Dated: August 5, 2015.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Parts 223 and 224

[Docket No. 150506426–5426–01]

RIN 0648–XD942

Endangered and Threatened Wildlife; 90-day Finding on a Petition To List the Bigeye Thresher Shark as Threatened or Endangered Under the Endangered Species Act

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

ACTION: 90-day petition finding, request for information, and initiation of status review.

SUMMARY: We, NMFS, announce the 90-day finding on a petition to list the bigeye thresher shark (*Alopias superciliosus*) range-wide, or in the alternative, as one or more distinct population segments (DPSs) identified by the petitioners as endangered or threatened under the U.S. Endangered Species Act (ESA). We find that the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted for the species worldwide. Accordingly, we will initiate a status review of bigeye thresher shark range-wide at this time. To ensure that the status review is comprehensive, we are soliciting scientific and commercial information regarding this species.

DATES: Information and comments on the subject action must be received by October 13, 2015.

ADDRESSES: You may submit comments, information, or data, identified by ''NOAA–NMFS–2015–0089'' by any one of the following methods:

- *Electronic Submissions:* Submit all electronic public comments via the Federal eRulemaking Portal. Go to *www.regulations.gov/#!docketDetail;D=NOAA-NMFS-2015-0089.* Click the ''Comment Now'' icon, complete the required fields, and enter or attach your comments.
- *Mail or hand-delivery:* Office of Protected Resources, NMFS, 1315 East-West Highway, Silver Spring, MD 20910.

Instructions: You must submit comments by one of the above methods to ensure that we receive, document, and consider them. 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. All comments received are a part of the public record and will generally be posted for public viewing on *http://www.regulations.gov* without change. All personal identifying information (*e.g.,* name, address, etc.), confidential business information, or otherwise sensitive information submitted voluntarily by the sender will be publicly accessible. We will accept anonymous comments (enter ''N/A'' in the required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word, Excel, or Adobe PDF file formats only

FOR FURTHER INFORMATION CONTACT: Chelsey Young, NMFS, Office of Protected Resources (301) 427–8491.

SUPPLEMENTARY INFORMATION:

Background

On April 27, 2015, we received a petition from Defenders of Wildlife requesting that we list the bigeye thresher shark (*Alopias superciliosus*) as endangered or threatened under the ESA, or, in the alternative, to list one or more distinct population segments (DPSs), should we find they exist, as threatened or endangered under the ESA. Defenders of Wildlife also requested that critical habitat be designated for this species in U.S. waters concurrent with final ESA listing. The petition states that the bigeye thresher shark merits listing as an endangered or threatened species under the ESA because of the following: (1) The species faces threats from historical and continued fishing for both commercial and recreational purposes; (2) life history characteristics and limited ability to recover from fishing pressure make the species particularly vulnerable to overexploitation; and (3) regulations are inadequate to protect the bigeye thresher shark.

ESA Statutory Provisions and Policy Considerations

Section 4(b)(3)(A) of the ESA of 1973, as amended (U.S.C. 1531 *et seq.*), requires, to the maximum extent practicable, that within 90 days of receipt of a petition to list a species as threatened or endangered, the Secretary of Commerce make a finding on whether that petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted, and promptly publish the finding in the **Federal Register** (16 U.S.C. 1533(b)(3)(A)). When we find that substantial scientific or commercial information in a petition and in our files indicates the petitioned action may be warranted (a ''positive 90-day finding''), we are required to promptly commence a review of the status of the species concerned, which includes conducting a comprehensive review of the best available scientific and commercial information. Within 12 months of receiving the petition, we must conclude the review with a finding as to whether, in fact, the petitioned action is warranted. Because the finding at the 12-month stage is based on a significantly more thorough review of the available information, a ''may be warranted'' finding at the 90-day stage does not prejudge the outcome of the status review.

Under the ESA, a listing determination may address a ''species,'' which is defined to also include subspecies and, for any vertebrate species, any DPS that interbreeds when mature (16 U.S.C. 1532(16)). A joint NMFS–U.S. Fish and Wildlife Service (USFWS) policy clarifies the agencies' interpretation of the phrase ''distinct population segment'' for the purposes of listing, delisting, and reclassifying a species under the ESA (''DPS Policy''; 61 FR 4722; February 7, 1996). A species, subspecies, or DPS is ''endangered'' if it is in danger of extinction throughout all or a significant portion of its range, and ''threatened'' if it is likely to become endangered within the foreseeable future throughout all or a significant portion of its range (ESA sections 3(6) and 3(20), respectively; 16 U.S.C. 1532(6) and (20)). Pursuant to the ESA and our implementing regulations, the determination of whether a species is threatened or endangered shall be based on any one or a combination of the following five section 4(a)(1) factors: The present or threatened destruction, modification, or curtailment of habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; inadequacy of existing regulatory mechanisms; and any other natural or manmade factors affecting the species' existence (16 U.S.C. 1533(a)(1), 50 CFR 424.11(c)).

ESA-implementing regulations issued jointly by NMFS and USFWS (50 CFR 424.14(b)) define ''substantial information'' in the context of reviewing a petition to list, delist, or reclassify a species as the amount of information that would lead a reasonable person to

believe that the measure proposed in the petition may be warranted. When evaluating whether substantial information is contained in a petition, we must consider whether the petition: (1) Clearly indicates the administrative measure recommended and gives the scientific and any common name of the species involved; (2) contains detailed narrative justification for the recommended measure, describing, based on available information, past and present numbers and distribution of the species involved and any threats faced by the species; (3) provides information regarding the status of the species over all or a significant portion of its range; and (4) is accompanied by the appropriate supporting documentation in the form of bibliographic references, reprints of pertinent publications, copies of reports or letters from authorities, and maps (50 CFR 424.14(b)(2)).

At the 90-day stage, we evaluate the petitioner's request based upon the information in the petition, including its references, and the information readily available in our files. We do not conduct additional research, and we do not solicit information from parties outside the agency to help us in evaluating the petition. We will accept the petitioner's sources and characterizations of the information presented, if they appear to be based on accepted scientific principles, unless we have specific information in our files that indicates the petition's information is incorrect, unreliable, obsolete, or otherwise irrelevant to the requested action. Information that is susceptible to more than one interpretation or that is contradicted by other available information will not be dismissed at the 90-day finding stage, so long as it is reliable and a reasonable person would conclude that it supports the petitioner's assertions. Conclusive information indicating the species may meet the ESA's requirements for listing is not required to make a positive 90-day finding. We will not conclude that a lack of specific information alone negates a positive 90-day finding, if a reasonable person would conclude that the unknown information itself suggests an extinction risk of concern for the species at issue.

To make a 90-day finding on a petition to list a species, we evaluate whether the petition presents substantial scientific or commercial information indicating the subject species may be either threatened or endangered, as defined by the ESA. First, we evaluate whether the information presented in the petition, along with the information readily available in our files, indicates that the petitioned entity constitutes a ''species'' eligible for listing under the ESA. Next, we evaluate whether the information indicates that the species at issue faces extinction risk that is cause for concern; this may be indicated in information expressly discussing the species' status and trends, or in information describing impacts and threats to the species. We evaluate any information on specific demographic factors pertinent to evaluating extinction risk for the species at issue (*e.g.,* population abundance and trends, productivity, spatial structure, age structure, sex ratio, diversity, current and historical range, habitat integrity or fragmentation), and the potential contribution of identified demographic risks to extinction risk for the species. We then evaluate the potential links between these demographic risks and the causative impacts and threats identified in ESA section 4(a)(1).

Information presented on impacts or threats should be specific to the species and should reasonably suggest that one or more of these factors may be operative threats that act or have acted on the species to the point that it may warrant protection under the ESA. Broad statements about generalized threats to the species, or identification of factors that could negatively impact a species, do not constitute substantial information that listing may be warranted. We look for information indicating that not only is the particular species exposed to a factor, but that the species may be responding in a negative fashion; then we assess the potential significance of that negative response.

Many petitions identify risk classifications made by non-governmental organizations, such as the International Union for the Conservation of Nature (IUCN), the American Fisheries Society, or NatureServe, as evidence of extinction risk for a species. Risk classifications by other organizations or made under other Federal or state statutes may be informative, but such classification alone may not provide the rationale for a positive 90-day finding under the ESA. For example, as explained by NatureServe, their assessments of a species' conservation status do ''not constitute a recommendation by NatureServe for listing under the U.S. Endangered Species Act'' because NatureServe assessments ''have different criteria, evidence requirements, purposes and taxonomic coverage than government lists of endangered and threatened species, and therefore these two types of lists should not be expected to coincide'' (*http://www.natureserve.org/prodServices/pdf/NatureServeStatusAssessmentsListing-Dec%202008.pdf*). Thus, when a petition cites such classifications, we will evaluate the source of information that the classification is based upon in light of the standards on extinction risk and impacts or threats discussed above.

Species Description

Distribution

The bigeye thresher shark *(Alopias superciliosus)* is a large, highly migratory oceanic and coastal species of shark found throughout the world in tropical and temperate seas. In the Western Atlantic (including the Gulf of Mexico), bigeye threshers can be found off the Atlantic coast of the United States (from New York to Florida), and in the Gulf of Mexico off Florida, Mississippi and Texas. They can also be found in Mexico (from Veracruz to Yucatan), Bahamas, Cuba, Venezuela, as well as central and southern Brazil. In the Eastern Atlantic, bigeye threshers are found from Portugal to the Western Cape of South Africa, including the western and central Mediterranean Sea. In the Indian Ocean, bigeye threshers are found in South Africa (Eastern Cape and KwaZulu-Natal), Madagascar, Arabian Sea (Somalia), Gulf of Aden, Maldives, and Sri Lanka. In the Pacific Ocean, from West to East, bigeye threshers are known from southern Japan (including Okinawa), Taiwan (Province of China), Vietnam, between the Northern Mariana Islands and Wake Island, down to the northwestern coast of Australia and New Zealand. Moving to the Central Pacific, bigeye threshers are known from the area between Wake, Marshall, Howland and Baker, Palmyra, Johnston, Hawaiian Islands, Line Islands, and between Marquesas and Galapagos Islands. Finally, in the Eastern Pacific, bigeye threshers occur from Canada to Mexico (Gulf of California) and west of Galapagos Islands (Ecuador). They are also possibly found off Peru and northern Chile (Compagno, 2001).

Physical Characteristics

The bigeye thresher shark possesses an elongated upper caudal lobe almost equal to its body length, which is unique to the Alopiidae family. It has a broad head, a moderately long and bulbous snout, curved yet broad-tipped pectoral fins, distinctive grooves on the head above the gills, and large teeth. The first dorsal fin mid base is closer to the pelvic-fin bases than to the pectoral-fin bases. The caudal tip is broad with a wide terminal lobe. While some of the above characteristics may be shared by

other thresher shark species, diagnostic features separating this species from the other two thresher shark species (common thresher, *A. vulpinus,* and pelagic thresher, *A. pelagicus*) are their extremely large eyes, which extend onto the dorsal surface of the head, and the prominent notches that run dorso-lateral from behind the eyes to behind the gills. The body can be purplish grey or grey-brown on the upper surface and sides, with grey to white coloring on its underside (light color of abdomen does not extend over pectoral fin bases like common thresher) and no white dot on upper pectoral fin tips like those often seen in common threshers (Compagno 2001).

Habitat

Bigeye thresher sharks are found in a diverse spectrum of locations, including coastal waters over continental shelves, on the high seas in the epipelagic zone far from land, in deep waters near the bottom on continental slopes, and sometimes in shallow inshore waters. They are an epipelagic, neritic, and epibenthic shark, ranging from the surface and in the intertidal to at least 500 m deep, but mostly below 100 m depth. In our files, we found information indicating that bigeye threshers prefer an optimum swimming depth of 240–360 m, water temperature of 10–16 °C, salinity of 34.5–34.7 ppt, and dissolved oxygen range between 3.0–4.0 ml/l (Cao *et al.,* 2011).

Feeding Ecology

Bigeye threshers feed on small to medium sized pelagic fishes (*e.g.,* lancetfishes, herring, mackerel and small billfishes), bottom fishes (*e.g.,* hake), and cephalopods (*e.g.,* squids). Thresher sharks are unique in that they use their tail in a whip-like fashion to disorient and incapacitate their prey prior to consumption (Oliver, 2013). The arrangement of the eyes, with keyhole-shaped orbits extending onto the dorsal surface of the head, suggest that this species has a dorsal/vertical binocular field of vision (unlike other threshers), which may be related to fixating on prey and striking them with its tail from below (FAO 2015 species fact sheet).

Life History

Bigeye thresher sharks have an estimated lifespan of approximately 20–21 years and a maximum total length of about 4.6 m. Maturity in bigeye threshers occurs at 7–13 years and 275–300 cm total length (TL) for males and 8–15 years and 290–341cm (TL) for females. Bigeye threshers have low reproductive capacity of only 2–4 pups per litter (Chen *et al.,* 1997; Compagno, 2001; Moreno and Morón, 1992) and a long gestation period of 12 months, although this remains uncertain due to a lack of birthing seasonality data (Liu *et al.,* 1998). They (like all thresher sharks) are ovoviviparous and oophagous (developing embryo in uteri eat unfertilized eggs produced by the ovary). Size at birth for the bigeye thresher ranges from 64–106 cm TL (Gilmore, 1993), but a mating season has not yet been identified. Bigeye threshers have the slowest population growth rate of all thresher sharks, with an exceptionally low potential annual rate of population increase (0.02; IUCN; λ=1.009 yr^{-1}, Cortés, 2009).

Analysis of Petition and Information Readily Available in NMFS Files

Below we evaluate the information provided in the petition and readily available in our files to determine if the petition presents substantial scientific or commercial information indicating that an endangered or threatened listing may be warranted as a result of any of the factors listed under section 4(a)(1) of the ESA. If requested to list a global population or, alternatively, a DPS, we first determine if the petition presents substantial information that the petitioned action is warranted for the global population. If it does, then we make a positive finding on the petition and conduct a review of the species range-wide. If after this review we find that the species does not warrant listing range-wide, then we will consider whether the populations requested by the petition qualify as DPSs and warrant listing. If the petition does not present substantial information that the global population may warrant listing, but it has requested that we list any distinct populations of the species as threatened or endangered, then we consider whether the petition provides substantial information that the requested population(s) may qualify as DPSs under the discreteness and significance criteria of our joint DPS Policy, and if listing any of those DPSs may be warranted. We summarize our analysis and conclusions regarding the information presented by the petitioners and in our files on the specific ESA section 4(a)(1) factors that we find may be affecting the species' risk of global extinction below.

Bigeye Thresher Shark Status and Trends

The petition does not provide a population abundance estimate for bigeye thresher sharks, but points to its ''vulnerable'' status on the IUCN Red List. The petition asserts that a global decline of bigeye thresher sharks has been caused mainly by commercial and recreational fishing (both direct harvest and bycatch), as evidenced by substantial population declines in every area where sufficient historical and current population data exist. In the Northwest and Western Central Atlantic, the petition cites an 80 percent decline in bigeye thresher sharks since the early 2000s, with an estimated average overall decline of 63 percent since the beginning of data collection in 1986. In the Southwest Atlantic, the petition describes the popularity of bigeye threshers in the Brazilian Santos longline fishery, and asserts that some vessels are directly targeting this species specifically for its fins. The petition also describes consistent gradual decreases in catch per unit effort (CPUE) for this species in the region. The petition describes likely declines of bigeye thresher sharks in the Mediterranean based on declines of other pelagic shark species, including congener *A. vulpinus,* due to high fishing pressure. In the Indo-West Pacific, the petition cites the prevalence of finning activities, including both legal and extensive illegal directed shark catch in this region, and states that the bigeye thresher in particular is preferentially retained in certain fisheries. In the Eastern Central Pacific, the petition cites 83 percent declines in thresher populations when compared to research surveys from the 1950s. Finally, the petition points to increased interest in recreational fishing of the bigeye thresher shark, with the potential for high post-release mortality. The petition does not provide information on abundance estimates across the global range of the species.

The last IUCN assessment of the bigeye thresher shark was completed in 2009, and several estimates of global and subpopulation trends and status have been made and are described in the following text. In the Northwest Atlantic, declines in relative abundance cited by the petitioner were derived from analyses of logbook data, reported in Baum *et al.,* (2003) and Cortés (2007). The former study analyzed logbook data for the U.S. pelagic longline fleets targeting swordfish and tunas in the Northwest Atlantic, and reported an 80 percent decline in relative abundance for thresher sharks (common and bigeye threshers combined) from 1986 to 2000. The latter study reported a 63 percent decline of thresher sharks (at the genus level) based on logbook data, occurring between 1986 and 2006 (Cortés, 2007). However, the observer index data from the same study (Cortés, 2007) shows an

opposite trend in relative abundance, with a 28 percent increase of threshers in the Northwest Atlantic since 1992. Logbook data over the same period (1992–2006) shows a 50 percent decline in thresher sharks. The logbook dataset is the largest available for the western North Atlantic Ocean, but the observer dataset is generally more reliable in terms of consistent identification and reporting. According to observer data, relative abundance of thresher sharks (again, only at the genus level) in the western North Atlantic Ocean appears to have stabilized or even be increasing since the late 1990s (Cortés, 2007). A more recent analysis using logbook data between 1996 and 2005 provides some supporting evidence that the abundance of thresher sharks has potentially stabilized over this time period (Baum and Blanchard, 2010). However, it should be noted that fishing pressure on thresher sharks began over two decades prior to the start of this time series; thus, the estimated declines are not from virgin biomass. Furthermore, the sample size in the latter observer analysis was also very small compared to the previous logbook analyses, which both showed declines. Thus, abundance trend estimates derived from standardized catch rate indices of the U.S. pelagic longline fishery suggest that thresher sharks (both bigeye and common) have likely undergone a decline in abundance in this region. However, the conflicting evidence between logbook and observer data showing opposite trends in thresher shark abundance cannot be fully resolved at this time. Data are not available in the petition or in our own files to assess the trend in population abundance in this region since 2006, or to assess the trend specific to the bigeye thresher shark. Because the logbook data from this region show consistent evidence of a significant and continued decline in thresher sharks, we must consider this information in our 90-day determination. Additionally, in the Southeastern United States, studies show significant declines in the species, with decreases in CPUE indicating that the population of *A. superciliosus* has declined by 70 percent from historical levels (Beerkircher *et al.,* 2002).

For the Northeast Atlantic, there are no population abundance estimates available, but data indicate that the species is taken in driftnets and gillnets. In the Mediterranean Sea, estimates show significant declines in thresher shark abundance during the past two decades, reflecting data up to 2006. According to historical data compiled using a generalized linear model, thresher sharks have declined between 96 and 99 percent in abundance and biomass in the Mediterranean Sea (Ferretti *et al.,* 2008). Overall, the bigeye thresher shark has been poorly documented in the Mediterranean and is considered scarce or rare.

In the Eastern Central Pacific, logbook data show a historical decline of thresher sharks due to pelagic fishing fleet operations. Trends in abundance and biomass of thresher sharks in the eastern tropical Pacific Ocean were estimated by comparison of pelagic longline research surveys in the 1950s with recent data (1990s); these data were collected by observers on pelagic longline fishing vessels and standardized to account for differences in depth and soak time. This analysis estimated a decline in combined thresher abundance of 83 percent and a decline in biomass to approximately 5 percent of virgin levels (Ward and Myers, 2005).

In other areas of the world, estimates of thresher shark abundance are limited. Bigeye threshers are recorded in the catches of fisheries operating in the Indo-West Pacific, but catches of the species are likely very under-reported. An analysis of purse seine and longline observer data from the Western and Central Pacific produced no clear catch trends for thresher sharks (*Alopias* spp.); however, shark data from observer data sets are constrained by a lack of observer coverage, particularly for the North Pacific, and for the purse seine fishery by the physical practicalities of onboard sampling (Clarke, 2011). Additionally, this study detected a significant decrease in median size for thresher sharks in tropical areas, most likely reflective of trends in bigeye threshers as they are the most commonly encountered species in this region. While catch data are incomplete and cannot be used to estimate abundance levels or determine the magnitude of catches or trends for bigeye threshers at this time, pelagic fishing effort in this region is high, with reported increases in recent years (IUCN assessment, 2009).

In conclusion, across the species' global range we find evidence suggesting that population abundance of the bigeye thresher shark is declining or, in the Northwest Atlantic Ocean, may be stable at a diminished abundance. While data are still limited with respect to population size and trends, we find the petition and our files sufficient in presenting substantial information on bigeye thresher shark abundance, trends, or status to indicate the petitioned action may be warranted.

ESA Section 4(a)(1) Factors

The petition indicated three main categories of threats to the bigeye thresher shark: overutilization for commercial, recreational, scientific, or educational purposes; the inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence. We discuss each of these below based on information in the petition, and the information readily available in our files.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The petition states that ''the bigeye thresher has shown substantial population declines in every area where sufficient historical and current population data exists'' and lists four categories of overutilization: historical, directed, incidental, and recreational. The petition describes historical exploitation as the first category of overutilization for the species, predominantly in the Northwest and Central Atlantic and Eastern Central Pacific. In the Northwest and Central Atlantic, bigeye threshers were historically caught in pelagic longline fisheries. Bigeye threshers have been a prohibited species in all commercial fisheries in the U.S. Atlantic since 2000. Since these regulations became effective in 2000, relative abundance of thresher sharks (again, only at the genus level) in the western North Atlantic Ocean appears to have stabilized or even be increasing since the late 1990s (Baum and Blanchard, 2010; Cortés, 2007). However, it should be noted that bigeye threshers are still caught as bycatch and occasionally landed in the Northwest Atlantic Ocean despite its prohibited status (NMFS, 2012; 2013), which may hinder the ability of the population to rebound from the historical declines.

As previously mentioned, the petition also states that logbook data from the Eastern Central Pacific shows a historical decline of bigeye thresher sharks due to pelagic fishing fleet operations known to take this species. Trends in abundance and biomass of thresher sharks in the eastern tropical Pacific Ocean were estimated by comparison of pelagic longline research surveys in the 1950s with recent data (1990s); these data were collected by observers on pelagic longline fishing vessels and standardized to account for differences in depth and soak time. For example, in the 1990's, longliners deployed more hooks (averaging 2240 hooks per day compared to 322 hooks in the 1950s) over a wider depth range

(down to 600 m compared to 200 m) for longer periods. Thus, while catches of thresher sharks increased (from 112 threshers in the 1950s survey to 511 threshers in the 1990s survey), this analysis estimated a decline in combined thresher abundance of 83 percent, with a decline in mean biomass to approximately 5 percent of virgin levels and a decline in mean body mass from 17 kg to 12 kg). While this analysis was not species-specific (Ward and Myers, 2005), we must consider this information in our 90-day finding given the potential significant population decline of bigeye threshers in this region.

In addition to broad commercial harvest of the species, the petition states that direct catch related to the shark fin trade has resulted in population decline, and that bigeye thresher sharks are targeted and preferentially retained for their fins. For example, the petition stated in the Indo-West Pacific, a single thresher fin can fetch US $250, creating incentives that would drive overutilization. However, this statement is not entirely correct. While it is true that high prices are paid for thresher sharks, the value of US $250 was not for a single fin, but rather for the entire shark (Gilman *et al.,* 2007). Still, in comparison to other sharks (*e.g.,* shortfin mako only fetches US $50 per shark), thresher sharks appear to be highly valued and consequently targeted for both their meat and fins. While the petition did not provide any information connecting population declines as a result of this direct catch, evidence suggests that the three thresher shark species, collectively, may account for approximately 2.3 percent of the fins auctioned in Hong Kong, the world's largest fin-trading center (Clarke, 2006). This translates to 0.4 million to 3.9 million threshers that may enter the global fin trade each year (Clarke, 2006), with bigeye thresher having the highest value and vulnerability to fishing compared to the other thresher species (Cortés, 2010); still, the relative proportion of each thresher shark species comprising the shark fin trade is not available in this genus-level assessment and information on the species-specific impact of this harvest on bigeye thresher shark abundance is not provided by the petitioner. However, we found species-specific evidence in our files that bigeye threshers may be highly utilized in the shark fin trade. In a genetic barcoding study of shark fins from markets in Taiwan, bigeye threshers were one of 20 species identified and comprised 0.07 percent of collected fin samples. Additionally, thresher sharks comprised 15 percent of fins genetically tested from markets throughout Indonesia (the largest shark catching country in the world), with bigeye threshers making up an estimated 7.6 percent of all fins tested. The high frequency of bigeye threshers in the markets across Indonesia provides some evidence that they are not just caught incidentally, but are targeted by large-scale fisheries (Sembiring, 2015). In another genetic barcoding study of fins from United Arab Emirates, the fourth largest exporter in the world of raw dried shark fins to Hong Kong, the authors found that the Alopiidae family represented 5.9 percent of the trade from Dubai, with bigeye thresher comprising 2.31 percent (Jabado *et al.,* 2015). Overall, evidence that bigeye thresher sharks (and threshers in general) are highly valued for their fins, are possibly targeted in some areas, and comprise a portion of the Hong Kong fin-trading auction suggests that this threat may impact the species.

In the Indian Ocean, the status and abundance of shark species is poorly known despite a long history of research and more than 60 years of commercial exploitation by large-scale tuna fisheries (Romanov *et al.,* 2010). Pelagic sharks, including bigeye threshers, are targeted in various fisheries, including semi-industrial, artisanal, and recreational fisheries. Countries that fish for various pelagic species of sharks include: Egypt, India, Iran, Oman, Saudi Arabia, Sudan, United Arab Emirates, and Yemen, where the probable or actual status of shark populations is unknown, and Maldives, Kenya, Mauritius, Seychelles, South Africa, and United Republic of Tanzania, where the actual status of shark populations is presumed to range from fully exploited to over-exploited (Young, 2006). In 2013, an Ecological Risk Assessment (ERA) was developed by the Indian Ocean Tuna Commission (IOTC) Scientific Committee to quantify which shark species are most at risk from the high levels of pelagic longline fishing pressure. In this ERA, the IOTC Scientific Committee noted that *A. superciliosus* received a high vulnerability ranking (No. 2) for longline gear, as the species is characterized as one of the least productive shark species, and is highly susceptible to catch in longline fisheries. The ERA also noted that the available evidence indicates considerable risk to the status of the Indian Ocean *Alopias* spp. stocks at current catch levels, which, from 2000–2011 was estimated to be 22,811 mt (Merua *et al.,* 2013).

Indirect catch is another category of overutilization identified by the petition, which states that post-release mortality may be high in the species. However, no information is provided in the petition to connect the effect of bycatch on population declines of the species. In the Northeast Atlantic and Mediterranean, while there are no target fisheries for thresher sharks, they are taken as bycatch in various fisheries, including the Moroccan driftnet fishery in the southwest Mediterranean. They are also caught by industrial and semi-industrial longline fisheries and by artisanal gillnet fisheries. In our files, we found evidence that in the last two decades, thresher sharks (common and bigeye) have declined between 96 and 99 percent in abundance and biomass in the Mediterranean Sea (Ferretti, 2008).

Although bigeye thresher sharks have been a prohibited species in U.S. Atlantic commercial fisheries since 2000, they are still incidentally taken as bycatch on pelagic longlines and in gillnets on the East Coast. For example, in our files, we found that since the prohibition on bigeye threshers came into effect in 2000, approximately 1,493 lbs, dressed weight (677 kg) of bigeye thresher were landed in the Atlantic (NMFS, 2012; 2014) despite its prohibited status. In 2010, the United States reported that bigeye thresher represented the second largest amount of dead discards in the Atlantic commercial fleet, reporting a total of 46 t (NOAA, 2010 Report to ICCAT). In 2011, this number dropped to 27 t of bigeye thresher dead discards (NOAA, 2011 Report to ICCAT). Further, several recent reports assessing the vulnerability of bigeye threshers and other pelagic sharks to bycatch in the U.S. Atlantic pelagic longline fishery characterized the bigeye thresher as highly vulnerable (Cortes, 2010; Cortes, 2012; Gallagher *et al.,* 2014). These landings and dead discards may be linked to declines in the species across the Northwest Atlantic portion of its range; however, as discussed earlier, conflicting logbook and observer data decrease the certainty of these trends (Cortés, 2007; Baum and Blanchard, 2010).

In the Southwest Atlantic Ocean, off the coast of Brazil, bigeye threshers represent almost 100 percent of thresher sharks caught in longline fisheries (Amorin, 1998). The landed catch and CPUE of bigeye thresher shark in this fishery increased from 1971 to 1989, and then gradually decreased from 1990 to 2001; however, this does not necessarily reflect stock abundance because changes in the depth of fishing operations also occurred, which may

have affected the time series. Thus, further information is needed to resolve this. In our files, we found that bigeye threshers are also taken in Uruguayan longline fisheries at similar levels. In one study, observer data from 2001–2005 recorded a total of 295 *A. superciliosus* specimens, in which the species' abundance was characterized as ''low'' despite high fishing effort (Berrondo *et al.,* 2007). Further, observer data from 1992–2000 showed that bigeye threshers experience high mortality in longline fisheries in the Southwest Atlantic, with 54 percent dead upon capture (Beerkircher *et al.,* 2002). Given the declines reported in other areas for which data are available throughout other parts of the species' range and the high fishing pressure from fleets throughout the Southwest Atlantic, *A. superciliosus* may be experiencing a level of exploitation in this part of its range that may increase its risk of extinction.

In the Eastern Central Pacific, the petition points to the fact that bigeye threshers have been recorded as bycatch in purse seine fleets operating in this region, in which bigeye threshers comprised 1 percent of shark species caught during a Shark Characteristics Sampling Program conducted from 1994–2004 (Roman-Verdesoto and Orozco-Zöller, 2005). Bycatch for this report was defined as sharks that were discarded dead after being removed from the net and placed on the vessel. Since 2010, catches of thresher sharks in this fishery have fluctuated between 10 t and 14 t; however, in a preliminary productivity-susceptibility assessment, bigeye threshers were characterized as having a low susceptibility to this fishery (IAATC, 2009). Complete bycatch and discard data are not readily available from longline fleets in the Eastern Pacific. In our files, we found that bigeye thresher sharks are minor components of U.S. West Coast fisheries, taken incidentally and presumably not overexploited, at least locally. The bigeye thresher occurs regularly but in low numbers, comprising only approximately 9 percent of common thresher catch (PFMC, 2003). Overall, we found that apart from blue and silky sharks, there are no stock assessments available for shark species in the Eastern Pacific, and hence the impacts of bycatch on the population are unknown (IATTC, 2014). However, despite a lack of information regarding present levels of bycatch occurring in other fisheries throughout the Eastern Pacific, as described earlier, thresher sharks were estimated to have experienced an 83 percent decline in this part of the species' range as a result of fishing mortality in longline fisheries. Given the high rates of bycatch-related mortality observed in this species throughout other parts of its range (*e.g.,* Northwest and Southwest Atlantic, Indian Ocean, and Central Pacific), it is likely the species experiences similar rates of bycatch-related mortality in this part of its range as well. Thus, it is likely that the historical and continued levels of exploitation in this part of the species' range are impacting the species, such that listing may be warranted.

We found evidence that bigeye threshers are known to interact with longline fisheries throughout the Indo-Pacific. In the Western and Central Pacific, where sharks represent 25 percent of the longline fishery catch, observer data showed that bigeye thresher shark is the 7th most commonly bycaught species of shark out of a total 49 species reported by observers (Molony, 2007). We found that bigeye threshers are commonly taken as bycatch in longline fisheries in the Republic of the Marshall Islands, in which they exhibit at-vessel and/or post-release mortality of 50 percent, and nearly 99 percent are finned and subsequently discarded (Bromhead, 2012). Further, in a species status snapshot for thresher sharks in the Western and Central Pacific, Clarke *et al.,* (2011) identified significant decreasing size trends for thresher sharks in tropical areas, which may be indicative of population declines in these areas. It is thought that these findings most likely reflect trends of bigeye threshers as they are the most common thresher species encountered in this region, with catches of common and pelagic threshers characterized as rare or uncommon. Bigeye threshers are also commonly caught by Hawaii longline fisheries, particularly on deep-set gear (Walsh *et al.,* 2009), and represented 4.1 percent of shark catches from 1995–2006. While catches of thresher sharks (*Alopias* spp.) have trended upward, actual landings of thresher sharks in Hawaii have decreased from 50 mt in 2001 to 16 mt in 2010, presumably due to the implementation of state and Federal laws regarding shark finning (NMFS, 2011).

In the Indian Ocean, while fisheries are directed at other species, bigeye threshers are commonly caught as bycatch and catch rates are considered high (IOTC, 2011; Hererra and Pierre, 2011). For example, bycatch of bigeye threshers has been recorded in Japanese and Taiwanese longline fisheries. According to Japanese observer data, 162 bigeye threshers were bycaught in 6 months (from July 2010 to January 2011). These data do not include live-released bigeye thresher sharks (Ardill *et al.,* 2011), which reportedly have high post-release mortality rates (IOTC, 2014). Observer data from Taiwanese longline fleets (with coverage ranging from only 2.2 percent in 2004 to 20.8 percent in 2007) recorded a total of 445 bigeye threshers bycaught from 2004–2008, with approximately 61 percent discarded (Huang and Liu, 2010). Hooking mortality is apparently very high in this region; therefore, the IOTC's regulation 10/12 that prohibits the onboard retention of any part of any thresher species and promotes live release of thresher sharks may be ineffective for the conservation of bigeye thresher sharks. For example, in the Portuguese longline fleet, bigeye threshers experienced a high rate of at-vessel mortality of 68.4 percent (n = 19) from May to September 2011 (Ardill *et al.,* 2011). The IOTC reported in 2014 that ''maintaining or increasing effort in this region will probably result in further declines in biomass, productivity and CPUE'' for bigeye threshers (IOTC, 2014).

Overall, there is considerable uncertainty regarding the actual levels of bycatch of bigeye thresher shark occurring throughout its range; however, it is likely that these rates are significantly under-reported due to a lack of comprehensive observer coverage in areas of its range in which the highest fishing pressure occurs, as well as a tendency for fishers to not record discards in fishery logbooks. Nevertheless, given the prevalence of bigeye threshers as incidental catch throughout its range and the species' observed high hooking and post-release mortality rates, combined with the species' low productivity, bycatch-related fishing mortality may be a threat placing the species at an increased risk of extinction.

The petition identified recreational fishing as the fourth category of overutilization. In our files, we found evidence that thresher sharks, particularly common threshers, are valued by recreational sport fishermen throughout the species' U.S. East Coast and West Coast range; however, bigeye threshers do not appear to be as important in recreational fisheries and are largely prohibited in many fisheries within the United States. The petition described results from Heberer (2010), which identified the potential negative impact of recreational fishing on the survival of congener, *A. vulpinus,* by assessing post-release survivorship of sharks captured using the caudal fin-based techniques used by most

recreational fishermen in southern California. As previously described, thresher sharks use their elongate upper caudal lobe to immobilize prey before it is consumed, and the majority of common thresher sharks captured in the southern California recreational fishery are hooked in the caudal fin and hauled-in backwards. This is significant because common threshers are obligate ram ventilators that require forward motion to ventilate the gills (Heberer, 2010), and the reduced ability to extract oxygen from the water during capture, as well as the stress induced from these capture methods, may influence recovery following release. The findings of Heberer (2010) demonstrate that large tail-hooked common thresher sharks with prolonged fight times (≥85 min) exhibit a heightened stress response, which may contribute to an increased mortality rate. This work suggests, especially for larger thresher sharks, that recreational catch-and-release may not be an effective conservation-based strategy for the species. A recent paper by Sepulveda (2014) found similar evidence for high post-release mortality of recreationally caught common thresher sharks in the California recreational shark fishery. Their results demonstrated that caudal fin-based angling techniques, which often result in trailing gear left embedded in the shark, can negatively affect post-release survivorship. This work suggests that mouth-based angling techniques can, when performed properly, result in a higher survivorship of released sharks. The petition argues that because common thresher sharks may exhibit high mortality in recreational fisheries that bigeye threshers would likely exhibit similar results. While this may be true, in our files, we found no evidence to suggest that bigeye threshers are declining (or responding in a negative fashion) as a result of utilization by recreational fisheries. While it is not known if this species enters the California recreational fishery on any regular basis, presumably only few are taken. Further, there are no records from the recreational fishery off Oregon or Washington (NMFS, 2007), and in fact, fishing of all thresher species is prohibited in Washington. Likewise, in the Northwest Atlantic, bigeye threshers have been prohibited in recreational fisheries by Federal regulations since 1999. Further, U.S. states from Maine to Florida have adopted the Interstate Fisheries Management Plan (FMP) for Atlantic Coastal Sharks adopted by the Atlantic States Marine Fisheries Commission (ASMFC), which prohibits recreational fishing of bigeye threshers. Finally, since prohibition of this species was implemented in 1999, there has been no observed recreational harvest of this species, with the exception of years 2002 and 2006 (NMFS, 2014). The petition did not provide, nor could we find in our files, any information regarding the threat of recreational fishing to bigeye threshers throughout the rest of the species' range. Thus, we find that the information presented in the petition, and in our files, does not comprise substantial information that would lead us to conclude the species may have an increased risk of extinction from overutilization as a result of recreational fishing activities.

Overall, trends in the North West and Central Atlantic Ocean suggest that the species experienced historical declines from overexploitation, but may be stabilized and possibly increasing in recent years, although there is considerable uncertainty regarding these trends. Elsewhere across the species' range, information in the petition and in our files suggests that the species may continue to experience declines as a result of overutilization from both direct and indirect fishing pressure. In summary, the petition, references cited, and information in our files comprise substantial information indicating that listing may be warranted because of overutilization for commercial purposes.

Inadequacy of Existing Regulatory Mechanisms

The petition points to ''virtually non-existent international regulatory protections'' to assert that bigeye threshers qualify for listing due to the inadequacy of existing regulatory mechanisms. For example, the petition mentions the lack of protections from the Convention on International Trade of Endangered Species (CITES) for the bigeye thresher shark, but then states that even if the species was listed under CITES, it would still be inadequate due to the fact that a CITES listing would only address threats associated with the international trade of the species, and would not address such impacts as bycatch. Although a CITES Appendix II listing or international reporting requirements would provide better data on the global catch and trade of the bigeye thresher shark, the lack of a CITES listing or requirements does not suggest that current regulatory mechanisms are inadequate to protect the bigeye thresher shark population from becoming threatened or endangered under the ESA. The petition also asserts that the recent listing of bigeye thresher shark under Appendix II of the Convention of Migratory Species (CMS) is also inadequate given that the United States and other range states are not Member Parties to CMS and are therefore not bound by the requirements imposed by the Appendix II listing. The petition further states that the Convention text is only suggestive and not self-executing upon the listing of a species. On the contrary, we find that a CMS Appendix II listing now encourages international cooperation towards conservation of the species, and although the United States is not currently a party to CMS, the United States is a signatory to a number of CMS instruments for the conservation of various marine species, including sharks.

The petition also asserts that finning regulations and species-specific retention bans are ''inadequate'' for protecting the bigeye thresher shark species because they may still be caught, either directly or indirectly. The petition also cites several regional fisheries management organizations (RFMOs) that implement a 5 percent fin-to-carcass ratio regulation, describes what the petitioner contends are potential loopholes in those regulations, and states that these general regulations are inadequate for the bigeye thresher shark, whose larger fins make it a more targeted species. The petition further contends that species-specific retention bans for bigeye threshers, such as the ones implemented by ICCAT and IOTC that specifically prohibit the retention, transshipping, landing, storing, selling, or offering for sale any part or whole carcass of bigeye thresher sharks, are also inadequate largely because they do not address incidental catch and subsequent high mortality rates of the species. Based on the information presented in the petition and in our files, we find that the bigeye thresher shark is highly valued for its fins, and can be identified in the shark fin market at the species level. While regulations banning the finning of sharks are a common form of shark management and have been adopted by far more countries and regional fishery management organizations than the petition lists (see HSI, 2012), we agree with the petition that due to high rates of hooking mortality observed in this species as a result of incidental catch, prohibitions on the retention of bigeye thresher or restrictions on the finning of sharks may not be adequate to protect the bigeye thresher from fishing mortality rates that may contribute to its extinction risk, especially given the species' significantly low productivity and intrinsic rate of population increase.

In addition to the inadequacy of international regulations, the petition states that ''while the U.S. has attempted to protect the bigeye thresher shark in U.S. waters, piecemeal protections that fail to cover the species throughout its migratory range have proven to be unsuccessful.'' Though U.S. regulations by their jurisdictional nature only cover U.S. fishers, we do not agree that this makes them inadequate. We find that U.S. national fishing regulations include numerous regulatory mechanisms for both sharks in general, and bigeye threshers specifically, that may help protect the species. For example, in the U.S. Atlantic, the bigeye thresher has been a prohibited species in both commercial and recreational fisheries since 2000 and 1999, respectively, under the 1999 Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks. In addition, current management measures for the Atlantic shark fisheries include the following: commercial quotas, commercial retention limits, limited entry, time-area closures, and recreational bag limits. Sharks are required to be landed with fins naturally attached to the carcass. Additionally, several U.S. states have prohibited the sale or trade of shark fins/products as well, including Hawaii, Oregon, Washington, California, Illinois, Maryland, Delaware, New York, and Massachusetts, subsequently decreasing the United States' contribution to the fin trade. For example, after the state of Hawaii prohibited finning in its waters in 2000 and required shark fins to be landed with their corresponding carcasses in the state, shark fin imports from the United States into Hong Kong declined significantly (54 percent decrease, from 374 to 171 tonnes), as Hawaii could no longer be used as a fin trading center for the international fisheries operating and finning in the Central Pacific (Miller, 2014). Except for smooth dogfish (*Mustelus canis*), the U.S. Shark Conservation Act of 2010 protects all shark species, making it illegal to remove any of the fins of a shark (including the tail) at sea; to have custody, control, or possession of any such fin aboard a fishing vessel unless it is naturally attached to the corresponding carcass; to transfer any such fin from one vessel to another vessel at sea, or to receive any such fin in such transfer, without the fin naturally attached to the corresponding carcass; or to land any such fin that is not naturally attached to the corresponding carcass, or to land any shark carcass without such fins naturally attached. However, we do agree with the petition that these regulations do not address the issue of bycatch-related mortality of the species, especially considering the fact that bigeye threshers are still bycaught in U.S. fisheries.

Overall, while measures may be implemented to reduce bycatch, we found no evidence that these measures have been incorporated into common practice throughout the species' range, particularly in areas where fishing pressure is most concentrated. Further, while numerous finning and species-specific retention bans have been implemented, these regulations fail to address the species' high rate of bycatch-related mortality. In summary, the petition, references cited, and information in our files comprise substantial information indicating that the species may be impacted by the inadequacy of regulatory mechanisms in parts of its range, such that listing may be warranted.

Other Natural or Manmade Factors Affecting Its Existence

The petition states that the biological constraints of the bigeye thresher shark, such as its low reproduction rate (typically 2–4 pups a year), coupled with a late age of maturity (approximately 12–14 years for females, and slightly earlier for males, between 9–10 years) contribute to the species' vulnerability to harvesting and its inability to recover rapidly. We agree with the petition that the bigeye thresher shark exhibits relatively slow growth rates and low fecundity. An ecological risk assessment conducted to inform the International Commission for the Conservation of Atlantic Tunas (ICCAT) categorized the relative risk of overexploitation of the 11 major species of pelagic sharks, including the bigeye thresher shark (Cortés *et al.,* 2010, 2012). The study derived an overall vulnerability ranking for each of the 11 species, which was defined as ''a measure of the extent to which the impact of a fishery [Atlantic longline] on a species will exceed its biological ability to renew itself'' (Cortés *et al.,* 2010, 2012). This robust assessment found that bigeye thresher sharks have a combination of low productivity and high susceptibility to pelagic longline gear, which places the bigeye thresher at high risk of overexploitation to the combined pelagic longline fisheries in the Atlantic Ocean (Cortés *et al.,* 2010, 2012). In fact, of the 11 species examined in this study, Atlantic bigeye thresher sharks were identified as one of the most vulnerable and least productive shark species. Even within the genus *Alopias,* the bigeye thresher shark has the slowest population growth rate of all thresher sharks, with an exceptionally low potential annual rate of population increase (0.002–0.009 or 1.6 percent) under sustainable exploitation (Cortés, 2008; Dulvy *et al.,* 2008; Smith *et al.,* 2008). This makes them particularly vulnerable to any level of fisheries exploitation, whether targeted or caught as bycatch in fisheries for other species. Given that bigeye thresher sharks are caught regularly as incidental bycatch throughout its range and experience high mortality rates as a result, and that the species may be targeted in some areas for its fins, the species' growth and reproductive factors may inhibit the species' ability to recover from even moderate levels of exploitation, thus placing the bigeye thresher shark at an increased risk of extinction as a result. In summary, the petition, references cited, and information in our files comprise substantial information indicating that the species is impacted by ''other natural or manmade factors,'' including the life history trait of slow productivity, such that listing the species may be warranted.

Summary of Section 4(a)(1) Factors

We conclude that the petition does not present substantial scientific or commercial information indicating that the ESA section (4)(a)(1) threats of ''present or threatened destruction, modification, or curtailment of its habitat or range'' or ''disease or predation'' may be causing or contributing to an increased risk of extinction for the global population of the bigeye thresher shark. However, we do conclude that the petition and information in our files present substantial scientific or commercial information indicating that the section 4(a)(1) factor ''overutilization for commercial, recreational, scientific, or educational purposes,'' as well as ''inadequacy of existing regulatory mechanisms'' and ''other manmade or natural factors,'' may be causing or contributing to an increased risk of extinction for the species.

Petition Finding

Based on the above information and the criteria specified in 50 CFR 424.14(b)(2), we find that the petition and information readily available in our files present substantial scientific and commercial information indicating that the petitioned action of listing the bigeye thresher shark worldwide as threatened or endangered may be warranted. Therefore, in accordance with section 4(b)(3)(A) of the ESA and NMFS' implementing regulations (50

CFR 424.14(b)(3)), we will commence a status review of the species. During the status review, we will determine whether the species is in danger of extinction (endangered) or likely to become so within the foreseeable future (threatened) throughout all or a significant portion of its range. We now initiate this review, and thus, we consider the bigeye thresher shark to be a candidate species (69 FR 19975; April 15, 2004). Within 12 months of the receipt of the petition (April 27, 2016), we will make a finding as to whether listing the species as endangered or threatened is warranted as required by section 4(b)(3)(B) of the ESA. If listing the species is found to be warranted, we will publish a proposed rule and solicit public comments before developing and publishing a final rule.

Information Solicited

To ensure that the status review is based on the best available scientific and commercial data, we are soliciting information relevant to whether the bigeye thresher shark is endangered or threatened. Specifically, we are soliciting information in the following areas: (1) Historical and current distribution and abundance of this species throughout its range; (2) historical and current population trends; (3) life history in marine environments, including identified nursery grounds; (4) historical and current data on bigeye thresher shark bycatch and retention in industrial, commercial, artisanal, and recreational fisheries worldwide; (5) historical and current data on bigeye thresher shark discards in global fisheries; (6) data on the trade of bigeye thresher shark products, including fins, jaws, meat, and teeth; (7) any current or planned activities that may adversely impact the species; (8) ongoing or planned efforts to protect and restore the species and its habitats; (9) population structure information, such as genetics data; and (10) management, regulatory, and enforcement information. We request that all information be accompanied by: (1) Supporting documentation such as maps, bibliographic references, or reprints of pertinent publications; and (2) the submitter's name, address, and any association, institution, or business that the person represents.

References Cited

A complete list of references is available upon request to the Office of Protected Resources (see **ADDRESSES**).

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: August 5, 2015.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

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