction would occur at some time after 2055. Moreover, recent reports indicate that average annual catches have decreased, falling to less than 200 mt from 2017 to 2019, and in 2021, dipping below the 100 mt recommended limit per the DFFE (2025). This has coincided with a similar reduction in fishing effort in the targeted demersal shark longline fishery. Only one vessel reportedly held a commercial permit as of October 2025, down from four in 2021. While illegal gillnetting remains a concern in some coastal areas, the recent reductions in both fishing effort and the reported landings lends support to a Moderate risk rating for this threat.

Ultimately, the mixed Moderate/High score reflects the finding that while historical overutilization has driven population biomass to below sustainable levels, recent trends in catch reduction offer some potential for mitigation. Even as landings have declined recently, South Africa’s DFFE (2025) stated that urgent steps were needed to maintain fishing mortality below 100 mt annually.

Given the species’ low productivity and the fact that the population remains at a fraction of its unexploited biomass, overutilization continues to contribute significantly to the species’ extinction risk in the foreseeable future. This threat is discussed in more detail in section 4.3.2 of the Status Review Report.

Disease and Predation

The team assessed the best available information on disease and predation on the tope shark throughout its range in **Summary of Section 4(a)(1) Factors Affecting All DPSs**, and no further information specific to the So. Africa DPS is available. The team assigned a score of Very Low for the threat of disease or predation, reflecting overall agreement that, based on the best available information, neither disease nor predation is likely to contribute significantly to the extinction risk of the So. Africa DPS.

Inadequacy of Existing Regulatory Mechanisms

Based on an evaluation of the best available information, the team determined that the inadequacy of existing regulatory mechanisms poses a Moderate risk to the So. Africa DPS. The scope of this threat is widespread as the existing regulations apply to the fisheries that interact with tope sharks across the species' core distribution off South Africa. The team was not able to find any information about existing fisheries or regulatory mechanisms for tope sharks outside of South Africa.

South Africa's DFFE is the agency charged with managing, protecting and conserving South Africa's environment and natural resources. South Africa issued and adopted the first NPOA-Sharks in 2013. After a panel of shark experts and managers assessed the NPOA in response to public concerns about coastal shark populations, the DFFE approved an updated version of the document in 2022. Since then, several management measures have been implemented. In the demersal longline fishery and the commercial linefishery, all retained elasmobranchs must fall into the slot limit of 70–130 cm. Safe handling and release protocols and data collection requirements also apply to all sharks that are caught and released. In the pelagic longline fishery, regulations no longer allow the use of wire leaders and require that sharks be landed with fins naturally attached or partially attached and tethered (DFFE 2022, 2023). In both the pelagic longline and demersal shark longline fisheries, no species that are listed in CITES Appendix II may be landed; however, as previously mentioned, the recent listing of tope sharks on Appendix II of CITES has yet to go into effect.

Several sources have highlighted an urgent need to strengthen regulatory mechanisms in South Africa to improve the outlook for the tope shark population. As discussed above with respect to the threat of overutilization, a 2019 stock assessment determined that annual harvest needed to be reduced to less than 100 mt to allow for rebuilding, and in 2023, South Africa's DFFE stated that urgent steps needed to be taken to reduce fishing mortality for tope sharks. To the team's knowledge, South Africa has not developed a formal rebuilding plan, nor has it implemented a TAC for tope sharks. Management of the demersal shark longline fishery instead relies on effort controls (*i.e.*, limiting the number of permits issued), which are generally less protective than catch limits, because they do not cap the total number (or biomass) of animals taken—even with limited vessels, efficiency increases or shifts in targeting can lead to unsustainable mortality levels. As discussed above, only one vessel held a commercial permit in this fishery as of October 2025. There do not appear to be any catch or effort restrictions for tope sharks in other South African fisheries, such as the commercial linefishery (which is estimated to account for over 60 percent of tope shark landings in South Africa) or the inshore demersal trawl fishery. DFFE (2023) states that because tope sharks are caught across multiple fisheries, reducing catches is more difficult than species that are mainly targeted by one fishery.

Recent reporting also highlights several challenges that South Africa's DFFE faces regarding the enforcement of existing regulatory mechanisms (*https://news.mongabay.com/2025/10/south-african-sharks-threatened-by-fisheries-weak-enforcement/*). In particular, resource constraints have prevented the agency from deploying sufficient on-board observers to satisfy regulatory requirements, and while electronic monitoring (EM) systems are being tested, the software is not well-suited to distinguish between species, limiting its utility for accurately monitoring discards. Moreover, documented incidents of regulatory non-compliance, such as vessels fishing for sharks within marine protected areas (MPAs) and violations of on-board processing restrictions (*e.g.*, fins-attached requirements) further demonstrate ongoing deficiencies in the existing regulatory regime. The 2025 DFFE report also highlighted a growing issue of illegal gillnetting throughout coastal South Africa, which is taking large numbers of sharks due to increased access to affordable nets.

Overall, the team assigned a Moderate rating to this threat, reflecting that while there are clear, ongoing deficiencies in the implementation and enforcement of tope shark management measures in South Africa, recent developments (such as the reduction of permits in the demersal shark longline fishery) and an increasing focus by South Africa's DFFE on tope shark conservation may be contributing to the ongoing reduction in landings since 2010. In a 2025 report, DFFE indicated that total landings in 2021 had declined to 96 mt, below the recommended level of 100 mt. The agency concluded that the stock is therefore no longer subject to overfishing, but that it is still in an overfished state, with an estimated 87 percent loss of historical biomass since the 1920s. Considering the scale of this historical population decline, driven in part by an absence of effective regulatory mechanisms, and the ongoing deficiencies in compliance and enforcement, the team finds it likely that this threat contributes significantly to the species' risk of extinction over the foreseeable future, but does not on its own constitute a danger of extinction in the near future.

Other Natural or Manmade Factors Affecting its Continued Existence

The team unanimously concluded that the contribution of this factor to the extinction risk of the species across its range could not be determined (see **Summary of Section 4(a)(1) Factors Affecting All DPSs**).

Demographic Risk Assessment for the So. Africa DPS

Abundance

Based on the best available information, the team assigned a score of Moderate to the Abundance demographic risk factor for the So. Africa DPS. They relied primarily on the 2019 stock assessment (Winker *et al*. 2019), which represents the most comprehensive analysis of tope shark abundance and population trends in the region. The results of this assessment indicate that the population has experienced unsustainable fishing pressure since at least the 1950s, reducing the population biomass from approximately 93–94 percent of its carrying capacity in 1952 to just 10–14 percent of carrying capacity in 2016. Between 1991 and 2016, tope shark abundance is estimated to have declined at an average rate of 2.7 percent per year, resulting in a total decline of 50.9 percent over that period.

The 2019 stock assessment model used JARA to project a total population decline of 85.1 percent over three generation lengths and potential commercial extinction by 2055 if catch levels from 2016 (~329 mt per year) were to continue. Separately, the most recent IUCN Red List Assessment estimated a 3.1 percent annual reduction in population, consistent with an estimated median reduction of 91.4 percent over three generation lengths (79 years, 1952–2029; Walker *et al*. 2020). The IUCN projections were based on the data cited to "H. Winker pers. comm. 21/01/2020" spanning 65 years (1952–2016); although, it appears that predictions from the Winker *et al*. (2019) stock assessment model were used as input data for the IUCN analysis (see Winker *et al*. 2019, Figure 7), rather than raw CPUE data, which complicates error estimation and created concerns about the robustness of the IUCN model. The population declines indicated by both JARA analyses are similar; however, the team found the results from Winker *et al*. (2019) to be the best available based on the clarity of model inputs and data on which the projections were based.

The team considered several caveats that contribute to uncertainty in these projections. First, the confidence interval in the projections from Winker *et al*. (2019) is very wide and includes a range of possible outcomes, from continued decline to a stable or even slightly increasing population trend. Additionally, both population trends described above are derived from a single research trawl survey, which likely suffers from low catchability and therefore may not accurately capture an accurate picture of population abundance. The models are also reliant on certain assumptions that may have influenced the results of the analysis to some degree. We also note the importance of distinguishing between "commercial extinction" and biological extinction, as described in relation to the threat of overutilization above. Thus, while there is high confidence that abundance has declined significantly since the 1950s and remains in a severely depleted state, there is substantial uncertainty regarding the future population outlook, particularly considering that recent harvest has been considerably lower than 2016 levels; at the most recent total catch assessment (96 mt in 2021), the projected trajectory is stable (DFFE 2025).

As mentioned above, an updated stock assessment conducted by South Africa's DFFE in 2024 concluded that the stock is no longer subject to overfishing based on the total landings reported in 2021 falling within the recommended level of 100 mt, but that it remains in an overfished state (DFFE 2025). Biomass in 2021 was estimated at 13 percent of the pristine stock (DFFE 2025). While the results of the stock assessment are reported, we were not able to obtain or review the stock assessment document itself.

Team members noted that population declines indicated by the above analyses are also consistent with findings from a separate long-term analysis of chondrichthyan species in False Bay, which showed that, despite being the most commonly recorded species from 1969 to 2011, *G. galeus* was the only species to experience a consistent and statistically significant decline in abundance across multiple data sources (Best *et al*. 2013).

Overall, the Moderate score reflects the significant depletion of the population and the consistent evidence of long-term decline due to unsustainable fishing pressure since the 1950s. While the depleted state of the population likely contributes significantly to the long-term risk of extinction, the most recent evidence from the South African government indicates that fishing pressure is currently at a sustainable level and the trajectory is stable. Therefore, there is not sufficient evidence to suggest that current and future abundance projections constitute a danger of extinction in the near future.

Productivity

As discussed previously, the tope shark's low productivity limits its capacity to rebound from depletion. While the team concluded that this trait does not by itself contribute significantly to long-term or near future risk of extinction, there is some concern that this demographic factor may, in combination with other threats and/or demographic risk factors, contribute to long-term extinction risk of the DPS. Beyond the inherent demographic vulnerability of the species, the team found no evidence that population growth is currently below the replacement rate or has been compromised to a level that threatens the persistence of the So. Africa DPS (*e.g.*, via depensatory processes). Consequently, this demographic risk factor was assigned a Low rating.

Diversity

The team assigned this demographic risk factor a rating of Very Low, reflecting their conclusion that this factor is unlikely to contribute significantly to the extinction risk for the So. Africa DPS, either by itself or in combination with other factors. Based on the best available information, they found no evidence that the DPS is at risk due to a substantial change or loss of variation in life-history traits, population demography, morphology, behavior, or genetic characteristics.

Regarding genetic structure and connectivity, the team noted that tope sharks throughout this region are generally considered to comprise a single, large population with local-scale population structuring across the South Africa coast, especially in the south-east (Bitalo *et al*. 2015; Bester-van der Merwe *et al*. 2017; Maduna *et al*. 2017). In an analysis of 53 mtDNA ND2 gene sequences from six sampling sites across the coast of South Africa, a total of seven haplotypes were generated, with very low levels of haplotype (h = 0.216 ± 0.076) and nucleotide (π = 0.001 ± 0.000) diversity overall (Bester-van der Merwe *et al*. 2017). Authors noted that this overall low haplotypic diversity in combination with a single haplotype shared by most of the individuals is similar to what was found for other coastal sharks assessed along the South African coastline. We found no evidence that natural processes of dispersal, migration, or gene flow have been significantly altered in a way that would pose a demographic risk.

The team also highlighted the species' behavioral and ecological plasticity as a factor reducing extinction risk. Tope sharks exhibit diverse migratory behaviors, including "partial migration," where some females undertake long-distance migrations exceeding 2,000 km, while others remain within a relatively localized home range. Furthermore, the species utilizes a wide variety of habitats, ranging from shallow coastal waters and continental shelves to oceanic insular areas and mesopelagic depths. The team reasoned that this diversity in habitat use and migratory strategy may provide the DPS with resilience against catastrophic events that might affect a specific local area or habitat type.

Overall, there is no evidence that the species is at risk due to a substantial change or loss of variation in life-history traits, population demography, morphology, behavior, or genetic characteristics. Therefore, diversity is not considered a significant contributor to the extinction risk of this DPS.

Spatial Structure/Connectivity

Spatial distribution for tope sharks in this DPS was assigned a rating of Very Low/Low. While there was agreement that this demographic factor is not likely to contribute significantly to extinction risk for the DPS by itself, there was concern from one team member that spatial distribution may contribute to the long-term extinction risk of this DPS in combination with other stressors given it is restricted from expanding further poleward.

Within their range, tope sharks in this DPS use shallow coastal bays and estuaries as well as deep offshore waters along the continental slope. Several studies have investigated whether dispersal and gene flow are limited by the merging of the cold, northward-flowing Benguela Current on the west coast of Africa and the warm, southward-flowing Agulhas Current on the southeast coast of Africa. Generally, available data indicate moderate to high rates of gene flow with some local population structuring across the South Africa coast (Bitalo *et al*. 2015; Bester-van de Merwe *et al*. 2017; Maduna *et al*. 2017). Bester-van der Merwe *et al*. (2017) found no significant differentiation indicated by mtDNA among six locations on the South African coast ($\Phi_{ST} = 0.013$, $p = 0.255$) or between the Atlantic and Indian Ocean areas of the South African coast ($\Phi_{ST} = -0.018$, $p = 0.752$). Analysis of microsatellite data indicated weak but significant differentiation among sample locations ($F_{ST} = 0.025$, $p < 0.05$), and no significant differentiation between the Atlantic and Indian Ocean areas ($F_{CT} = 0.000$, $p = 0.273$) (Bester-van der Merwe *et al*. 2017). While the authors hypothesize that local structuring may be due to a combination of habitat preference, thermal fronts that generate cold water pockets, and upwelling currents, there is not information to suggest that currents or any other physical barriers prevent the species from accessing available habitat or moving between areas in the So. Africa region in response to environmental or anthropogenic stressors. The available scientific data support the characterization of the DPS as a single population with moderate to high gene flow.

Based on observed seasonal variation in the sex ratio of mature male and female sharks, the tope sharks in this region appear to undergo seasonal migrations similar to tope sharks of other regions (Freer 1992). Preliminary results from acoustic tagging efforts in South Africa suggest seasonal residency at specific sites along the southern coast of South Africa, with inshore migration during the cooler months (May to September) and offshore migration in warmer months, based on a sample of 6 individuals

(SASC unpublished data 2025). The suggested migratory behaviors coupled with the available genetic data suggest that localized depletions or habitat degradation in specific sub-regions are unlikely to threaten the persistence of the DPS as a whole.

Future loss of suitable habitat is projected in the northern portion of the DPS's range due to changing ocean conditions, and the population will be unable to shift its distribution poleward as the continent does not extend further south. Thus, over the foreseeable future, the spatial distribution of the species may place it at greater risk of extinction in combination with projected habitat loss.

Extinction Risk Summary: So. Africa DPS

Based on the team's consideration of the best available data regarding threats and demographic risks to the So. Africa DPS, the team concluded that it is currently at a Moderate Risk of extinction. The team's confidence in this conclusion was moderately high, as the majority of likelihood points (19/30) were allocated to the moderate risk category, 7 points were allocated to the High Risk Category, and the remainder of the points (4/30) were all allocated to the Low Risk category.

Overutilization was identified as the most significant threat to the So. Africa DPS of tope sharks. The species was historically targeted and landed as bycatch for trade and consumption, and while fishing intensity fluctuated from the 1930s through the 1990s, very high fishing pressure is evident during certain periods (*e.g.*, landings reached 3,750 mt in 1948). Currently, tope sharks continue to be caught as a target species in the demersal shark longline fishery, and as bycatch in several other fisheries. Annual catch has decreased to less than 400 mt since 2010, and most recently, DFFE reported landings of 96 mt in 2021. Recent efforts have been made to improve the management of shark fisheries and protect shark habitat in the region. Very recently (as of 2024), a stock assessment reportedly indicates that the stock is no longer subject to overfishing, although the team was unable to obtain and review the stock assessment. DFFE states that urgent steps need to be taken to maintain landings under 100 mt annually. While regulatory measures controlling effort (*e.g.*, limited vessel permits) are in place for the demersal shark longline fishery, there are no catch limits for tope sharks in this or other fisheries. Further, recent reporting raises concerns about compliance with and enforcement of existing shark fishing regulations.

Available data indicate that significant abundance declines have resulted from overutilization. Using a combination of fisheries catch data and fisheries-independent survey data, the 2019 stock assessment for the South African tope shark population estimates a 2.7 percent annual abundance decline from 1991 to 2016, yielding an estimated population decline of 50.9 percent over the full survey period (Winker *et al*. 2019). The stock assessment also concluded that population biomass in 2021 was just 13 percent of pristine biomass and is considered overfished. Projecting the abundance trend over 3 generation lengths, Winker *et al*. (2019) predicted a total population decline of 85.1 percent by the year 2060 compared to 1991, though the 95 percent confidence interval around this estimate is very wide, spanning a range of possibility that even includes a stable population trend and even slight population growth.

The team considered other potential threats to the DPS, including how its life history strategy increases its vulnerability to overutilization. Data are limited, but the team found no indication of declines in productivity or diversity such that depensatory processes are at work. The team considered the projected loss of suitable habitat over the foreseeable future, and as the DPS will be unable to shift its distribution further poleward, the spatial distribution of the species may place it at greater risk of extinction in combination with projected habitat loss. There is no evidence that disease, predation, or other manmade factors are contributing to the So. Africa DPS's risk of extinction.

Overall, the team found that this DPS is at risk of extinction over the foreseeable future. A recent stock assessment concludes that the population has undergone significant abundance declines and is heavily depleted; however, improving regulatory mechanisms and population monitoring efforts have reduced fishing pressure on the species to the point that it is no longer considered to be experiencing overfishing. Projected population trends at current fisheries mortality levels allow for population stability and future rebuilding, although rebuilding will happen slowly due to the life history traits of the species. Ongoing deficiencies in implementation and enforcement of existing regulatory mechanisms contribute to the DPS's extinction risk. Several likelihood points were allocated to the High Risk category as a result of continued targeting of the species in one fishery, potential losses of suitable habitat over the foreseeable future, and uncertainty in data used in the stock assessment. Four likelihood points were allocated to the Low Risk category as a reflection of the possibility of population increase in modeled trends, especially given the recent reduction in mortality rates.

Significant Portion of its Range Analysis: So. Africa DPS

Because the team determined that the So. Africa DPS is at moderate risk of extinction throughout all of its range, they also considered whether the DPS is at a high risk of extinction within any SPRs. That is, they assessed whether there are any portions of the DPS's range where both: (1) the portion is significant, and (2) the DPS, in that portion, is at high risk of extinction. To identify portions that may be at elevated risk of extinction and thus may qualify as an SPR, the team considered whether threats are geographically concentrated in any portion of the DPS's range, or whether these threats are having a greater impact on the status of the DPS in any portions relative to other portions.

Fisheries-related mortality and inadequate regulatory mechanisms were identified as major threats to this DPS. Within South Africa, fisheries that interact with tope sharks (demersal longline, commercial linefish, and inshore trawl fisheries) operate off the majority of the coastline; however, fishing activity appears to be focused off the southwestern coast (Bester-van der Merwe *et al*. 2017). Commercial-scale fishing for tope sharks also began and was concentrated off the Western Cape (Winker *et al*. 2019, DFFE 2025). Thus, the team identified the southwestern portion of South Africa as a potential SPR.

However, as previously discussed (see **Distinct Population Segment Analysis**), results from multiple genetic studies indicate that there is no or only weak differentiation among tope sharks sampled at various locations along South Africa's coast and a high level of connectivity across this part of the range (Bitalo *et al*. 2015, Maduna *et al*. 2017, Bester-van der Merwe *et al*. 2017). Although data are limited, the weight of the available evidence indicates that tope sharks within South Africa comprise a single population. For this reason, the team could not differentiate between the status of tope sharks off southwestern South Africa versus South Africa as a whole. In other words, there is insufficient data to conclude that tope sharks within the southwestern portion of the range are demographically independent from the remainder of the DPS. Similarly, given the high level of connectivity across South Africa, the team was unable to assess the independent contribution of tope sharks in this portion of the range to the long-term viability of the DPS. Sufficient data are simply lacking with respect to how tope sharks in any parts of this DPS's range may have historically contributed or currently contribute to the overall viability of the DPS such that they could be considered "significant" portions.

Thus, while the team could identify portions of the range where the threat of fisheries mortality is relatively more concentrated, they could not identify specific portions of the range where extinction risk of tope sharks could be assessed independently from the remainder of the DPS, or where the tope sharks could be considered as comprising a "significant" portion. Therefore, the team found no basis to change the range-wide conclusion of Moderate risk for the So. Africa DPS.

Proposed Listing Determination: So. Africa DPS

Based on our review of the best available scientific and commercial data and the extinction risk assessment, as provided in the Status Review Report and summarized herein, we conclude that the So. African DPS is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. We also considered efforts being made by any state or foreign nation, or political subdivisions thereof, to protect and conserve the species (see **Conservation Efforts**). These conservation efforts do not change the conclusion we would otherwise have reached regarding the species' status. Therefore, we find that the So. Africa DPS meets the definition of a threatened species and warrants listing as a threatened species under the ESA.

Summary and Analysis of Section 4(a)(1) Factors for the SW Atlantic DPS

The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Based on an evaluation of the best available information, the team determined that the threat of habitat modification from changes in ocean conditions poses a Very Low/Low risk to the SW Atlantic DPS. Their evaluation relied in large part on the modeled projections of habitat suitability, as detailed in **Summary of Section 4(a)(1) Factors Affecting All DPSs**. The team's analyses project a 12.1 percent (95,988 sq. km) increase in suitable habitat area for the tope shark in the SW Atlantic over the foreseeable future as well as a poleward shift in habitat, with potential losses in the northern part of the range (*i.e.*, off southern Brazil) and habitat gains off southern Argentina. Based on this, we concluded that widespread habitat curtailment is likely not a significant threat to this DPS by itself currently or in the foreseeable future. Limitations of the analyses, including the lack of specific information on impacts to nursery habitats known to be more susceptible to changes in temperature and salinity, and other considerations (*e.g.*, the impact of ocean acidification), are discussed in **Summary of Section 4(a)(1) Factors Affecting All DPSs**. The team was not aware of any research that has specifically evaluated these other potential impacts on tope shark habitat; thus, the team was not able to evaluate their likelihood or severity with any certainty.

In summary, the best available information indicates a significant net increase in suitable habitat for the SW Atlantic DPS, supporting a Very Low risk score. However, uncertainty regarding potential impacts on vulnerable life stages (juveniles) in critical nursery habitats resulted in modifying the rating to a Very Low/Low risk score, as these impacts could, in combination with other factors, contribute to the extinction risk of the SW Atlantic DPS over the foreseeable future.

The team assessed the best available information on the impacts of coastal development and pollution on tope sharks throughout their range in **Summary of Section 4(a)(1) Factors Affecting All DPSs**, and no further information specific to this region or DPS is available. The team acknowledged that impacts to sensitive coastal habitats (and therefore early life stages) could, in combination with other factors, contribute to the extinction risk of the SW Atlantic DPS; however, there is no evidence that habitat destruction from coastal development and pollution is contributing significantly by itself to the extinction risk of the DPS now or in the foreseeable future. Therefore, this threat was rated as Very Low/Low.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The team determined that overutilization poses a Moderate/High risk to the SW Atlantic DPS due to the historical overexploitation of the species in artisanal and industrial fisheries across Brazil, Uruguay, and Argentina, and ongoing bycatch of the species. Today, tope sharks are primarily incidentally caught in the region.

Beginning in the 1940s, tope sharks were heavily fished in Uruguay and Argentina for liver-oil during World War II (Van der Mollen 1998; Walker 1999). At the peak of the fishery, estimated annual landings in Argentina reached 10,303 mt in 1944 and 8,327 mt in 1945, the highest recorded annual landings of the species anywhere in the world (Walker 1999). After the war, tope sharks continued to be targeted across the region at varying levels for decades until a region-wide collapse of the fishery in the 1990s and early 2000s. In Argentina, tope sharks accounted for approximately 40 percent of total chondrichthyan landings in 1985 and reached over 5,000 mt landed in a single year (Chiaramonte *et al*. 2016). Average annual landings of tope sharks fell to about 1,000 mt (less than 5 percent of the total chondrichthyans landed) from 1997 through 2015, and an average of about 500 mt from 2016 through 2023 (Chiaramonte *et al*. 2016; pers. comm., G. E. Chiaramonte, Puerto Quequén Hydrobiological Station, November 30, 2025). Similar landings trends are reported in Uruguay. In the early 1970s, the export market for tope shark meat led to increased pressure from industrial longliners and artisanal gillnetters, leading to annual landings peaking at approximately 3,000 mt in 1975 (Nion 1999). In artisanal fisheries for the period 2004–2012 the average annual landings of tope shark were 28.7 mt, and from 2016–2018, landings ranged between 16–27 mt per year (Paesch and Pereyra 2024). In the Rio de la Plata Treaty area, a highly productive fishing area spanning the border of Uruguay and Argentina, tope shark landings declined precipitously in 2000 concurrent with a spike in landings of *Mustelus schmitti* in the same area (Comisión Técnica Mixta del Frente Marítimo (CTMFM) 2020). This suggests that an intensive shark fishery continued in this area even as *G. galeus* landings declined (CTMFM 2020).

There is no record of a tope shark fishery for liver-oil in Brazil in the 1940s and 1950s (Walker 1999). Exploitation of the species here began in the 1970s in mostly otter and pair bottom trawls (Haimovici 1998). Fisheries for the species diversified to other gears including double-rig trawls for fish and shrimp and bottom gill nets in 1980s, and later bottom longlines in 1990s (Haimovici 1998). Currently, the species is caught in beach trawls, bottom gillnets, bottom longline, and pelagic longline gear (Fiedler *et al*. 2017). Reconstructed landings in Brazil increased gradually through the 1960s and 1970s, peaked in the early 1980s (approximately 1,600 mt in 1982), and then declined precipitously during the 1990s and early 2000s, eventually reaching a minimum in 2006 and remaining very low in the years since (approximately 27 mt annually, according to reconstructed landings data from Freire *et al*. 2021).

Several issues with the available data exist, including the practice of reporting landings in broad taxonomic groups comprising several different species (*e.g.*, "cazón" or "cação"), as well as inconsistent implementation of reporting standards for fisheries statistics and a general lack of high-quality, fishery-independent data and formal stock assessments. Despite this, multiple independent datasets show drastic declines in landings and CPUE. Further, exploitation of the species in known breeding and pupping areas was and continues to be concerning in terms of allowing for reproduction and recruitment (Nion 1999, Chiaramonte 2015) and contributes to the severity of the threat posed by overutilization.

Beyond commercial and artisanal fisheries, *G. galeus* is also subject to sport and recreational fishing in the region (Barbini 2015, Bovcon *et al*. 2018). Catch records are not available for recreational fisheries, and therefore the team could not assess its contribution to the overutilization of the DPS.

Overall, all team members agreed that the threat of overutilization contributes significantly to the long-term risk of extinction of the SW Atlantic DPS. Two team members concluded that overutilization is likely to contribute to near-term risk of extinction of the DPS based on the persistence of intense fishing pressure over many decades and the widespread nature of the threat across the region. All team members agreed, however, that the lack of systematic population abundance data makes it difficult to assess the current severity of the threat, and that the available data (*i.e.*, continued capture as bycatch at much lower levels) do not support a conclusion that overutilization is of such severity that it constitutes a danger of extinction by itself in the near future.

Disease and Predation

The team assessed the best available information on disease and predation on the tope shark throughout its range (see **Summary of Section 4(a)(1) Factors Affecting All DPSs**), and no further information specific to the SW Atlantic DPS is available. The team assigned a score of Very Low for the threat of disease or predation, reflecting overall agreement that, based on the best available information, neither disease nor predation is likely to contribute significantly to the extinction risk of the SW Atlantic DPS.

Inadequacy of Existing Regulatory Mechanisms

The inadequacy of existing regulatory mechanisms was assessed as posing a Moderate/High risk to the SW Atlantic DPS. Given that overutilization in commercial fisheries was identified as the primary threat to this DPS, the team's assessment of regulatory mechanisms was focused on a review of relevant fisheries management measures and their effectiveness. The team agreed that across the SW Atlantic region, regulatory mechanisms are inadequate to address the ongoing threat of overutilization such that this factor contributes significantly to long-term extinction risk of the DPS. Where national-level regulatory measures do exist, they are poorly enforced.

In Brazilian waters, the tope shark is included in Appendix I of the regulation Instrução Normativa do Ministério do Meio Ambiente No. 5, de 21 de maio de 2004 (IN MMA No. 5 (21/5/2004)), which identifies the species as endangered, overexploited, or threatened by overexploitation (Fiedler *et al*. 2017). The regulation bans all catches of listed species (except for scientific purposes) and stipulates a maximum period of 5 years for the creation of management plans, which was not observed (Fiedler *et al*. 2017). Tope sharks have continued to be landed despite this prohibition (Fiedler *et al*. 2017). Further, frequent changes in fisheries management agencies in Brazil have resulted in the loss of historical fisheries data. There is still no official national database available online with Brazil's landings statistics, and improved data collection and management is needed to properly assess the impact of fisheries on the tope shark (Freire *et al*. 2021).

In Uruguay, the tope shark is classified as "fully exploited" under Executive Decree No. 319/998, with the purpose of not increasing fishing vessels or fishing power until the fishing impact produced by the current level of effort is analyzed (Paesch and Pereyra 2024). The team did not find any information regarding whether this analysis has been conducted or whether this regulatory measure has resulted in any changes to the management of fisheries affecting the species.

In Argentina, living marine resources of the Argentine Sea out to 12 nm from the coast are managed and conserved by individual coastal provinces, which have patchwork of regulatory measures relating to sharks including protected areas, size limits, and requirements for release in recreational fisheries (Venerus and Cedrola 2017; Delpiani *et al*. 2020). Nationwide, there is a maximum allowed catch (MAC) set by the Argentine fisheries authorities on an annual basis, and a ban on commercial landings of sharks over 1.6 m TL; however, enforcement of these rules is deficient (Delpiani *et al*. 2020). The practice of mislabeling seafood allows for bypassing of the MAC and ban on landings of larger sharks (Delpiani *et al*. 2020). Across the country, low enforcement capacity, lack of regulations, and lack of long-term monitoring has contributed to the overutilization of the species (Delpiani *et al*. 2020, Venerus and Cedrola 2017).

Overall, the threat of inadequate regulatory mechanisms was assigned a rating of Moderate/High and all team members agreed that the threat contributes significantly to the long-term risk of extinction of the SW Atlantic DPS. Two team members noted that this threat has persisted over many decades and across the range of the DPS, and has allowed unsustainable levels of exploitation in commercial and artisanal fisheries. They concluded that the threat is likely to contribute to near-term risk of extinction.

Other Natural or Manmade Factors Affecting its Continued Existence

The team unanimously concluded that the contribution of this factor to the extinction risk of the species across its range could not be determined (see **Summary of Section 4(a)(1) Factors Affecting All DPSs**).

Demographic Risk Assessment for the SW Atlantic DPS

Abundance

The demographic risk factor of abundance was rated as Moderate, reflecting the team's general agreement that this descriptor contributes significantly to long-term risk of extinction, but does not in itself constitute a danger of extinction in the near future. Keeping in mind the various limitations in the data and the lack of fisheries-independent stock assessment, the team concluded that the available data indicated a population decline of moderate severity throughout the region.

There have not been any formal assessments of tope shark abundance in the SW Atlantic region, and the best available data included several fisheries-derived CPUE datasets and anecdotal accounts from regional experts. A 24-year dataset from the demersal trawl fleet in Argentina indicates that tope shark CPUE declined significantly from 1992 to 2000 and remained at this reduced level until the end of the dataset in 2015 (Chiaramonte unpublished 2019, cited in Walker *et al*. 2020). Modeling of this trend estimated a 5.9 percent annual decline in abundance and projected a severe long-term reduction of 99.3 percent over three generations (79 years; 1992–2069) (Walker *et al*. 2020). This result is corroborated by a demographic model for the Bahía Anegada region of Argentina, which predicted an annual population decline of between 6.7 percent and 12.8 percent under the most representative fishing conditions at the time and using data from 1999–2001. The general consistency between results of these analyses and evidence of the region's history of intensive fishing pressure and subsequent fishery collapse support the conclusion that the population has been severely depleted. There are, however, significant data limitations and uncertainties that were considered. The Argentine trawl CPUE series, for instance, was based on a metric (kg per trip) that does not fully account for variations in fishing effort between trips.

The team also considered other available datasets relating to the abundance of the SW Atlantic DPS. CPUE calculated from the tope shark gillnet fishery in Necochea from 1990 to 1996 fluctuated significantly during this period without any discernible trend (Chiaramonte 1998). Further, changes to certain features of the tope shark gillnet fishery during the study period limit the reliability of the results as an indication of tope shark abundance. Similarly, CPUE data from Rio Grande do Sul, Brazil, were reported by broad taxonomic category and showed conflicting temporal trends between different gear types, making it difficult to draw strong conclusions (Villwock de Miranda and Vooren 2003).

Other information sources indicate population decline in the region. During the late 1990s, Necochea-based trawlers were forced to set gillnets farther from the coast due to declining yields near shore, likely indicating declining abundance (Chiaramonte 1998). Additionally, modeling of the number of total annual records of tope sharks from a recreational fishing magazine that published monthly between 1973 and 2008 supported trends of population decline similar to those presented above (Barbini *et al*. 2015).

Productivity

This demographic risk factor was assigned a Low/Moderate rating. As discussed previously, the tope shark's low productivity limits its capacity to rebound from depletion. There is evidence of historical fishing of large pregnant females in pupping and breeding areas in Argentina and Uruguay, which may have further reduced the productivity of the population (Nion 1999, Chiaramonte 2016). Nion (1999) presents evidence that in certain months, females made up the majority of catch in Uruguay, many of them pregnant; other months of the year had catches predominantly made up by males.

The team concluded that, while this threat does not by itself contribute significantly to near-term risk of extinction, the DPS's fairly low productivity is likely to contribute to the long-term extinction risk of the DPS in combination with other threats (such as overutilization) and/or demographic risk factors (such as reduced abundance).

Diversity

Regarding genetic structure and connectivity, the team noted that tope sharks throughout this region are considered to comprise a single, large population. Genetic analyses using both mtDNA and microsatellite markers have found no evidence of significant population structure or barriers to gene flow within the region. An analysis of 10 samples of tope sharks captured in the Bahía San Blás MPA in Argentina found 5 haplotypes and resulted in a haplotype diversity (h) of 0.822 ± 0.097 with a nucleotide diversity (π) of 0.002 ± 0.001 (Bester-van der Merwe *et al*. 2017). This was the highest haplotype diversity found in the study by Bester-van der Merwe *et al*. (2017) of five southern hemisphere tope shark populations; however, total number of alleles (3) and unbiased expected heterozygosity (0.373) for the Argentina samples were the lowest of all studied sites. In all, the team did not find evidence that genetic diversity in the SW Atlantic region has declined or is low such that it contributes to the extinction risk of the DPS.

The team highlighted the species' behavioral and ecological plasticity as a factor reducing extinction risk. Given the seasonal patterns in their distribution (Peres and Vooren 1991; Ferreira and Vooren 1991; Elías *et al*. 2005; Lucifora *et al*. 2004; Chiaramonte 2015; Klippel *et al*. 2016; Trobbiani *et al*. 2021; see *Range, Distribution and Habitat Use*), the team assumed tope sharks in this DPS exhibit similarly diverse migratory behaviors as observed in other regions, including "partial migration," where some females undertake long-distance migrations exceeding 2,000 km, while others remain within a relatively localized home range. Furthermore, the DPS utilizes a wide variety of habitats, ranging from shallow coastal waters and continental shelves to oceanic insular areas and mesopelagic depths. The team reasoned that this diversity in habitat use and migratory strategy may provide the DPS with resilience against catastrophic events that might affect a specific local area or habitat type.

Overall, there is no evidence that the species is at risk due to a substantial change or loss of variation in life-history traits, population demography, morphology, behavior, or genetic characteristics. Therefore, diversity is not considered a significant contributor to the extinction risk of this DPS.

Spatial Structure/Connectivity

Spatial distribution for tope sharks in this DPS was assigned a rating of Very Low, as this demographic factor was not viewed by any team members as contributing significantly to risk of extinction for this DPS, either by itself or in combination with other factors. The tope shark occupies a broad geographic range (from Rio Grande do Sul, Brazil, south to Península San Julián in Argentine Patagonia) and uses multiple habitat types within the SW Atlantic. Within this extensive range, the species utilizes diverse habitats, occupying shallow coastal bays and estuaries—often used as pupping and nursery grounds—as well as deep offshore waters along the continental slope. The team noted that there are no known physical barriers to dispersal within this region that would prevent the species from accessing available habitat or moving between areas in response to environmental or anthropogenic stressors.

Available genetic and tagging data, though limited, support the characterization of the DPS as a single, well-mixed population that migrates seasonally from shelf waters off southern Brazil in colder months to areas southward and deeper during warmer months. This high degree of mobility and genetic exchange suggests that localized depletions or habitat degradation in specific sub-regions are unlikely to threaten the persistence of the DPS as a whole.

In summary, due to the species' wide distribution, lack of barriers to dispersal, and high connectivity, the team concluded that spatial distribution is unlikely to contribute significantly to the risk of extinction for the SW Atlantic DPS, either by itself or in combination with other factors.

Extinction Risk Summary: SW Atlantic DPS

Based on the team's consideration of the best available data regarding threats and demographic risks to this DPS, they concluded that the SW Atlantic DPS is currently at a Moderate Risk of extinction. Confidence in this conclusion was moderate, as just over half of the likelihood points (16/30) were allocated to the moderate risk category, 11 points were allocated to the High Risk Category, and the remainder of the points (3/30) were allocated to the Low Risk category. The absence of more reliable, historical and long-term abundance data were noted as preventing a higher level of confidence in this rating.

Overutilization and the inadequacy of existing regulatory mechanisms were identified as the most significant threats to the SW Atlantic DPS. Tope sharks in this region experienced intense fishing pressure in the 1940s, with landings in Argentina in 1944 representing the highest reported annual landings of the species anywhere in the world. Over the following decades, the species continued to be targeted in commercial and artisanal fisheries for various purposes (*e.g.*, frozen, salted, and fresh meat for consumption and sale). The stock collapsed across the region by the early 2000s as evidenced by sharp declines in landings of tope sharks, concurrent spikes in landings of similar shark species, and the continuation of intensive shark fishing. Tope sharks continue to be taken primarily as bycatch today, although in much lower numbers due to the collapse of the stock. Historically and currently, there has been a lack of regulations aimed at conserving the species, and where regulatory mechanisms do exist, they are ineffective because of poor enforcement. Further, the lack of systematic data collection and long-term monitoring prevents effective fisheries management and therefore contributes to the overutilization of the species.

General agreement in trends estimated using several fisheries-dependent datasets indicates that the population has experienced significant decline. The strongest evidence of this comes from a 24-year nominal CPUE dataset from the demersal trawl fleet in Argentina. Walker *et al*. (2020) estimated a 5.9 percent annual decline from 1992 to 2015, and projected a 99.3 percent decline over three generations (79 years, from 1992 to 2070). It is worth highlighting that CPUE in this study was calculated in terms of kg per trip, so the dataset does not account for variations in fishing effort between trips. Because the data are from the later stages of the fishery (late 1990s and onward), the downward trend appears to have continued after the collapse of the fishery. Available qualitative information further supports the conclusion that the tope shark population has undergone significant decline; for example, the lack of landings of tope sharks in productive fishing areas where tope sharks were once frequently caught (*e.g.*, Rio de la Plata). While it is clear that the species has experienced abundance declines, longstanding data limitations and the lack of high-quality fishery-independent data or stock assessments limited the team's ability to draw conclusions about the severity of population decline or about current population abundance. The team did not find evidence that the species is at such a low abundance that depensatory processes are at work or that it constitutes an immediate risk of extinction to the population. Regular landings of the species in locations across its range, though at much lower levels, indicate that the DPS has not been extirpated from any parts of its range.

The team considered how the life history of tope sharks increase the DPS's vulnerability to overutilization. The species is long-lived, slow-growing, and late-maturing, and has low overall productivity. This limits the species' capacity to rebound from depletion. There is evidence of historical fishing of large pregnant females in pupping and breeding areas of the SW Atlantic, which may have further reduced the productivity of the population, contributing to long-term extinction risk.

Data are limited, but the team found no indication of declines in diversity. Data are also limited with respect to the loss or degradation of habitat including pupping areas. Available evidence does not provide any indication that the DPS's range has contracted, or that changing environmental conditions will limit critical habitats in the foreseeable future. There is also no evidence that disease, predation, or other manmade factors are contributing to the SW Atlantic DPS's risk of extinction.

Overall, the team concluded that overutilization in commercial and artisanal fisheries and the inadequacy of existing regulatory mechanisms to address the threat of overutilization have resulted in substantial declines in abundance of tope sharks within this region. Given ongoing bycatch of the species and relatively slow rebound potential of tope sharks, the population will likely remain depleted or continue to decline over the foreseeable future. Despite the recent listing of tope shark on Appendix II of CITES, which will not become effective until June 2027, any improved management or changes in fishing practices would likely take several generations to be realized at the population level given the life history traits of this species. While the DPS continues to occupy a fairly large, continuous geographic range, its reduced abundance, low productivity, ongoing threats of incidental catch, and inadequate regulatory mechanisms put it at a moderate risk of extinction throughout its range.

Significant Portion of its Range Analysis: SW Atlantic DPS

Having determined that the SW Atlantic DPS is at moderate risk of extinction throughout all of its range, the team conducted an additional analysis to determine whether the DPS is at high risk of extinction in an SPR. That is, the team assessed whether there is any portion of the DPS's range for which it is reasonably likely they could conclude that both: (1) the portion is significant, and (2) the DPS, in that portion, is at high risk of extinction. To help identify potential “portions” for this analysis, the team first considered whether the threats to this DPS are geographically concentrated in any portion of the DPS’s range, or whether identified threats are having a greater impact on the status of the DPS in any portions relative to other portions.

Considering the threats posed by overutilization, the best available data indicate that historical overfishing of tope sharks has been severe across the range, leading to the collapse of the fisheries in Brazil, Argentina and Uruguay. Throughout the range, tope sharks continue to be caught and landed as bycatch, and are occasionally targeted. In Argentina, annual landings averaged about 500 mt from 2016 through 2023 (pers. comm., G. E. Chiaramonte, Puerto Quequén Hydrobiological Station, November 30, 2025). In Brazil, reconstructed landings registered under the term cação are currently low relative to historical levels (averaging 27 mt/year from 2007–2015) (Freire *et al*. 2021). In Uruguay, annual landings in artisanal fisheries ranged between 16–27 mt (Paesch and Pereyra 2024). Further, there are no parts of the range where the team found regulatory measures to be adequate for the management of threats to the species. Ultimately, the team concluded that the threat of overfishing, although occurring at lower levels relative to historical, is ongoing across the range of the DPS, and there is no information to indicate that the threat of overutilization is geographically concentrated. For these reasons, the team was ultimately unable to identify any portions of the range where threats are concentrated or clearly having a greater impact on the DPS.

Furthermore, as previously discussed, there is no indication of subpopulations or population structuring within this region; instead, the available evidence indicates that the DPS is a single population that seasonally migrates throughout the entire range. Seasonal peaks in tope shark abundances within different parts of the range at different times of year indicate consistent seasonal movements across the range. In particular, tope sharks have been observed to peak in abundance off southern Brazil (around 30–34°S) in June through September; off Puerto Quequen, Argentina (around 38°32' S) in September through December; Anegada Bay, Argentina (40°30' S) from October to December; and other northern Patagonia gulfs (around 43° S) between January and April (see *Range, Distribution, and Habitat Use*). Genetic studies are limited for this DPS; however, an analysis of mtDNA from two areas of Argentina (Buenos Aires and Golfo San Matias) indicated no significant differences between locations (Cuevas *et al*. 2016, see *Population Structure*). Given the lack of evidence indicating any population structure within the region, fisheries-related mortality occurring within one portion of the DPS's range will likely impact the DPS as a whole, not just tope sharks within any distinct portion. For this additional reason, the team was unable to identify specific portions of the range where the extinction risk of tope sharks could be assessed independently from the remainder of the DPS.

Proposed Listing Determination: SW Atlantic DPS

Based on our review of the best available scientific and commercial data and the extinction risk assessment, as provided in the Status Review Report and summarized herein, we conclude that the SW Atlantic DPS is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. We also considered efforts being made by any state or foreign nation, or political subdivisions thereof, to protect and conserve the species (see **Conservation Efforts**). These conservation efforts do not change the conclusion we would otherwise have reached regarding the species' status. Therefore, we find that the SW Atlantic DPS meets the definition of a threatened species and thus warrants listing as a threatened species under the ESA.

Summary and Analysis of Section 4(a)(1) Factors for the SE Pacific DPS

The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Threats to tope shark habitat stemming from changes in environmental conditions was assigned a rating of Low based primarily on the available evidence suggesting that the net effect of changing ocean conditions on the availability of suitable habitat for this DPS may be neutral or even positive over the foreseeable future. In particular, the team's analyses, project a 6.6 percent (11,569 sq. km) increase in suitable habitat area for the tope shark in the SE Pacific over the foreseeable future as well as a poleward shift in habitat, with projected losses in the northern part of this DPS's range (*e.g.*, Ecuador) potentially being offset by habitat gains off southern Chile. Based on this, the team concluded that habitat curtailment as a result of changes in environmental conditions is likely not a significant threat to this DPS by itself currently or in the foreseeable future. They noted, however, that the total area of suitable habitat in the SE Pacific is significantly smaller relative to other regions. As with other DPSs, adequate data were also not available regarding other possible changes in ocean conditions to tope shark habitat (*e.g.*, precipitation, salinity, pH).

Habitat-related threats stemming from coastal development and pollution received a Very Low/Low rating based on evidence that habitat destruction from coastal development and pollution are not likely contributing significantly to extinction risk for the SE Pacific DPS; however, impacts to sensitive coastal habitats may, in combination with other factors, contribute to long-term extinction risk of this DPS.

As with other DPSs, this potential threat could affect important pupping and nursery habitats across the range. However, the team did not find any information about known or potential impacts of coastal development on tope sharks in the SE Pacific specifically or elsewhere such that they could reasonably extrapolate to this DPS. Similarly, with respect to toxic contaminants and plastics, specific levels of exposure, contamination, and their consequences on tope shark health and survival are unknown, so they were unable to assess the extinction risk posed by these other potential forms of habitat degradation.

In summary, while this threat could disproportionately affect early life stages and contribute to the long-term extinction risk of the SE Pacific DPS in combination with other factors, the available information is not sufficient to conclude that this threat is likely to contribute by itself to the long-term or near future risk of extinction of this DPS.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The threat posed by overutilization for commercial purposes was assigned a rating of Very Low, reflecting the conclusion that overutilization of tope sharks is not likely posing a threat to this DPS, either by itself or in combination with other risk factors. Despite extensive shark fishing within the region, the available data do not indicate that tope sharks have historically been or currently are an important target species. Based on available data landings for Ecuador, Peru, and Chile, tope sharks comprise an extremely small percentage of the reported landings. Landings of tope sharks in Ecuador appear to be extremely rare, and the fishing pressure on sharks generally in Chile appears to be relatively low and declining. In Peru, where the volume of shark landings is highest among the three range countries, tope sharks, along with about 11 other species combined, comprised less than 2 percent of the reported annual landings from 1996–2015 (Gonzalez-Pestana *et al*. 2016, López de la Lama *et al*. 2018). Under-reporting of landings and species misidentifications are likely ongoing, but without a clearer indication of harvest pressure on tope sharks, the team could not conclude that overutilization is posing a threat to this DPS. The lack of fisheries-independent surveys or formal stock assessments for the population coupled with the limited fisheries-dependent data led to all reviewers assigning a “low” data sufficiency rating to this factor. This threat is discussed in more detail in section 4.3.6 of the Status Review Report.

Disease and Predation

As with other DPSs, this threat category was assigned a Very Low rating based on consideration of the best available information and conclusion that neither disease nor predation is contributing significantly to the extinction risk of the SE Pacific DPS now or over the foreseeable future.

The team considered the best available information regarding disease and predation on the tope shark throughout its range (see **Summary of Section 4(a)(1) Factors Affecting All DPSs**) and were unable to find further information specific to the SE Pacific DPS. Although one of tope sharks' main predators, the broadnose sevengill shark, does co-occur with the SE Pacific DPS, there is no evidence that predation is posing an extinction risk to this DPS.

Inadequacy of Existing Regulatory Mechanisms

This factor was assigned a rating of Low, reflecting the team's conclusion that existing regulatory mechanisms are unlikely to be contributing significantly to extinction risk of this DPS on their own, but they may in combination with other risk factors. Overall, the team agreed there was a "medium" level of data sufficiency to assess this factor.

Shark finning is prohibited throughout the region, and targeted shark fishing is prohibited in Ecuador. Each range country has also taken various steps to improve management of sharks in general, including, for example, increasing onboard monitoring, adopting the use of electronic logbooks, improving standardization and collection of data, and implementing a certification system to improve traceability of fins. However, targeted fishing of tope sharks is allowed through most of the region and there appear to be no size limits or catch limits for bycaught tope sharks. Given some regulatory protections, the general frameworks in place for shark conservation across the region, and the lack of information indicating that overutilization of this DPS is occurring, the team found that the existing regulatory mechanisms are not posing an extinction risk to this DPS. This threat is discussed in more detail in section 4.5.7 of the Status Review Report.

Other Natural or Manmade Factors Affecting its Continued Existence

As with the other DPSs, the assessment of this factor focused primarily on the potential threat posed by EMFs generated by undersea power cables, and given the general lack of information on this potential threat, the team concluded that the contribution of this threat to the extinction risk of the SE Pacific DPS is Unknown.

Demographic Risk Assessment for the SE Pacific DPS

Abundance

Given the extremely limited data by which to assess the abundance and trends of this DPS, this risk factor was assigned a rating of Unknown. As summarized in section 3.6 of the Status Review Report, fisheries-independent data do not appear to be available, and species-specific landings data are very limited. Based on the landings and trade information available for Peru and Chile, tope sharks comprise a very small percentage of the total shark harvest in the region. Given the intense and extensive fishing effort within this region and the low reported catch of tope sharks, the species may not be abundant in the region. An alternative hypothesis is that tope sharks had already declined so significantly in abundance that they comprise only a small fraction of the available landings data. However, there is no indication that a targeted or substantial fishery for tope sharks ever occurred in this region, and the estimated landings for 1950 to 2019 fluctuate at relatively low levels with the exception of a spike in 1980 (when landings may have reached ~200 to 300 mt). Overall, the available data do not allow for any strong inferences with respect to total or relative abundance for this DPS over time.

Productivity

As with most of the other DPSs, this demographic risk factor was assigned a rating of Low. The team concluded that, although the relatively low productivity of the tope shark limits its capacity to rebound from depletion, this trait does not, by itself, contribute significantly to long-term or near future risk of extinction. However, the low productivity and life history strategy of tope sharks may, in combination with other threats and/or demographic risk factors, contribute to the long-term extinction risk of the DPS. Beyond this demographic vulnerability inherent to the species generally, the team found no information regarding population growth, mating, fertilization, pupping, or other relevant traits of the SE Pacific DPS specifically.

Diversity

This demographic risk factor was assigned a partial rating of Very Low, reflecting the conclusion that this factor is unlikely to contribute significantly to the risk of the extinction for the SE Pacific DPS, either by itself or in combination with other factors. One team member rated this factor as Unknown given the extremely limited data for this region. Ultimately, the team agreed that based on the best available information, there was no evidence indicating the DPS is at risk due to a substantial change or loss of variation in life-history traits, population demography, morphology, behavior, or genetic characteristics.

Based on analysis of mtDNA (control region) and microsatellites (11 polymorphic loci) from samples collected from 6 different ocean regions, tope sharks in the SE Pacific (Peru) have been shown to have a comparable but higher mean nucleotide diversity and haplotype diversity relative to tope sharks of other regions but also had the fewest private alleles (Chabot and Allen 2009, Chabot 2015). A similar result was observed in a separate study comparing genetic samples collected from Chile, New Zealand, and Australia; results from this study, which analyzed both mtDNA (control region) and microsatellite DNA (8 loci), indicated tope sharks in Chile had the highest estimated haplotype and nucleotide diversity relative to the two other sample groups ($h=0.800\pm0.089$, $\pi= 0.002\pm0.001$) but the fewest mtDNA haplotypes (Hernández *et al.*

2015). Based on their analyses of the genetic data, these authors also suggested that the population of tope sharks in Chile has been stable for the past 20,000 years. Overall, these studies do not provide any clear indication regarding changes in the level of genetic diversity within the SE Pacific DPS or whether any such changes are posing an extinction risk to the DPS. There appear to be no other studies regarding population structure or gene flow within the region, nor other relevant information by which to evaluate this risk factor, such as phenotypic diversity, gene flow, migratory behaviors, or habitat use of tope sharks in this region. Thus, the team found no evidence that genetic diversity or the natural processes of dispersal, migration, or gene flow have been significantly altered in a way that would pose a demographic risk. Given the limited information for this region, the team also noted that there is a high level of uncertainty with respect to this risk factor.

Spatial Structure/Connectivity

This risk factor received a mixed rating of Unknown/Very Low because, while tope sharks in this region may still fully occupy and move throughout their historical range, data to fully assess the spatial structure and connectivity of this DPS are extremely limited. The extremely rare reports of tope sharks in Ecuador's waters despite significant fishing activity caused the team to question whether tope sharks were historically and are currently present in this part of the range with any significant abundance. However, there is no basis to conclude that the current range of this DPS will contract or become fragmented over the foreseeable future, particularly given the lack of physical barriers to movement within the range and the projected poleward expansion of suitable habitat for this DPS over the foreseeable future. There appear to be no studies regarding movements, habitat use patterns, or regional-scale population structure of tope sharks in the SE Pacific. Overall, there were insufficient data to indicate that the spatial structure or connectivity of this DPS contributes significantly to its extinction risk, either by itself or in combination with other factors.

Extinction Risk Summary: SE Pacific DPS

Based on the best available data regarding threats and demographic risks to this DPS, the team concluded that the SE Pacific DPS is currently at a Low Risk of extinction. Confidence in this conclusion was fairly low: while the majority of the likelihood points (50 percent) were allocated to the low risk category, and the remainder of the points were spread almost equally across the two other categories (27 percent in Moderate, 23 percent in High). This level of uncertainty reflects the fact that extremely limited data were available by which to reliably assess the extinction risk of this DPS.

Despite intense shark fishing in the region, tope sharks consistently comprise a very small portion of the reported landings. There are no data indicating that tope sharks were historically targeted or were commercially desirable in this part of the world. The very limited species-specific data and lack of any stock assessment mean there is no empirical evidence of overutilization of this DPS for commercial or other purposes; however, it also means there is very limited information by which to assess the status of tope sharks in this region. Existing regulatory protections, including the 2007 prohibition on shark fishing in Ecuador and the prohibitions on finning within the region, likely confer a measurable conservation benefit to tope sharks. The lack of any catch and bycatch limits for tope sharks are concerning and mean the threat of potential overutilization of tope sharks has persisted for decades in this region; however, no available data indicate the population has collapsed or is currently declining as a result of overutilization. Overall, because tope sharks do not appear to be a primary target of fisheries, there is no evidence of other operative threats, and there are no available data showing a downward trajectory in tope shark biomass, there is insufficient evidence to conclude that the population is facing risk of extinction—either imminently or over the longer term.

Significant Portion of its Range Analysis: SE Pacific DPS

Because the team reached a conclusion that the SE Pacific DPS was at low risk of extinction throughout its range, they next considered whether there were any portions of the range in which this DPS may both be at elevated risk of extinction and may qualify as a “significant” portion. Ultimately, and largely as a result of the extremely limited data for this region, they were unable to identify any such portions.

The extremely limited reports of tope sharks in Ecuador could be the result of a historical collapse in tope sharks in this part of the range; however, without further information, this would be a speculative conclusion. They also considered whether tope sharks in Peru, where they are taken in the largest volume, may be at elevated risk of extinction relative to other tope sharks elsewhere within the region. The available and estimated landings data indicate that tope shark landings fluctuate at low levels from 1950 to 2019 (with the exception of a spike in 1980) and comprise a very small fraction of the annual shark landings (Gonzalez-Pestana *et al*. 2016; see Figure 4-26 in the Status Review Report). Given the limited corresponding data on fishing pressure and the available information indicating that other shark species, like blue and mako sharks, were being targeted, the team could not conclude that tope sharks are at elevated risk in Peru. The extremely limited data for Chile similarly does not indicate a decline or an elevated risk of extinction of tope sharks in this portion of the range. In addition, there are no data by which to evaluate the relative contribution of tope sharks within these portions (or combination of portions) to the long-term viability of the DPS. For example, there are no abundance, genetic diversity, or movement data for particular portions of the range to inform an assessment of their relative biological importance to the DPS. Given this lack of data, there is no basis to differentiate between tope sharks that may occur in one portion of the range versus anywhere else within their range, across which they may move and interbreed freely. Therefore, the team found no basis to evaluate the extinction risk of this DPS within only a particular portion of its range.

Listing Determination: SE Pacific DPS

Based on our review of the best available scientific and commercial data and extinction risk assessment, as provided in the Status Review Report and summarized herein, we conclude this DPS is not in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. We considered efforts being made by any state or foreign nation, or political subdivisions thereof, to protect and conserve the species (see **Conservation Efforts**). These conservation efforts do not change the conclusion we would otherwise have reached regarding the DPS's status. Therefore, we find that the SE Pacific DPS does not meet the definition of a threatened or endangered species and thus does not warrant listing under ESA.

Summary and Analysis of Section 4(a)(1) Factors for the SW Pacific DPS

The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range.

Based on an evaluation of the best available information, the team determined that the threat of habitat modification as a result of changing ocean conditions poses a Very Low/Low risk to the SW Pacific DPS. Their evaluation relied in large part on the modeled projections of habitat suitability, as detailed in **Summary of Section 4(a)(1) Factors Affecting All DPSs**. The team's analyses project a 13.4 percent (184,593 sq. km) increase in suitable habitat area for the tope shark in the SW Pacific in the foreseeable future as well as a poleward shift in habitat, with potential losses in the northern part of the range and habitat gains off southern New Zealand. Based on this, the team concluded that widespread habitat curtailment is likely not a significant threat to this DPS by itself currently or in the foreseeable future. Limitations of the analyses, including the lack of specific information on impacts to nursery habitats known to be more susceptible to changes in temperature and salinity, and other considerations (*e.g.*, the impact of ocean acidification), are discussed in **Summary of Section 4(a)(1) Factors Affecting All DPSs**. Given an apparent lack of research to specifically evaluate these other potential impacts on tope shark habitats in this region; the team was not able to evaluate their likelihood or severity with any certainty.

In summary, the best available information indicates a significant net increase in suitable habitat for the SW Pacific DPS, supporting a Very Low risk score. However, uncertainty regarding potential impacts on vulnerable life stages (juveniles) in critical nursery habitats resulted in modifying the rating to a Very Low/Low risk score, as these impacts could, in combination with other factors, contribute to the extinction risk of the SW Pacific DPS over the foreseeable future.

The team assessed the best available information on the impacts of coastal development and pollution on tope sharks throughout their range in **Summary of Section 4(a)(1) Factors Affecting All DPSs**, and no further information specific to this DPS is available. The team acknowledged that impacts to sensitive coastal habitats (and therefore early life stages) could, in combination with other factors, contribute to the extinction risk of the SW Pacific DPS; however, there is no evidence that habitat destruction from coastal development and pollution is contributing significantly by itself to the extinction risk of the DPS now or in the foreseeable future. Therefore, this threat was rated as Very Low/Low.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The threat of overutilization for the SW Pacific DPS was assigned a rating of Low/Moderate based largely on the mixed impact of commercial fishing on the species in different parts of the region. For additional information on the fisheries affecting tope sharks in this region, see section 4.3.5 of the Status Review Report.

In Australia, available data indicate that high historical fishing pressure (beginning in the late 1800s through the 1990s) and absence of fisheries regulations led to declines in abundance of tope sharks. After gillnets were introduced in 1964, catch peaked at 2,500 mt around 1969 (Davis *et al*. 2024). In 1973 tope shark catch fell to 700 mt due to concerns and regulations regarding mercury concentrations in shark meat. As the health standard for mercury in fish was relaxed, landings increased gradually into the mid-1980s, reaching a peak of approximately 2,000 mt in 1986 (Walker 1999; Davis *et al*. 2024). Due to restrictions on gillnet use and the declining abundance of tope sharks in Australian waters, catch declined steadily through the late 1980s and 1990s, and following the introduction of a quota system in 2001, stabilized at around 200 mt per year (Davis *et al*. 2024). Concerning aspects of the historical fishery that were noted by two team members include the practice of targeting large gravid females as they moved into shallow, inshore areas to give birth, reduced abundance of mature adults that were targeted nearshore, and the subsequent geographic shifts of the fishery further offshore to target subadults (Walker 1999). Assessments of the population indicate that biomass has been less than 20 percent of unfished biomass since 1991. The stock has been subject to a rebuilding plan since 2008 and while tope sharks are no longer targeted in Australia, they are bycaught in several fisheries. CKMR assessment models indicate that the stock was on an increasing trajectory between 2000 and 2017 (Thomson *et al*. 2020), and from 2006 through 2020 (Thomson *et al*. in prep) and therefore, reduced fishing pressure resulting from management measures are likely alleviating the threat. However, total landed catch and discards for the 2023–2024 fishing season is estimated to be 338.1 mt (Davis *et al*. 2024), which exceeds the recommended TAC.

In New Zealand, historical fishing pressure was also high. During the 1940s, landings averaged roughly 2,500 mt annually and fell when demand for liver oil fell. Demand and landings fluctuated over the ensuing decades, and reached a peak of 5,600 mt in 1984 due to reopening of Australian export markets that had been closed due to concerns about mercury concentrations, increased fishing effort due to the introduction of monofilament set gillnets, and a decline in the abundance of other more valuable inshore fish species (Francis 1998). This prompted the creation of a quota management system (QMS) and adoption of a conservative TAC in 1986 to ensure the future sustainability of the fishery. During this time, set gillnets made up about half of the catch, with lining making up about a third and the remainder taken by trawl (Fisheries New Zealand 2024b). Total commercial landings have remained near the level of total allowable commercial catch (TACC) (2,613 mt in 2019–2020; 2,830 mt in 2020–2021; 2,407 mt in 2021–2022; and 2,650 mt in 2022–2023 (Fisheries New Zealand 2024b)). In recent years, set gillnets targeting sharks (tope shark, rig, elephantfish, and spiny dogfish) have been responsible for just under half of tope shark landings, while bottom longline and bottom trawl approximately split the remaining 50 percent (Fisheries New Zealand 2024b). The stock status is monitored by Quota Management Area (QMA), and while some areas are unlikely or less likely to be experiencing overfishing, others are likely to be experiencing overfishing or have unknown trends. Overall, the team noted that the fishery has been able to sustain high catch levels (2,500–3,500 mt per year) over multiple decades without any clear evidence of a corresponding decline in abundance.

Recreational catch of tope sharks in Australia occurs using rod and line gears, as well as demersal longline and gillnet gears in Tasmania (Marton *et al*. 2014). Estimates of recreational catch levels are uncertain and not available from all areas (Davis *et al*. 2024). Tope sharks are also caught recreationally in New Zealand and are managed through daily bag limits (Fisheries New Zealand 2024b). Annual landings of recreational catch were estimated at only 6–8 percent of total landings of the species in the 1990s (Francis 1998). In more recent years it is caught regularly by recreational fishers, but is not a desired target and harvest levels (indicated through surveys of fishers) are low (Fisheries New Zealand 2024b).

Two team members found that the available data were not sufficient to find that this threat, on its own, is likely to contribute significantly to the long-term or near future extinction risk of the SW Pacific DPS, but it may in combination with other factors. The long-term stability of fisheries landings and the apparently effective management of tope sharks in New Zealand, as well as focused and active management and monitoring of the stock in Australia, were cited as supporting this conclusion. One team member placed greater weight on indicators of historical overutilization across the region, ongoing exceedance of recommended catch limits in Australia, and localized overfishing and resulting depletion in certain regions of New Zealand, to reach the conclusion that this threat is contributing to the long-term risk of extinction; thus, this team member assigned a Moderate rating to this threat. This team member also noted that the lack of nationwide assessment in New Zealand adds some uncertainty to the level of threat posed by overutilization, especially given the continued high levels of tope shark landings.

Disease and Predation

The team assessed the best available information on disease and predation on the tope shark throughout its range (see **Summary of Section 4(a)(1) Factors Affecting All DPSs**), and no further information specific to the SW Pacific DPS is available. The team assigned a score of Very Low for the threat of disease or predation, reflecting overall agreement that, based on the best available information, neither disease nor predation is likely to contribute significantly to the extinction risk of the SW Pacific DPS.

Inadequacy of Existing Regulatory Mechanisms

The inadequacy of existing regulatory mechanisms was assessed as posing a Low/Moderate risk to the SW Pacific DPS. Given that overutilization in commercial fisheries was identified as the primary threat to this DPS, the team’s assessment of regulatory mechanisms was focused on a review of relevant fisheries management measures and their effectiveness. While genetic and tagging data indicate a single, interbreeding population in this region, trans-Tasman migration is relatively infrequent. For this reason, tope sharks in Australia and New Zealand are managed as separate stocks and have different statuses and management needs. The team agreed that the adequacy of regulatory mechanisms is not uniform across the range of the DPS, and their rating reflects a conclusion that this factor may contribute to long-term extinction risk of the DPS, especially in combination with other threats or demographic factors.

In Australia, the tope shark stock is considered overfished and is experiencing overfishing, and has been subject to a formal rebuilding strategy (the School Shark Stock Rebuilding Strategy) since 2008 (updated in 2015). The strategy's primary objective is to rebuild the stock to the biomass limit reference point (20 percent of unfished biomass) within a biologically reasonable timeframe, which was set at three generation times (66 years) from 2008. After reaching this reference point, the strategy aims for biomass to reach B_{MSY} (set at 40 percent of unfished biomass) and eventually for further targets on the trajectory of rebuilding (AFMA 215).

The strategy takes an adaptive management approach and aims to rebuild the tope shark population through mechanisms such as TAC limits, gear restrictions, closed areas, size restrictions on retained tope sharks, limited entry to fishery, and limits on proportion of tope sharks taken to other species. TAC limits are intended to account for unavoidable, incidental bycatch of the species, primarily in the gummy shark (*Mustelus antarcticus*) fishery. The incidental bycatch TAC for the 2024–2025 fishing season was set at 197 mt, and for the 2025–2026 season, SharkRAG recommended a revised TAC of 207 mt. This was calculated using a logbook-based method that caps total mortality at the threshold projected by the CKMR model (SharkRAG 2024). To further discourage targeting of tope sharks, a "20 percent rule" was introduced in the 2011–2012 season, requiring that an operator's catch of tope shark in the SESSF not exceed 20 percent of their gummy shark quota holdings (Davis *et al*. 2024). Additionally, since the 2014–2015 season, the mandatory release of all live-caught tope sharks has been required (Davis *et al*. 2024). Among other gear restrictions, gillnet mesh sizes are restricted to 150–165 mm to selectively capture mid-sized sharks while allowing for the escape of large breeding females and smaller juveniles. To prevent the targeting of juveniles, all retained tope sharks must exceed 450 mm in length (AFMA 2015). Lastly, area closures have been implemented to protect pupping and nursery grounds, known habitats, and migration routes of pregnant females; however, recent satellite tracking research revealed that some migrating females use offshore pathways outside the existing inshore closures, leaving those sharks unprotected from fishing (AFMA 2015; McMillan *et al*. 2019).

Compliance is monitored via mandatory EM systems on all full-time vessels, which replaced onboard observers in 2015 (AFMA 2015). EM consists of sensors and video cameras that record fishing activity to verify logbook data. The baseline audit rate was historically 10 percent of recorded hauls. In May 2024, citing high congruence between EM and logbook reporting, AFMA reduced this to 5 percent for a trial period. However, a 100 percent video review rate remains for gillnet boats in Australian Sea Lion Management Zones. Catch rates and biological data for the species are reviewed annually by SharkRAG, which serves as the primary process for assessing whether the objectives of the rebuilding strategy are being met (AFMA 2015).

An assessment of the rebuilding strategy was conducted by AFMA and discussed by SharkRAG in 2021, and the group concluded that there was no evidence to suggest that the strategy was not working or that significant changes to management were needed. Tope sharks are actively and extensively monitored and regulatory mechanisms are increasingly being put in place to recover the stock. There is evidence that reduced fishing mortality is allowing for population growth; however, fisheries mortality for the

2023–2024 season exceeds the level recommended for rebuilding. Overall, the team agreed that the best available information indicates that recent management of the tope shark in Australia has been effective in reducing mortality and has contributed to stabilizing and beginning to recover the stock. Recent catch levels slightly reduced the team's confidence in this conclusion, however.

In New Zealand, tope sharks have been managed under the QMS since 1986. Catch limits are set, and the stock status is assessed, at the subregional level. TACs are set annually with the goal of maintaining or moving the stock towards a biomass that is at or above the level that can produce the maximum sustainable yield (B_{MSY}) (New Zealand Ministry for Primary Industries 2013). The TAC is divided into allowances for commercial, recreational, and customary non-commercial fishing, as well as other sources of mortality. Commercial quota owners (those that own shares in a fishery stock) receive Annual Catch Entitlement on the first day of the fishing year based on the TACC and how much quota they own (Fisheries New Zealand 2024a). The best available data indicates that the effectiveness of the QMS varies by subregion, with certain regions likely to be at or above target biomass without overfishing occurring, and others likely below target biomass and very likely to be experiencing overfishing (Fisheries New Zealand 2024b). Despite the local-scale occurrences of overfishing or depletion, all team members agreed that regulatory mechanisms appear to be largely adequate in managing the sustainable harvest of tope sharks in New Zealand with no clear evidence of a corresponding decline in abundance. A single, consistent abundance trend has not been established for the entire New Zealand stock, and certain management areas have unknown trends, which adds some uncertainty to this conclusion.

The team concurred that this particular threat is not uniform across the range of the DPS, but is of somewhat greater severity in Australia than in New Zealand. All team members agreed that the threat of inadequate regulatory mechanisms does not in itself constitute a danger of extinction in the near future. Based on the long-term management of the species in New Zealand with a lack of indication of abundance decline, as well as the ongoing adaptive management in Australia, two team members concluded that it is unlikely that this threat contributes significantly to long-term or near future risk of extinction by itself, but there is some concern that it may, in combination with other factors. One team member weighed more heavily the recent exceedance of recommended catch levels in Australia and the mixed stock status in New Zealand, concluding that this factor contributes significantly to long-term extinction risk.

Other Natural or Manmade Factors Affecting its Continued Existence

The team unanimously concluded that the contribution of this factor to the extinction risk of the species across its range could not be determined (see **Summary of Section 4(a)(1) Factors Affecting All DPSs**).

Demographic Risk Assessment for the SW Pacific DPS

Abundance

The demographic risk factor of abundance was assigned a rating of Very Low/Low. While the team agreed that abundance by itself is not likely to contribute significantly to extinction risk for the DPS, there was concern from two team members that abundance may contribute to the long-term extinction risk of this DPS in combination with other stressors given the well-documented depletion of the Australian stock.

Heavy fishing pressure on large gravid females and juvenile tope sharks began in Australia in the 1940s and resulted in lower CPUE, mean body size, and numbers of juveniles at surveyed nursery sites (Olsen 1959, Olsen 1984, Stevens and West 1997, Walker 1998, Walker *et al*. 2005). In addition to these indications of population decline, formal stock assessments for the Australian tope shark stock provide evidence of significant reductions in biomass and pup production: by 2007, the biomass of sharks aged 1+ was just 7 percent to 20 percent of pre-exploitation levels and pup production estimated to be only 6 percent to 17 percent of historical levels (Thomson and Punt 2009). Thomson *et al*. (2020) projected population trends to the year 2037 using four rates of constant exploitation (zero catch, the 2016 catch rate, the 2017 catch rate, and the mean catch rate between 2013 and 2017); all resulted in a modest upward trend with estimated annual increases of approximately 1–11 percent. However, the team noted that these projections included very wide confidence intervals and continued decline could not be ruled out. Recent modeling using updated CKMR data estimated that the Australian tope shark population has been increasing in abundance at a rate of 7.5 percent per year between 2006–2020 (Thomson *et al*. in prep). An analysis of tope shark CPUE in the trawl sector of the SESSF shows a decline in catch rate from 1996 to 2003, consistent with the datasets used by Thomson and Punt (2009); after 2003, however, catch rate has increased steadily until the end of the dataset in 2020 (Tuck 2022). This fishery represents a small portion of the total catch and may not reflect the trend of the overall population.

In New Zealand, population status varies across 5 different management areas, with some regions appearing stable or increasing while others show signs of localized depletion. The Far North (N/1E) region shows a steadily increasing biomass index since 1995 and is likely at or above its target level; the West Coast (7/8/1W) is considered stable and about as likely as not to be at or above B_{MSY}; Chatham Rise (SCH4) has fluctuated with no discernible trend since 2003/4; the Lower South Island (3S/5) region has seen a gradual decline in biomass since 1999, and it is “very likely” (>90 percent probability) that overfishing is occurring. The status of eastern North Island (2/3N) is unknown due to conflicting/insufficient data, although a fisheries-independent survey tentatively suggests increased CPUE after 2007 compared to pre-1996. There is no consistent nationwide abundance trend, but the team found the lack of evidence of a widespread collapse across the region an indication of the stability of the stock as it continues to be fished at fairly consistent levels for several decades.

The most recent IUCN Red List Assessment finds that based on data from the 2009 stock assessment (Thomson and Punt 2009) annual rates of reduction were estimated at 2.8 percent, consistent with a median reduction of 90.1 percent over 3 generation lengths (79 years). In New Zealand, results indicated annual rates of reduction of 0.5 percent and estimated median reduction of 29.8 percent over three generations (79 years; Walker *et al*. 2020).

The best available data from the range of the SW Pacific DPS indicate mixed population trends. While the historical depletion in Australia is concerning and may exacerbate the species' extinction risk in combination with other factors, the best available data indicates that the population is increasing. The stability of the New Zealand stock, while unlikely to significantly alter the population status of the Australian stock, provided confidence to the team that the DPS is unlikely to be at risk of extinction currently or in the foreseeable future due to its abundance alone.

Productivity

This demographic risk factor was assigned a Low/Moderate rating. The tope shark's low productivity limits its capacity to rebound from depletion. There is evidence of historical fishing of large pregnant females and juveniles in pupping and breeding areas in southern Australia and Tasmania (Olsen 1959; Fowler *et al*. 2005). Reports also indicate that while fishing effort increased sharply between 1944 and 1956, mean body size declined (Olsen 1959). Estimates of pup production by Thomson and Punt (2009) ranged from 6 percent to 17 percent of pre-exploitation levels, indicating reduced productivity of the population. The team concluded that, while this threat does not by itself contribute significantly to near-term risk of extinction, the DPS's productivity is likely to contribute to the long-term extinction risk of the DPS in combination with other threats (such as overutilization) and/or demographic risk factors (such as reduced abundance).

Diversity

The team assigned this demographic risk factor a rating of Very Low, reflecting their conclusion that this factor is unlikely to contribute significantly to the extinction risk for the SW Pacific DPS, either by itself or in combination with other factors. Based on the best available information, the team found no evidence that the DPS is at risk due to a substantial change or loss of variation in life-history traits, population demography, morphology, behavior, or genetic characteristics.

Regarding genetic structure and connectivity, the team noted that tope sharks throughout this region are considered to comprise a single, large population. Genetic analyses using both mtDNA and microsatellite markers are largely in agreement that there is no significant population differentiation or barrier to gene flow within the region (Ward and Gardner 1997, Hernández *et al*. 2015, Devloo-Delva *et al*. 2019). Bester-van der Merwe *et al*. (2017) did find significant genetic differentiation between tope sharks from Tasmania and New Zealand based on microsatellite markers, however, Devloo-Delva *et al*. (2019) re-examined the samples used in the prior study and suggested that the results may have been due to sampling artifacts and should be interpreted with caution.

The team also highlighted the species' behavioral and ecological plasticity as a factor reducing extinction risk. Tope sharks exhibit diverse migratory behaviors, including "partial migration," where some females undertake long-distance migrations exceeding 2,000 km (including across the Tasman Sea), while most others remain within a relatively localized home range (within 500 km). Furthermore, the species utilizes a wide variety of habitats, ranging from shallow coastal waters and continental shelves to oceanic insular areas and mesopelagic depths. The team reasoned that this diversity in habitat use and migratory strategy may provide the DPS with resilience against catastrophic events that might affect a specific local area or habitat type.

Overall, there is no evidence that the species is at risk due to a substantial change or loss of variation in life-history traits, population demography, morphology, behavior, or genetic characteristics. Therefore, diversity is not considered a significant contributor to the extinction risk of this DPS.

Spatial Structure/Connectivity

Spatial distribution for tope sharks in this DPS was assigned a rating of Very Low, as this demographic factor was not viewed by any team members as contributing significantly to risk of extinction for this DPS, either by itself or in combination with other factors. The tope shark occupies a broad geographic range within the SW Pacific, from Houtman's Abrolhos to Cape Leeuwin in Western Australia, eastward to Moreton Bay in Southern Queensland, around Lord Howe Island, Tasmania, around the North and South Islands of New Zealand, and as far east as the Chatham Islands. Within this extensive range, the species utilizes diverse habitats, occupying shallow coastal bays and estuaries—often used as pupping and nursery grounds—as well as deep offshore waters along the continental slope.

The team noted that there are no known physical barriers to dispersal within this region that would altogether prevent the species from accessing available habitat or moving between areas in response to environmental or anthropogenic stressors. Tope sharks are known to migrate across the Tasman Sea in both directions, and available genetic data support the characterization of the DPS as a single regional population. Such movements are likely infrequent, however, based on relatively few trans-Tasman recaptures in tagging studies and results of CKMR analyses. While movement between New Zealand and Australia is unlikely to allow for any significant population recovery from localized depletions, there is some resilience provided by these movements such that the spatial distribution of the DPS is unlikely to threaten the persistence of the DPS as a whole.

In summary, due to the species' wide distribution, lack of barriers to dispersal, and genetic connectivity, the team concluded that spatial distribution is unlikely to contribute significantly to the risk of extinction for the SW Pacific DPS, either by itself or in combination with other factors.

Extinction Risk Summary: SW Pacific DPS

Based on the team's consideration of the best available data regarding threats and demographic risks to this DPS, they concluded that the SW Pacific DPS is currently at a Low Risk of extinction. Their confidence in this conclusion was fairly high as the majority of their likelihood points (70 percent) were allocated to the Low Risk category and the remainder of the points (30 percent) were allocated to the Moderate Risk category.

Overutilization for commercial purposes was identified as the most significant threat to tope sharks in the SW Pacific DPS. The species was targeted and heavily fished across the region historically, leading to significant abundance declines in the Australian stock. Currently, tope sharks are bycaught in several Australian fisheries, including the gillnet, hook and trap sector of the SESSF which targets gummy sharks. The rebuilding strategy for the species (updated in 2015) lays out goals and timeframes for rebuilding the stock through a variety of regulatory mechanisms. An assessment of the rebuilding plan was conducted by AFMA and discussed by SharkRAG in 2021, and SharkRAG concluded that there was no evidence to suggest that the strategy was not working. The team agreed that there is evidence of population increase in modeled CKMR data and observed CPUE trends. However, the team expressed some concern that estimated fisheries mortality for the 2023–2024 season exceeds the level recommended for rebuilding.

In New Zealand, a conservative QMS for tope sharks was implemented in 1986 to ensure the sustainability of the fishery, and team members were in agreement that it appears to have been adequate for managing the sustainable harvest of tope sharks since then. While recent assessments indicate local-scale occurrences of overfishing in certain management areas, the team found no clear evidence of widespread population decline after decades of fishing at relatively steady, high levels (2,500–3,500 mt per year). The IUCN Red List Assessment for New Zealand's tope sharks indicates annual rates of reduction of 0.5 percent and estimated median reduction of 29.8 percent over three generations (79 years; Walker *et al*. 2020).

The team considered how the life history of tope sharks increase the DPS's vulnerability to overutilization. The species is long-lived, slow-growing, and late-maturing, and has low overall productivity. This limits the species' capacity to rebound from depletion. There is evidence of historical fishing of large pregnant females and juveniles in pupping and breeding areas of the SW Pacific, as well as evidence of significantly reduced pup production in Australia. This reduces the productivity of the population and contributes to long-term extinction risk.

Data are limited, but the team found no indication of declines in diversity. Data are also limited with respect to the loss or degradation of habitat including pupping areas. Available evidence does not provide any indication that the DPS's range has contracted, or that changing environmental conditions will limit critical habitats in the foreseeable future. There is also no evidence that disease, predation, or other manmade factors are contributing to the SW Pacific DPS's risk of extinction.

Overall, the team found that this DPS is at Low Risk of extinction. This conclusion is based on: the lack of evidence of widespread, significant population decline in New Zealand despite sustained high catch over several decades; adequate management and monitoring of the species in New Zealand; an adaptive management strategy aiming to rebuild tope sharks in Australia; and resulting abundance increases in Australia. Several likelihood points were allocated to the Moderate Risk category as a result of fisheries mortality in Australia exceeding the recommended TAC in the most recent season, evidence of reduced pup production in the DPS, and uncertain stock status in certain QMAs in New Zealand.

Significant Portion of its Range Analysis: SW Pacific DPS

Because the team concluded that this DPS is at low risk of extinction throughout its range, they also considered whether this DPS is at a moderate or high level of extinction risk within an SPR. In order to conduct this analysis, they first identified portions of the DPS's range where there is a reasonable likelihood that the DPS may be both at elevated extinction risk and where the members of the DPS in that portion may be biologically significant to the long-term viability of the DPS.

Given that overutilization has resulted in abundance and productivity declines in Australia, and that fisheries-related mortality is concentrated here, the team identified the Australian portion as potentially being at moderate or high risk of extinction. The effective long-term management of tope shark fisheries in New Zealand with low to moderate rates of abundance declines indicated by available data led the team to conclude that tope sharks are not at elevated risk of extinction in New Zealand relative to the rest of the range. Thus, this portion was not further considered in the analysis.

To conduct this SPR analysis, the team first addressed the question of whether tope sharks are at moderate or high risk of extinction in the Australian portion of their range. They considered the available information on the historical overfishing and the resulting abundance and productivity declines of tope sharks indicated by the 2009 stock assessment (Thomson and Punt 2009). Since these observed declines, a rebuilding strategy and various management measures have been put in place. There is evidence that these conservation measures have stabilized the stock and led to recent abundance increases: tope shark CPUE in the trawl sector of the SESSF steadily increased from 2003 until the end of the dataset in 2020 (Tuck 2022); modeling indicates likely population increases (between 1–11 percent annual increases depending on exploitation scenario) (Thomson *et al*. 2020); new CKMR data from 3,000 additional tope shark samples indicate that 7.5 percent per annum population increases have occurred over the time period 2006 to 2020 (90 percent CI: 2.7–12.3 percent) (Thomson *et al*. in prep). There are also ongoing updates to Australia's management framework, including the development of a harvest strategy based on absolute abundance estimates provided by the CKMR assessment, rather than reference points defined relative to pristine abundance. While recent fishing mortality has exceeded the level that is recommended for rebuilding, personal communication from R. Thomson (Australia Commonwealth Scientific and Industrial Research Organisation; December 2, 2025) suggests that the fishing industry is finding it increasingly difficult to avoid tope sharks as their population increases in size. In addition, the team considered how connectivity with the New Zealand portion of the range, as evidenced by both tagging and genetic data, provides a degree of population resilience to the Australian portion. In all, considering the increasing abundance trend due to strengthened regulatory measures applicable to the Australian portion of the DPS, and the benefits provided by connectivity with the New Zealand portion of the range, the team concluded that tope sharks in Australia are at a low risk of extinction. Therefore, they concluded that the Low risk conclusion for the DPS range-wide also applies to tope sharks in the Australian portion of the range.

Listing Determination: SW Pacific DPS

Based on our review of the best available scientific and commercial data and extinction risk assessment, as provided in the Status Review Report and summarized herein, we find that this DPS is not in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. We considered efforts being made by any state or foreign nation, or political subdivisions thereof, to protect and conserve the species (see **Conservation Efforts**). These conservation efforts do not change the conclusion we would otherwise have reached regarding the DPS's status. Therefore, we find that the SW Pacific DPS does not meet the definition of a threatened or endangered species and thus does not warrant listing under ESA.

Summary and Analysis of Section 4(a)(1) Factors for the NE Pacific DPS

The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

The threat of habitat modification from changing environmental conditions was rated as Very Low/Low based on available evidence indicating that the net effect of changes in environmental conditions on the availability of suitable habitat for this DPS is likely neutral or even positive over the foreseeable future. In particular, the team's analyses project a 28.6 percent (~68,749 sq. km) increase in suitable habitat area for the tope shark in the NE Pacific in the foreseeable future as well as a poleward shift in suitable habitat, with potential losses in the southern part of the range (*e.g.*, off Baja California and in Gulf of California) being more than offset by substantial projected habitat gains off British Columbia, Canada and Southeast Alaska. Based on this, the team concluded that habitat curtailment as a result of changing environmental conditions is likely not a significant threat to this DPS by itself currently or in the foreseeable future. As with other DPSs, the team discussed how more localized impacts of ocean warming could be masked by the coarse scale of the habitat suitability model, and they noted that effects of ocean warming and other environmental variations (*e.g.*, changes in runoff, salinity, pH) could be more severe in nearshore nursery and pupping areas. Such acute habitat changes could contribute to the DPS's extinction risk in combination with other threats, however, there is insufficient information to evaluate the scope or severity of this potential threat to tope sharks with any confidence. Given these other considerations, they concluded that changes in environmental conditions in tope shark habitat are unlikely to pose an independent extinction risk currently but may, in combination with other factors, contribute to the extinction risk of the NE Pacific DPS over the foreseeable future.

Similar to other DPSs, habitat threats stemming from coastal development and pollution were assigned a rating of Very Low/Low reflecting the team's conclusion that habitat destruction from coastal development and pollution are not likely contributing significantly to extinction risk for the NE Pacific DPS, but impacts to more sensitive coastal habitats may, in combination with other factors, contribute to long-term extinction risk of the DPS. As noted for other DPSs, this potential threat could affect important pupping and nursery habitats across the range; however, no information regarding known or potential impacts of coastal development on tope sharks in the NE Pacific specifically or elsewhere were available to indicate this is an operative threat affecting tope sharks. Similarly, with respect to toxic contaminants and plastics, specific levels of exposure, contamination, and their consequences on tope shark health and survival are unknown, so the team was unable to assess the extinction risk posed by these other potential forms of habitat degradation.

In summary, there is very little information regarding the threat of coastal development and pollution to tope sharks in the NE Pacific. The team acknowledged concerns that this threat could disproportionately affect early life stages and may contribute to the long-term extinction risk of the NE Pacific DPS in combination with other factors; however, the available information is not sufficient to conclude that this threat is likely to contribute by itself to the long-term or near future risk of extinction of this DPS.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The threat of overutilization for the NE Pacific DPS was assigned a rating of Low, as a result of the greatly reduced level of fishing pressure on tope sharks within the region. There have been no directed commercial fisheries for tope sharks within the NE Pacific since the 1950s and recreational catch appears to be limited. Tope sharks, however, continue to be taken as bycatch in some commercial fisheries and in artisanal fisheries, primarily in the southern portion of the range.

Prior to 1936, tope sharks were not a major target species for commercial fishers in the region and were predominantly landed as bycatch from demersal trawl and trammel net fisheries (Walker 1999). From 1916 to 1936, total shark landings in California were relatively stable at approximately 227 mt per year on average (Ripley 1949). Beginning in 1937, tope sharks in this region were subject to an intense, ~8-year long commercial fishery. This fishery developed rapidly after it was discovered that the liver oil of adult *G. galeus* contained high levels of vitamin A and could serve as an effective replacement for the vitamin A from cod liver oil, sources of which had been disrupted by World War II (Ripley 1946). By 1939, approximately 600 vessels were fishing for tope sharks throughout California waters (Ripley 1946), and in the ensuing years, fishermen in Oregon, Washington, and British Columbia followed suit (Barraclough 1948; Cleaver 1951; Nakatsu 1957). In California, where the greatest quantities of tope sharks were landed, tope shark landings peaked at over an estimated 3,000 mt by the late 1930s, were recorded as 2,173 mt in 1941, and declined to 287 mt by 1944 (Ripley 1946). Market demand for tope sharks declined precipitously by the early 1950s when cod liver oil as well synthetic sources of vitamin A became available, but significant declines in CPUE by the mid-1940s in both Canada and the United States had already signaled the collapse of the fishery. For instance, between 1942 and 1945, estimated CPUE of tope sharks landed in the Eureka, California region declined by about 86 percent (Ripley 1946), and, between 1943 and 1946, estimated CPUE for tope shark livers landed by gillnets in Hecate Strait, British Columbia declined by 93 percent (Barraclough 1948). The steeply declining CPUEs, landings, and concurrent anecdotal reports that tope sharks were increasingly less common provide strong evidence that this historical fishery greatly reduced tope shark abundance. Using the estimated and available tope shark landings data for 1938–1944 in California, Holden (1977) concluded that the steep decline in CPUE observed in California was due to a decline in the stock and not due to recruitment failure. This conclusion suggests that following the collapse of the fishery the population retained the ability to rebound from the previous fishing pressure.

During the early stages of the tope shark fishery in the United States, tope sharks were primarily fished using bottom-set longlines, as the commercial halibut fleet could quickly repurpose this gear. However, by 1943, bottom-set gillnets, which were found to catch tope sharks more efficiently, largely replaced longlines as the preferred gear in the United States (Ripley 1946; Westrheim 1950). In British Columbia, longlines remained a common fishing method throughout the duration of the fishery due to local regulations on gillnets (Barraclough 1948). Due to practical constraints, the use of bottom-set gillnets was largely limited to relatively shallow waters (< 150 m). Later, drift nets also gained popularity when it was found that tope sharks in the northern region could also be caught during the spring and summer months near the ocean surface as far as 100 miles (~161 km) from shore (Westrheim 1950). Since 2000, gillnets have been responsible for the vast majority of tope shark captures in the United States (Figure 4-21 in Status Review Report) and are also responsible for most of the tope shark captures in Mexico. Set gillnets are the most widely used gear type in Mexican artisanal elasmobranch fisheries due to their low cost, ease of use, and high catch efficiency (Bizarro *et al*. 2009; Sosa-Nishizaki *et al.* 2020; IMIPAS-CONAPESCA 2025).

Since the 1950s, commercial landings of tope sharks in the NE Pacific have declined significantly. Although increased demand for shark meat in the early 1980s led to a noticeable but brief increase in tope shark landings in California (peaking at about

125 mt per year), fishing effort at this time was not focused on tope sharks, and landings of tope sharks declined to less than 30 mt by 2000 and less than 10 mt by 2008. At the peak of this more recent shark fishery, tope sharks were mainly being caught in southern California, particularly between September and December, in depths less than 180 m and within about 4 nm from shore (Holts 1988). Subsequent declines in tope shark landings were likely attributable, at least in part, to depth- and area-based gillnet restrictions in coastal California, which significantly constrained the location of the state's commercial set gillnet fishery by 1994 (see *Inadequacy of Existing Regulatory Mechanisms* section below). In Canada, total shark landings declined from a peak of 9,000 mt in 2005 to near zero in 2010, with most (99 percent) of the catch consisting of spiny dogfish (*Squalus suckleyi*; Jabado *et al*. 2024).

Currently, the threat of overutilization is concentrated in the southern portion of the DPS's range, as landings are occurring primarily in Mexican artisanal fisheries and to a lesser extent in offshore waters of southern California. Most of this take occurs along the Pacific coast of the Baja California Peninsula; whereas capture of tope sharks is rare within the Gulf of California (Saldaña-Ruiz *et al*. 2017). Data from the artisanal fisheries in Mexico are very limited due to limited monitoring and species-specific landings data, but various surveys of fishing camps in Baja California and Baja California Sur during 1995–2010 indicate that tope sharks are captured year-round and comprise a very small percentage of the total shark catch (Cartamil *et al*. 2011, Santana-Morales *et al*. 2020). Based on these surveys, smaller tope sharks appear to be captured primarily during summer months by gillnets, while longline captures appear to increase in winter and consist of larger adults. Based on data reported to FAO, total tope shark landings in Mexico averaged 58.4 mt per year between 2019 and 2023. Elsewhere, annual landings are low and have not exceeded 10 mt in the United States or Canada since at least 2010. In addition, gillnet fishing has declined significantly in the United States and is largely prohibited in Canada, and bycatch in other commercial fisheries is rare. Since 2002, total tope shark mortality (*i.e.*, landings plus estimated discard mortality) has averaged 2.3 mt per year in U.S. hook and line fisheries and 3.9 mt per year in U.S. bottom and midwater trawl fisheries (Figure 4-23 in Status Review Report). Likewise, from 2000 to 2018, bycatch of tope sharks averaged 1.3 mt per year in the Canadian hook and line fishery and 0.5 mt in the Canadian trawl fishery (Figure 4-22 in Status Review Report; COSEWIC, 2021).

Overall, while there is continued concern regarding fisheries-related take of tope sharks in the NE Pacific, the scope and severity of the threat of overutilization have declined significantly given existing management measures and the lack of a directed tope shark fishery. The available data suggest that tope shark abundance remains depressed relative to historical levels despite the significant reduction in fishing pressure; however, a population rebound to former peak abundances is likely to require several generations given the tope shark's life history and ongoing fisheries mortality. While no stock assessments are available for this DPS, available evidence suggests that, as of the early to mid-2000s, abundance of this DPS is stable and possibly increasing (*e.g.*, WCGOP data, see section 3.4 of the Status Review Rerport, COSEWIC 2021). Given the greatly decreased fishing pressure and evidence that the population may be stable or possibly even increasing, fisheries-related mortality, by itself, is unlikely to contribute significantly to the DPS's long-term or near future risk of extinction, but there is some concern that it may, in combination with other factors. Incomplete fisheries data and the lack of a stock assessment or recent abundance data contribute to substantial uncertainty with respect to the level of extinction risk posed by past and current fishing levels on the NE Pacific DPS, and thus the team rated the available data as having Low to Medium sufficiency. Additional detail regarding fishing activity within this region is provided in section 4.3.4 of the Status Review Report.

Disease and Predation

The team assigned this threat category a rating of Very Low, reflecting agreement that, based on the best available information, neither disease nor predation is contributing significantly to the extinction risk of the NE Pacific DPS now or over the foreseeable future. The best available information on disease and predation on the tope shark throughout its range (see **Summary of Section 4(a)(1) Factors Affecting All DPSs)**, and no further information specific to this DPS is available.

Inadequacy of Existing Regulatory Mechanisms

The inadequacy of existing regulatory mechanisms was assessed as posing a Low risk to the NE Pacific DPS. Given that historical overutilization in commercial fisheries was identified as a major threat to this DPS, the assessment of regulatory mechanisms was focused on a review of relevant fisheries management measures and their effectiveness. The Low rating assigned to this threat reflects the team's conclusion that effective regulatory mechanisms are in place across most of the range of this DPS such that this factor itself is not likely to contribute significantly to long-term or near future risk of extinction, but may in combination with other factors.

Existing regulatory mechanisms in both the United States and Canada have drastically reduced fishing pressure on tope sharks and have likely minimized the threat of overutilization across the range of the DPS. In Canada, shark finning has been banned since 1994, and targeting and retention of tope sharks in commercial and recreational fisheries has been prohibited since 2011. All commercial longline and trawl vessels have had either at-sea observers or EM since 2006, allowing for effective monitoring of bycatch and enforcement of the requirement to discard tope sharks at sea. Other management measures include a code of conduct, developed in 2010, intended to reduce incidental capture and reduce mortality through safe handling protocols.

In the United States, shark finning has been prohibited since 2000, and in California, a series of regulatory restrictions on gillnet fishing has drastically reduced the total effort in the state's set gillnet fishery, which has historically accounted for the large majority of tope shark landings. For instance, beginning in 1994, a statewide ballot measure (CA Proposition 132) prohibited gillnet fishing (and trammel net fishing) in all waters within 3 nm of the mainland coast and within 1 nm of the Channel Islands. More recently, first through emergency measures in 2000 and 2001 and then through a permanent extension in 2002, the California Fish and Game Commission (CFGC) established an additional depth restriction on the use of set gillnets in central California, prohibiting their use in waters less than 60 fathom deep (110 m) between the Point Reyes headlands and Point Arguello (California Code of Regulations, Title 14, Section 104.1). As a result of these measures, set gillnetting largely shifted to the south of Point Arguello and is now very limited in northern and central portions of the state—where a large percentage of the tope shark landings occurred in the 1940s (Ripley 1946). Using fisheries-independent gillnet survey data, Pondella and Allen (2008) reported a significant increase in tope shark CPUE ($p = 0.02$) from 1995 to 2004 in the Southern California Bight (following enactment of CA Proposition 132), whereas previously they had been declining. These authors attributed the increased CPUE to the nearshore gillnet prohibition and subsequent positive response of the population. In addition to area restrictions, overall gillnet fishing effort has also declined: in 1939, there were an estimated 600 active California gillnet fishermen who were primarily fishing for tope sharks (Ripley, 1946); in 1987, there were over 300 active permittees (CDFW 2023), many of whom were targeting various shark species, including tope shark; and, as of 2023, there were a total of 91 permit holders in the California commercial set gillnet fishery, primarily targeting California halibut and white seabass (CFGC 2024). Likewise, the total number of gillnetting trips has also declined from 27,798 trips in 1986 to less than 2,000 trips per year since 2012, with the vast majority of landings in the set gillnet fishery (over 90 percent) coming from just 13 vessels (Fang *et al*. 2025). Washington, Oregon, and California have also all enacted measures to prohibit or effectively eliminate the use of drift gillnets. Large, adult tope sharks may potentially benefit from the Driftnet Modernization and Bycatch Reduction Act of 2022, which will prohibit the use of large mesh (> 14 inches, ~36 cm) drift gillnet gear in Federal waters off the U.S. West Coast after December 2027.

Mexico has enacted several measures to promote sustainable shark fishing that are likely to have measurable benefits for tope sharks. Most notably, the Norma Oficial Mexicana (NOM-029-PESC-2006), among other restrictions, prohibited landing of shark fins without the carcass, established a moratorium on new commercial shark fishing permits, prohibited the use of sharks as bait, and prohibited the use of gillnets and longlines for shark fishing along much of the Baja California peninsula and in coastal lagoons from December 1 to April 30. Additionally, beginning in 2013, Mexico has imposed a seasonal closure of the shark and ray fishery in federal waters along the Pacific coast from May 1 to July 31 to coincide with the peak pupping and nursery season for many Pacific shark species, including tope sharks. Despite these measures and a reported increased interest in shark conservation, management gaps appear to remain in Mexico due to deficient enforcement and monitoring, particularly at remote fishing camps, and the continued practice of reporting landings under generic categories (Santana-Morales *et al*. 2020, Sosa-Nishizaki *et al*. 2020).

Overall, existing regulatory mechanisms in Canada and in the United States likely minimize the threat of overutilization throughout the majority of the NE Pacific region. A prohibition on the targeting and retention of tope sharks since 2011 has nearly eliminated this threat in Canada. In the United States, despite there not being any species-specific regulations or commercial catch limits, the lack of a directed fishery combined with existing gillnetting restrictions have resulted in a drastic reduction in fishing pressure and catch levels. Mexico has also taken steps to improve the sustainability of the Pacific shark fishery, but deficiencies in monitoring and enforcement remain. Thus, as with the threat of overutilization, the team found that the scope and severity of this threat are limited, particularly relative to historical levels, and the threat is now largely restricted to the southern portion of the DPS's range. Thus, the team concluded that the threat of inadequate existing regulatory mechanisms, by itself, is unlikely to contribute significantly to the DPS's long-term or near future risk of extinction, but they acknowledge there is some concern that it may, in combination with the depressed abundance stemming from historical overutilization. Additional detail regarding various management measures for this DPS are provided in section 4.5.5.1 of the Status Review Report.

Other Natural or Manmade Factors Affecting its Continued Existence

As with all other DPSs, the assessment of this factor focused primarily on the potential threat posed by EMFs generated by undersea power cables, which was highlighted by the petitioner as a potential risk to tope sharks. As noted previously, the team was unable to find any data or research regarding tope sharks' reliance on natural electrical or magnetic signals and how EMFs may impact their behaviors. Available research to date (*e.g.*, Kavet *et al*. 2016; SEER 2022) has also not indicated that EMFs pose more than a minor impact on marine fishes. Given the general lack of information on this potential threat, the team concluded that the contribution of this threat to the extinction risk of tope sharks is Unknown.

Demographic Risk Assessment for the NE Pacific DPS

Abundance

The demographic risk factor of abundance was rated as Low, reflecting agreement among the team members that abundance of the NE Pacific DPS is not likely to be contributing to the species' long-term or near future risk of extinction by itself, but may in combination with other factors. Because much of the relevant, available data are derived from other fisheries or surveys designed for other species, and are thus affected by low gear selectivity and low catch rates for tope sharks, the team had a low to moderate confidence in interpreting these data as a measure of tope shark abundance and trends.

Available estimates of CPUE from historical Canadian and U.S. commercial fisheries as well as qualitative descriptions of the historical tope shark fishery, provide clear evidence that tope shark abundance was significantly reduced during the ~8 years that the directed tope shark fishery was active. Based on historical catch data from California (during 1938–1944), the unexploited population was roughly estimated to consist of 670,000 mature females (Ripley 1946), and based on genetic data collected from tope sharks (n = 26) off California (during 1997–2006), mature females were estimated to number 89,545 (Chabot and Allen 2009). While the population very likely remains depleted compared to its historical abundance levels, the available data provide a reasonably strong indication that the population is stable or potentially even increasing. As noted previously, based on data from the Southern California Bight, Pondella and Allen (2008) found that the tope shark population responded positively following enactment of restrictions on gillnetting within California state waters. In addition, analysis of the IPHC FISS data, which are the most statistically robust data available for this DPS, show a significant increase in the mean number of tope sharks caught per sampling station from 2003 to 2018, and a continued increasing trend to 2024 (see Figure 3-19 in Status Review Report). Analysis of these fishery-independent, long-line survey data, which are collected annually (during May to September) at the northern end of the DPS's range and as far south as Northern California, also reveal that the largest increases in tope shark catch has occurred off British Columbia, and may reflect a range shift.

However, several other data sources indicate patterns that are consistent with an increase in population abundance: at-sea discard rates of tope sharks in the Pacific hake mid-water trawl fishery have increased since 2015; catch of tope sharks per vessel has increased since 2015 for each gear type where tope sharks are consistently observed in the WCGOP (*i.e.*, bottom trawl, bottom/midwater trawl, fixed gear, and non-trawl net gear fisheries) in California; and logbook data from California gillnet fishery show that tope sharks caught per vessel trip and has generally increased from 2015 to 2021. While there are limitations to each of the available datasets, and changes in effort and location of gillnet fishing during the past decades likely result in a downward skew in the tope shark CPUE data, the consistent pattern across these independent datasets is compelling.

Overall, the available data do not indicate that abundance of this DPS is currently posing an extinction risk for the species. Considering the changes in fishing practices and management measures across the majority of the DPS's range, the team also concluded that abundance is also unlikely to pose an extinction risk for the species over the foreseeable future.

Productivity

This demographic risk factor was assigned a Low risk rating and a low data sufficiency rating. As noted previously, the tope shark's fairly low productivity clearly limits its capacity to rebound from depletion, but this trait does not, by itself, contribute significantly to long-term or near future risk of extinction. Beyond this inherent demographic vulnerability, the team found no evidence that population growth is currently below the replacement rate or has been compromised to a level that threatens the persistence of the NE Pacific DPS (*e.g.*, via depensatory processes). Rather, consistent observation of seasonal aggregations of adult and pregnant females off the coast of southern California and indications of population rebound suggest that the DPS is successfully reproducing and that the population growth rate may be above replacement rate. The 1994 restrictions on gillnetting, which prohibited gillnetting within shallow nearshore waters of the Southern California Bight where tope sharks were known to pup and where adult females consistently aggregate in summer, may have also had a positive effect on population growth (Pondella and Allen 2008). Ongoing fishing activity in Mexico, however, may hinder productivity, which, in combination with the still-depleted status of the population, warrants some concern.

Diversity

The team assigned this demographic risk factor a rating of Very Low, reflecting their conclusion that this factor is unlikely to contribute significantly to the risk of the extinction for the NE Pacific DPS, either by itself or in combination with other factors. As there are limited genetic data available for this DPS, the data sufficiency for this demographic factor was rated as Low.

Analysis of microsatellite DNA (using 11 polymorphic microsatellite loci) collected from tope sharks off California (n = 25) indicated that observed heterozygosity, average allelic richness, and number of private alleles are all within the range observed for tope shark populations in the four other regions sampled (Australia, South America, Africa, Western Europe (Chabot 2015)). Similarly, based on analysis of mtDNA (control region), tope sharks sampled in the NE Pacific (California) have a comparable level of nucleotide and haplotype diversity relative to tope sharks of other regions (Chabot and Allen 2009). There appear to be no other studies regarding genetic diversity, population structure, or gene flow within the region. The team found no evidence that the DPS is at risk due to a substantial change or loss of variation in life-history traits, population demography, morphology, behavior, or genetic characteristics, nor any evidence that natural processes of dispersal or migration have been significantly altered. Fisheries capture data as well as more recent telemetry data indicate that seasonal movement patterns along the coast as well as distinct movements and aggregations of males and females continue, suggesting there has not been a loss of intra-population ecological variation.

Spatial Structure/Connectivity

Spatial distribution for tope sharks in this DPS was assigned a rating of Very Low, as this demographic risk factor was not viewed by any team members as contributing significantly to risk of extinction for this DPS, either by itself or in combination with other factors. The sufficiency of the available data to assess this risk factor was rated as Medium.

Tope sharks remain broadly distributed across the region, and range from the waters off British Columbia, south to Baja California Sur, Mexico. There are no known extirpations of tope sharks within this range nor are there any known physical barriers to dispersal that would prevent the species from accessing available habitat or moving between areas in response to environmental or anthropogenic stressors. The projected potential net expansion of suitable habitat at the northern end of the range also suggests that the distribution of this DPS is not likely to contract over the foreseeable future. Observational data from the historical fishery as well as more recent telemetry data indicating regular, seasonal movements and long-distance migrations, support the current view that the NE Pacific population of tope sharks consists of a single, migratory stock.

Extinction Risk Summary: NE Pacific DPS

Based on the best available data regarding threats and demographic risks to this DPS, the team concluded that the NE Pacific DPS is currently at Low Risk of extinction. Confidence in this conclusion was moderate, as the majority of the team’s likelihood points (63 percent) were allocated to the low risk category, and the remainder of the points (37 percent) were all allocated to the Moderate Risk category. Limited abundance data and lack of stock assessments, population growth rate estimates, or model projections information were noted as preventing a higher level of confidence in this rating.

Historical overutilization for commercial purposes was identified as the most significant threat to tope sharks in the NE Pacific DPS. Although tope sharks have generally not been targeted since the collapse of the directed liver oil fishery in the 1940s, this intense, short-lived fishery resulted in substantial declines in abundance from which the population has yet to fully rebound. In the decades that followed the end of the tope shark fishery, the decline in commercial value of tope sharks coupled with the significant changes in fishing practices within both Canadian and U.S. waters, particularly as a result of restrictions on gillnetting, drastically reduced the threat of overutilization. Take of tope sharks, however, continues, largely as a result of bycatch in commercial fisheries as well as directed take in artisanal fisheries in Mexico. While sufficient data are not available to quantify the effects of the current exploitation on the population, multiple indicators (*e.g.*, increasing CPUEs from the FISS dataset and increasing discard rates from multiple observed fisheries) suggest that population abundance is increasing, providing further evidence that the threat of overutilization has been greatly reduced.

The life history strategy of this species increases its vulnerability to overutilization; however, the team found no evidence of other demographic risks to this DPS. Based on the limited, available data, for example, they found no indication of declines in productivity or diversity or evidence that the species is at such a low abundance that depensatory processes are at work. There is no indication that habitat degradation has resulted in destruction or loss of habitat, and based on habitat suitability modelling, there is no indication that changing environmental conditions will limit the availability of suitable habitat for this DPS over the foreseeable future. There is also no evidence that disease, predation, or other manmade factors are contributing to the NE Pacific DPS’s risk of extinction.

Overall, the team concluded that this DPS is at low risk of extinction over the foreseeable future throughout its range. This conclusion is largely based on the multiple indicators that population abundance is stable and possibly increasing, the significantly reduced fishing pressure, particularly from gillnets in areas with high overlap with tope shark habitat, and lack of evidence of other operative threats.

Significant Portion of its Range Analysis: NE Pacific DPS

Because the team concluded that this DPS is at low risk of extinction throughout its range, they also considered whether this DPS is at a moderate or high level of extinction risk within an SPR. In order to conduct this analysis, they first identified portions of the DPS's range where there is a reasonable likelihood that the species may be at elevated extinction risk and where the members of the species in that portion may be biologically significant to the long-term viability of the DPS.

Because risk of fisheries interactions and fisheries-related mortality is mainly occurring in the southern parts of this DPS's range, they identified the southern California (south of Point Arguello) and Mexico (Baja California and Baja California Sur) individually, and the combined area of southern California and Mexico together, as portions for further analysis. The limited bycatch and reduced gillnetting in central and northern portions of the DPS's range, coupled with information indicating that the population trends appear positive and habitat is unlikely to be limiting in the northern portion of the range, led the team to conclude that tope sharks are not at elevated risk of extinction in the central and northern portions of its range.

Ultimately, based on the available data, the team could not conclude that either the southern California or Mexico portion, when considered separately or in combination, qualify as a "significant" portion of the range. Tope sharks in the NE Pacific are viewed as consisting of a single, migratory stock. Repeated, seasonal patterns in their latitudinal and bathymetric distributions along the coast are consistent with the hypothesis of a single migratory population. For example, during the historical fishery in California, annual landings of tope shark captures peaked in colder months in the northern California fishing areas and largely consisted of males that had been caught in deeper water (>37 m); whereas annual landings south of Point Conception peaked in summer months and consistent predominantly of females that had been captured in shallow water (<18 m) (Ripley 1946). Seasonal patterns in fisheries catch are also observed in Canada and Mexico, suggesting that seasonal movements occur range-wide. Tagging and telemetry data also provide support for the hypothesis of a single migratory stock. In particular, telemetry data from adult females tagged off La Jolla, California, showed these sharks will undertake long distance migrations along the coast, travelling as far north as Oregon and Washington, or south to Mexico (Nosal *et al*. 2021). Of the 40 female sharks tagged by Nosal *et al*. (2021), one was captured in Washington by WDFW, and six were captured in commercial gillnets in Mexico. Most of the sharks detected over subsequent years (12 of 21 sharks) in this study, returned to La Jolla within about 3 years, suggesting movements are tied to reproductive behavior and that there is some degree of fidelity to particular seasonal habitats. As part of an earlier tagging effort, two female tope sharks that were tagged in the Southern California Bight, one in 1943 and one in 1949, were later recaptured in British Columbia after travelling at least 1,600 km during 26 months and at least 1,760 km in 3.3 months, respectively (COSEWIC 2021). While some level of population structuring may exist within the DPS, there are no genetic data yet available to evaluate this, nor any phenotypic data, or data regarding mating patterns. There are also no physical barriers to dispersal or mixing throughout their range.

Under the current view that this is a single, migratory stock, threats operating in the southern portions of the range will impact the status of the DPS throughout its entire range—not in any distinct portion. Similarly, the available data also do not allow for an assessment of the independent contribution of tope sharks in any portions to the long-term viability of the DPS (*e.g.*, by contributing to abundance, productivity, or diversity). Thus, while the team could identify portions of the range where the threat of fisheries-mortality is relatively more concentrated, they could not identify specific portions of the range where extinction risk of tope sharks could be assessed independently from the remainder of the DPS, nor could they evaluate whether tope sharks within any portions may qualify as important to the long-term viability of the DPS. Therefore, the team concluded that the Low risk conclusion for the DPS range-wide also applies to tope sharks in the southern portions of the range.

Listing Determination: NE Pacific DPS

Based on our review of the best available scientific and commercial data and extinction risk assessment, as provided in the Status Review Report and summarized herein, we conclude this DPS is not in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. We considered efforts being made by any state or foreign nation, or political subdivisions thereof, to protect and conserve the species (see **Conservation Efforts**). These conservation efforts do not change the conclusion we would otherwise have reached regarding the DPS's status. Therefore, we find that the NE Pacific DPS does not meet the definition of a threatened or endangered species, and thus does not warrant listing under ESA.

Conservation Efforts

Section 4(b)(1)(A) of the ESA requires that NMFS make listing determinations based solely on the best available scientific and commercial data after conducting a review of the status of the species and taking into account those efforts, if any, being made by any State or foreign nation, or political subdivisions thereof, to protect and conserve the species. In the preceding sections of this document, we discussed the various international, national, state, and local regulatory mechanisms associated with the management of each of the six DPSs, in the context of evaluating their adequacy in addressing the primary threat of overutilization. Here, we summarize some of the key, non-regulatory efforts to conserve and protect the species globally, but focus the discussion in particular on the two DPSs that we found to be at risk of extinction (SW Pacific and So. Africa), and our consideration of whether efforts being made to protect those DPSs ameliorate their risk of extinction.

Among the protective efforts relevant to tope sharks is the FAO's International Plan of Action for Conservation and Management of Sharks, which is a voluntary international instrument that was adopted in 1999 to address concerns over the increasing fishing pressure on shark populations globally. Its primary goal is to ensure the conservation and long-term sustainable use of all shark species by encouraging nations whose vessels fish for sharks or regularly catch them as bycatch to develop and implement National Plans of Action for Sharks (NPOA-Sharks). The priorities of these plans generally include strengthening regulations for protected species, improving enforcement capacity and outreach to increase compliance with existing regulations, improving scientific knowledge and monitoring, encouraging sustainable fishing practices, and restoring important habitats such as nursery grounds.

As of 2026, nearly every country within the range of the tope shark has adopted or drafted an NPOA-Sharks and/or falls under the purview of a regional NPOA-Sharks. This includes ten national plans (UK, Netherlands, Turkiye, Israel, Mauritania, Senegal, The Gambia, Guinea-Bissau, Guinea, and Sierra Leone) and three regional plans (EU, Mediterranean, and West Africa) in the NE Atlantic region; three national plans (South Africa, Namibia, Mozambique) in So. Africa; three national plans (Brazil, Uruguay, and Argentina) and one regional plan ("Regional Plan of Action for The Conservation and Management of Sharks and Rays in the Western Central Atlantic Fishery Commission Area") in the SW Atlantic; three national plans (Canada, United States, Mexico) in the NE Pacific; two national plans (Australia, New Zealand) in the SW Pacific; and three national plans (Ecuador, Peru, and Chile) and one regional plan ("Plan de Acción Regional para la Conservación de tiburones, rayas y quimeras en el Pacífico Sudeste") in the SE Pacific.

While the plans are not legally binding on the respective country or countries, they indicate a level of commitment to reducing the impact of commercial fishing on shark populations. However, their effectiveness is contingent on addressing significant challenges in implementation and enforcement, which are explicitly identified in several of the plans. A common theme in many of the plans is a lack of resources and technical capacity for adequate monitoring, control, and surveillance. Furthermore, a critical and widespread challenge is the persistent lack of species-specific catch data. Notably, a global assessment of NPOA-Sharks by Gilman *et al*. (2024) found that they are largely inadequate for effective planning and assessing the efficacy of activities for the conservation and management of chondrichthyans, because most plans are old, do not utilize performance assessments, and do not contain specific, measurable, and time-bound objectives and activities.

In the SW Atlantic, the CTMFM is a binational fisheries management body established by the 1973 Treaty of the Río de la Plata and its Maritime Front between Argentina and Uruguay. Unlike purely advisory bodies, the CTMFM has the authority to adopt binding conservation and management measures for the Common Fishing Zone in the Rio de la Plata region, including the setting of TACs, temporal and spatial closures, and minimum landing sizes. To address the specific vulnerabilities of elasmobranchs, the CTMFM established a technical working group (GT-Condrictios) in 2005 and subsequently adopted the "Regional Action Plan for the Conservation and Sustainable Fishing of Chondrichthyans in the Area of the Treaty of the Río de la Plata and its Maritime Front" in 2018. This plan establishes a framework for the binational management of priority species in the Treaty area, including the tope shark, recognizing its migratory nature and the necessity of coordinated regulatory action to ensure sustainable exploitation.

There are also numerous MPAs throughout the coastal region of Uruguay, Argentina, and southern Brazil. Per the World Database on Protected and Conserved Areas, Uruguay and Argentina have designated approximately 1.5 and 12.0 percent, respectively, of their marine and coastal areas as MPAs (UNEP-WCMC 2026a,b). There are also two small marine wildlife refuges encompassing approximately 1.7 sq. km collectively off the coast of Rio Grande do Sul, Brazil. The Marine Conservation Institute has assessed a small fraction of these areas as providing full protection (*i.e.*, no extractive or destructive activities are allowed; all abatable impacts are minimized) with active management in place, but most others have not yet been evaluated in terms of their protection level or implementation status (*https://mpatlas.org*, accessed February 23, 2026).

In all, while there are various measures that may contribute to the conservation of the SW Atlantic DPS in certain limited areas of its range, they likely do not ameliorate the threat of overutilization to the extent that would change the proposed listing status of the SW Atlantic DPS. Specifically, there is little evidence that the NPOA-Sharks and the CTMFM have addressed the primary challenges related to the threat of overutilization in the region, as it does not appear that they have yet motivated the adoption of stronger regulations, enforcement, or monitoring to control the harvest of tope sharks in Uruguay, Argentina, or southern Brazil. Moreover, given the limited spatial coverage of the MPAs, the uncertainty of their protective level and implementation status, and the highly mobile nature of the tope shark, there is not sufficient evidence that they provide protection to an extent that significantly reduces the species' extinction risk. For these reasons, we do not find that conservation efforts change the proposed listing status of the SW Atlantic DPS.

With respect to the So. Africa DPS, there are 42 MPAs in South Africa, 26 of which are coastal (Cortelezzi *et al*. 2022). According to the Marine Conservation Institute's Marine Protection Atlas, these MPAs provide full protection (*i.e.*, no extractive or destructive activities are allowed, and all abatable impacts are minimized) for 3.8 percent of the country's total marine area; high protection (*i.e.*, only light extractive activities are allowed that have low total impact, and all other abatable impacts are minimized) for 0.5 percent of the country's marine area; light protection (*i.e.*, some protection of biodiversity exists, but extractive or destructive activities that can have moderate to significant impact are allowed) for 1.1 percent of the country's marine area; and minimal protection (*i.e.*, extensive extraction and other activities with high total impact are allowed) for 9.3 percent of the country's marine area (*https://mpatlas.org*, accessed February 23, 2026). Using baited remote underwater video to measure the effectiveness of the De Hoop MPA, a 288 sq. km no-take reserve on the Western Cape, Albano *et al*. (2021) found that tope shark abundance was higher inside the MPA than outside. Studies of other South African MPAs that are smaller and provide partial protection showed mixed results on benefits to chondrichthyans (Cortelezzi *et al*. 2022; Osgood *et al*. 2019). Overall, although there is some indication that strict no-take MPAs may provide some conservation benefit for tope sharks in certain areas, given the limited spatial coverage of the MPAs relative to the DPS's range, the varying protection levels, and the highly mobile nature of the tope shark, existing MPAs likely do not provide protection to an extent that significantly reduces the species' extinction risk. Therefore, we do not find that conservation efforts change the proposed listing status of the So. Africa DPS.

We also considered non-regulatory efforts to protect or conserve the NE Atlantic, NE Pacific, SE Pacific, and SW Pacific DPSs, but because we are not proposing to list these DPSs as threatened or endangered, the conservation efforts would not change the listing determinations of these DPSs and therefore are not discussed in detail here. Please see the Status Review Report (Manning *et al*. 2026) for further information about conservation efforts relevant to these four DPSs.

Final Determinations and Proposed Listings

Based on our review of the best available scientific and commercial data and considering efforts being made to protect and conserve the species, we find that the SW Atlantic and So. Africa DPSs of tope shark meet the definition of a threatened species. We are therefore proposing to list these two DPSs as threatened species under the ESA.

ESA Section 4(d) Regulations

Under section 4(d) of the ESA, the Secretary is authorized to issue protective regulations he deems necessary and advisable to provide for the conservation of species listed as threatened. The Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1). The petition requested that, if we determine that listing the tope shark (or any DPSs thereof) as threatened is warranted, we simultaneously issue a 4(d) rule outlining necessary and advisable regulations for the species' conservation. The petitioners urged us, "as part of the 4(d) rule and in light of the threat posed to the tope shark by trade," to extend to the tope shark all prohibitions of ESA section 9, and to promulgate additional protective regulations needed for survival and recovery of the tope shark.

We have considered the petitioners' request to issue section 4(d) protective regulations for the SW Atlantic and So. Africa DPSs; however, we are not proposing to extend the prohibitions of section 9 or apply any other protective regulations under section 4(d) to these DPSs. As discussed in the extinction risk analysis, the greatest threats to these two DPSs of tope shark are overutilization in fisheries and inadequacy of existing regulatory mechanisms to control fisheries mortality. Fisheries regulations impacting overutilization in each DPS are established and enforced by range countries for each DPS, and we are unable to control fishing activities in other countries' waters. The threat posed by international trade in tope shark meat, fins, and other products is expected to be addressed by the recent inclusion of the tope shark and the entire *Mustelus* genus in Appendix II of CITES (effective June 5, 2027). Trade in specimens of the species would require that certain conditions be met; for example, exporting specimens of tope shark would require that the specimens were legally obtained, and that the export is non-detrimental to the survival of the species in the wild. Because international trade in tope sharks will be regulated and monitored through CITES management authorities worldwide, and because we have no jurisdiction to manage fisheries for these DPSs, we cannot identify any protective regulations at this time that are necessary and advisable to provide for the conservation of the two DPSs.

ESA Section 4(e) Regulations

The petitioners also requested that if the tope shark or any DPS thereof is listed as endangered or threatened, NMFS promulgate a rule under ESA section 4(e) for species similar in appearance to the tope shark. Under section 4(e) of the ESA, the Secretary may treat any species as an endangered species or threatened species even though it is not listed pursuant to section 4 of this Act if he finds that (A) such species so closely resembles in appearance, at the point in question, a species which has been listed pursuant to such section that enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species; (B) the effect of this substantial difficulty is an additional threat to an endangered or threatened species; and (C) such treatment of an unlisted species will substantially facilitate the enforcement and further the policy of this Act.

We are not proposing to promulgate a 4(e) rule for species similar in appearance to the tope shark. The CITES Appendix II listing for the species also includes the entire genus *Mustelus* because the form of tope shark products in trade (meat and fins, largely) are difficult to distinguish between those of *Mustelus* spp. As this mechanism to control the trade of tope sharks will soon be effective, and no additional enforcement issues have been identified, a separate 4(e) regulation is not necessary at this time.

Critical Habitat Designation

Under the ESA, we are authorized to designate critical habitat within U.S. jurisdiction only (50 CFR 424.12(g)). Given the So. Africa and SW Atlantic DPSs of tope sharks have wholly foreign ranges, we are not proposing to designate critical habitat for these two DPSs of tope shark.

Effects of Listing

Conservation measures provided for species listed as threatened under the ESA include the development and implementation of recovery plans (16 U.S.C. 1533(f)); designation of critical habitat, if prudent and determinable (16 U.S.C. 1533(a)(3)(A)); and a requirement that Federal agencies consult with NMFS under section 7 of the ESA to ensure their actions do not jeopardize the species or result in adverse modification or destruction of designated critical habitat (16 U.S.C. 1536). Recognition of the species' threatened status through listing may also promote conservation actions by Federal and state agencies, foreign entities, private groups, and individuals. In this case, as both of the DPSs being proposed for listing are wholly foreign, we will consider whether a recovery plan would promote the conservation of the DPSs. As noted above, we are not proposing to designate critical habitat for either of these foreign DPSs. It is unlikely that the listing of this species under the ESA will increase the number of section 7 consultations. As both DPSs occur wholly in foreign waters, listing of these DPSs will not create section 7 consultation requirements for commercial fisheries, energy development, aquaculture, or other activities in U.S. waters with a federal nexus.

Public Comments Solicited

We are soliciting comments, information, and/or recommendations on any aspect of this proposed rule from all concerned parties (see **DATES** and **ADDRESSES**). We will consider all relevant information, comments, and recommendations received before reaching a final listing determination.

Public Hearing

The ESA provides for a public hearing on this proposal, if requested. Requests must be filed by the date specified in the **DATES** section above.

Peer Review

In December 2004, the Office of Management and Budget issued a Final Information Quality Bulletin for Peer Review (Peer Review Bulletin), establishing minimum peer review standards, a transparent process for public disclosure, and opportunities for public input. The Peer Review Bulletin, implemented under the Information Quality Act (Pub. L. 106-554), is intended to provide public oversight on the quality of agency information, analyses, and regulatory activities. The text of the Peer Review Bulletin was published in the **Federal Register** on January 14, 2005 (70 FR 2664). The Peer Review Bulletin requires Federal agencies to subject “influential” scientific information to peer review prior to public dissemination. Influential scientific information is defined as “information the agency reasonably can determine will have or does have a clear and substantial impact on important public policies or private sector decisions,” and the Peer Review Bulletin provides agencies broad discretion in determining the appropriate process and level of peer review. The Peer Review Bulletin establishes stricter standards for the peer review of “highly influential” scientific assessments, defined as information whose “dissemination could have a potential impact of more than $500 million in any 1 year on either the public or private sector or that the dissemination is novel, controversial, or precedent-setting, or has significant interagency interest.” As stated previously, in developing this rule, we relied on previous NMFS reviews of this species, and thus we do not consider the scientific information underlying the proposed protective regulations to constitute newly compiled or disseminated influential scientific information requiring peer review per the Peer Review Bulletin.

References

A complete list of the references used in this proposed rule is available online (see **ADDRESSES**) and upon request (see **FOR FURTHER INFORMATION CONTACT**).

Classification

National Environmental Policy Act

Section 4(b)(1)(A) of the ESA restricts the information that may be considered when assessing species for listing and sets the basis upon which listing determinations must be made. Based on the requirements in section 4(b)(1)(A) of the ESA and the opinion in *Pacific Legal Foundation* v. *Andrus*, 675 F. 2d 825 (6th Cir. 1981), we have concluded that ESA listing actions are not subject to the environmental assessment requirements of the National Environmental Policy Act (NEPA). *See also* “Policy and Procedures for Compliance with the National Environmental Policy Act and Related Authorities: Companion Manual for NOAA Administrative Order 216-6A” (June 30, 2025) at 2–3.

Executive Order 12866, Regulatory Flexibility Act, and Paperwork Reduction Act

As noted in the Conference Report on the 1982 amendments to the ESA, economic impacts cannot be considered when assessing the status of a species. Therefore, the economic analysis requirements of the Regulatory Flexibility Act are not applicable to the listing process. In addition, this proposed rule is exempt from review under Executive Order 12866. This proposed rule does not contain a collection-of-information requirement for the purposes of the Paperwork Reduction Act.

Executive Order 13132, Federalism

In accordance with E.O. 13132, we determined that this proposed rule does not have significant federalism effects and that a federalism assessment is not required. Given that the DPSs we propose to list occur entirely outside of U.S. waters, any final listing will not affect state programs; therefore, there will be no federalism impacts. This proposed rule will be given to the relevant governmental agencies in the countries in which the DPSs occur, and they will be invited to comment.

Executive Order 14192, Unleashing Prosperity Through Deregulation

This proposed rule is not an Executive Order 14192 regulatory action because this rule is not significant under Executive Order 12866.

List of Subjects in 50 CFR Part 223

Endangered and threatened species.

Dated: April 10, 2026.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs,

National Marine Fisheries Service.

For the reasons set out in the preamble, NMFS proposes to amend 50 CFR part 223 as follows:

PART 223—THREATENED MARINE AND ANADROMOUS SPECIES

1. The authority citation for part 223 continues to read as follows:

Authority: 16 U.S.C. 1531-1543; subpart B, § 223.201-202 also issued under 16 U.S.C. 1361 *et seq.*; 16 U.S.C. 5503(d) for § 223.206(d)(9).

2. In § 223.102, amend paragraph (e), by adding entries for “Shark, tope (Southern Africa DPS)” and “Shark, tope (Southwest Atlantic DPS)” in alphabetical order under the “Fishes” table subheading to read as follows:

§ 223.102 Enumeration of threatened marine and anadromous species.

* * * * *

(e) * * *

Species[1]			**Citation(s) for listing determination(s)**	**Critical habitat**	**ESA rules**
Common name	**Scientific name**	**Description of listed entity**			
* * * * * * *					
Fishes					
* * * * * * *					
Shark, tope (Southern Africa DPS)	*Galeorhinus galeus*	Tope sharks originating from and occurring in waters off the southern coast of Africa, including waters off Namibia, Angola, and South Africa.	*[Insert* ***FEDERAL REGISTER*** *page where the document begins], [Insert date of publication when published as a final rule]*	NA	NA

Shark, tope (Southwest Atlantic DPS)	*Galeorhinus galeus*	Tope sharks originating from and occurring in waters off southern Brazil, Uruguay, and Argentina.	*[Insert **FEDERAL REGISTER** page where the document begins], [Insert date of publication when published as a final rule]*	NA	NA
* * * * * * *					

[1] Species includes taxonomic species, subspecies, distinct population segments (DPSs) (for a policy statement, see 61 FR 4722, February 7, 1996), and evolutionarily significant units (ESUs) (for a policy statement, see 56 FR 58612, November 20, 1991).

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